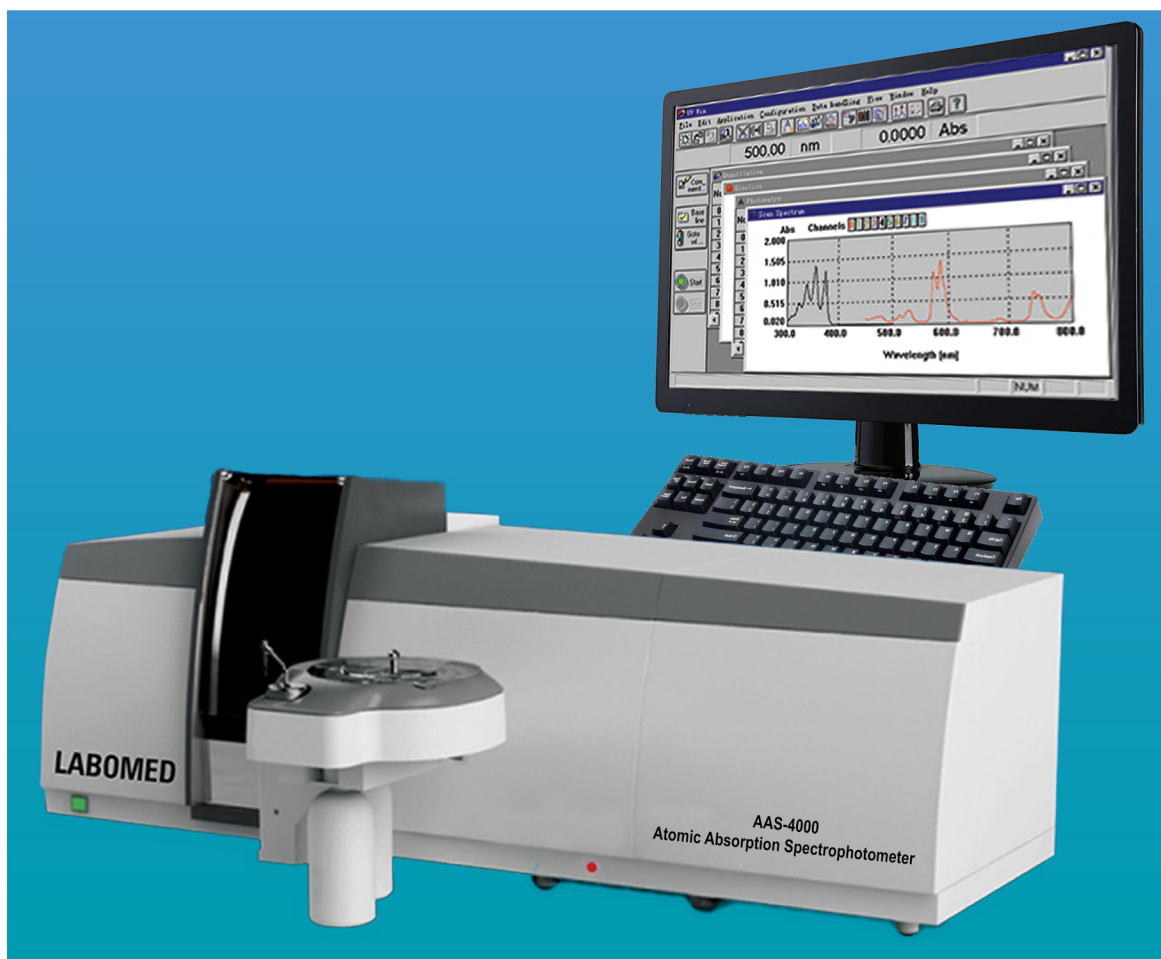




## Fully Automated Atomic Absorption Spectrophotometer Graphite Furnace System

### Model AAS-4000



**Atomic Absorption Spectrophotometer AAS-4000** is a high performance automated instrument designed to meet the requirements of the modern laboratory. Due to its versatility and performance it can be used for a wide range of applications including: Agricultural, Clinical, Environmental, Food, Metal, Mining, Geological, Petrochemical, and Pharmaceutical.

The instrument is equipped with a Graphite Furnace Atomizer only. The graphite head is fixed into the optical path to maximize performance and eliminate drift. The temperature of the transversely heated graphite tube is accurately controlled by means of a precision feedback system. Pyrolytically coated platform tubes are supplied as standard to improve the performance and eliminate many analytical problems associated with this technique.

The Fully Automatic Fast Sequential Multi-Element Analysis Graphite Furnace Atomic Absorption Spectrometer system is equipped with an EIGHT Hollow cathode lamp motorized turret Atomic Absorption Spectrophotometer. The graphite furnace heating cycle, all electronic functions, analytical data and gases are fully controlled via the AAWin3 Software for maximum safety and optimum performance.

Labomed, Inc. is certified by ISO-9001-2013, has CE Conformity and is FDA Licensed.



# Fully Automated Atomic Absorption Spectrophotometer Graphite Furnace System

## Model AAS-4000

### Features

#### FEATURES AND FUNCTIONS:

TPC System is used to control the instrument. Pre-installed AA-Win Pro software, user manuals, cook book and Windows 7 professional operating system.

AA-Win Pro software provides full control of the instrument and autosampler with easy method change for each technique.

Automatic 8 Hollow Cathode lamp turret controlled and optimized by the AA-Win Pro software. Operating lamp current and warm-up lamp current can be individually controlled to eliminate drift commonly associated with lamp warming.

D2 lamp background correction system fitted as standard to all configurations. High energy D2 lamp and adjustable beam splitter mirror are optimized by the AA-Win pro software.

Self background correction system fitted as standard to all configurations. The high performance background system uses the same hollow cathode lamp as installed for the analysis. Minimum extra components are required and optical alignment is very simple. Self Reversal can be used for any element at any wavelength, making it extremely versatile.

High precision minimal optics ensures maximum light throughput to the computer controlled Czerny-Turner monochromator.

A universal autosampler is available as an optional accessory which is conveniently mounted on the front of the AAS-4000 instrument.

#### Air/Acetylene

The Air/Acetylene flame uses a 100mm single slot burner for the standard configuration.

The high sensitivity (Cu 2ppm >0.280abs) is due to the efficiency of the fixed position glass nebulizer fitted as standard. An acid resistant replacement is available as an option.

The flame can be easily set from blue lean flame through stoichiometric to fuel rich by means of computer control.

#### N2O/Acetylene

The N2O/Acetylene flame uses a 50mm single slot burner and is available as an optional extra.

This flame configuration is used to measure elements less prone to ionization such as: Aluminium, Tin, Titanium, Calcium, Vanadium and Molybdenum.

Switching from Air/Acetylene to N2O/Acetylene to Flame Off is fully controlled by the AAWinPro software.

#### Air/Propane (LPG)

This flame uses a 3 slot burner and with the low pressure requirement, it is also much safer to operate.

Due to the low temperature of the flame, it is ideal for analyzing alkali metals such as: Potassium, Sodium and Lithium, especially when used in the emission mode.

Some remote areas of the world have difficulty obtaining Acetylene gas of a high enough purity to operate the flame correctly, LPG can give a real alternative and offer comparable results for most elements throughout the wavelength range.

#### SAFETY FEATURES

Argon Gas Pressure Sensor

Water Flow Sensor

Over Temperature Sensor

Broken Graphite Tube Protection

#### GRAPHITE ATOMIZER FEATURES

The integrated Graphite Furnace Atomizer is available in two instrument configurations:

In the AAS-4000 instrument, the graphite furnace head is fixed into the light path, so alignment with the optical path is simple and accurate.

In the AAS-4100 instrument the graphite furnace head is fixed behind the flame atomizer assembly and is motorized into position by a simple operation in the AA-WinPro software. The positions for the flame and graphite are saved, making it easy to swap between modes for different analysis.

#### FEATURES AND FUNCTIONS

The temperature of the transversely heated graphite tube is accurately controlled by means of a precision feedback system and has been designed to reduce analytical problems normally associated with this type of technique.

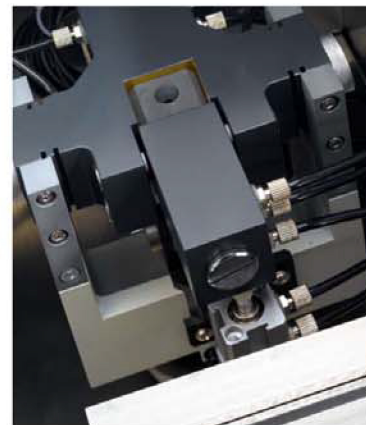
Pyrolytically coated graphite tubes are used as standard and are manufactured to improve performance, as well as to increase the analytical life.

Platform graphite tubes are supplied as standard and will accept volumes up to 20ul. Non-platform graphite tubes are also available as an optional extra.

Up to 10 heat stages are available for the programming of the graphite atomizer. These can be set and stored within the AA-WinPro software.

The graphite tube is held in position by means of a gas piston. Replacement of the graphite tube is performed by a simple command in the AA-Win Software.

The graphite tube is efficiently cooled by an additional water circulation system (supplied separately).



Graphite Furnace



# Fully Automated Atomic Absorption Spectrophotometer Graphite Furnace System

## Model AAS-4000

### Spectrometer System

Wavelength range	185nm -910nm
Light Source	Hollow cathode lamp (HCL), Deuterium Arc lamp (D2)
Modulation	Square Wave Pulse
Modulation frequency	100Hz Self reversal (SR) background, 400Hz Deuterium Arc (D2) background

### Monochromator

Grating	1800 grooves/mm diffraction grating
Blazed Wavelength	250nm
Focus	300nm
Bandwidth	0.1nm, 0.2nm, 0.4nm, 1.0nm, 2.0nm (Software selectable)
Scan mode	Automatic
Photometric Type	Single Beam
Wavelength Accuracy	± 0.15nm
Wavelength Resolution	0.2nm ± 0.02nm
Wavelength Reproducibility	< 0.05nm
Baseline Stability	0.005Abs/30min
Background Correction	Deuterium Arc (D2) 1.0Abs, Self Reversal (SR) 3.0Abs

### Graphite Furnace Analysis

Graphite Head	Transversally Heated
Temperature Range	Ambient - 3000 °C
Heating Program	Up to 10 steps. Drying, Ashing, Atomization, Cleaning
Feedback	Voltage and Optical temperature control feedback
Sensitivity (Cu)	50ng/ml Absorption > 0.40Abs
Detection Limit	Cd < 0.004ng/ml
Repeatability	Cu < 2.0%, Cd < 2.0%
Graphite Tubes	Pyrolytically Coated with Platform
Sample Size	Up to 20ul
Graphite Cooling	Water Circulator Available
Safety Features	Argon Pressure Sensor, Water Flow Sensor, Over Temperature Sensor, Broken Tube Protection



# Fully Automated Atomic Absorption Spectrophotometer Graphite Furnace System

## Model AAS-4000

### Data Processing

PC System	PC, Windows 7 Professional Operating System
Operating Program	AA Win Pro software
Analytical Methods	Flame AA, Flame AE, Graphite Furnace, Hydride Generation
Readout Mode	Continuous, Manual, Peak Height, Peak Area
Calibrations	Multi-Standard Calibration, Standard Addition, Interpolation
Data Storage	Analytical results, instrument and measurement parameters, signal profile, calibration curve

### Power Requirements

Main Unit	220VAC 50/60Hz
Graphite Power Supply	220VAC 50/60Hz Instantaneous power 5KW Current rating 7KW

### Dimensions

Main unit	110cm x 54cm x 54cm 75Kg
Graphite Power Supply	50cm x 54cm x 54cm 70Kg

## Accessories

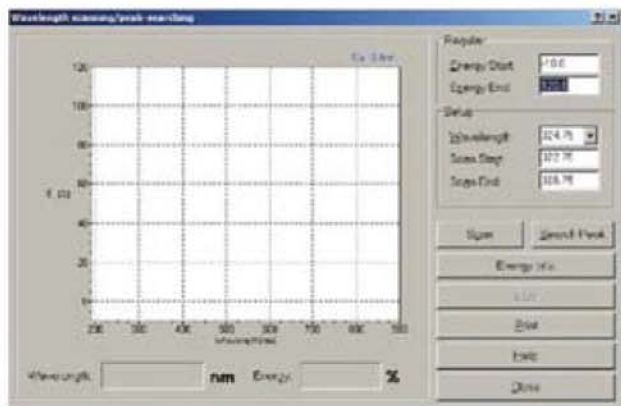
1	AAS-4000 Operation Manual
1	Cook book
1	Safety Manual
1	System Validation document
8	Hollow cathode Lamp Holders
2	Power Cables
1	Tool Kit
1	Various Gas Fittings
10	Graphite Tubes
1	Gas Tubing Argon
1	Connection Cable (Graphite)
1	Pipette
1bag	Pipette Tips



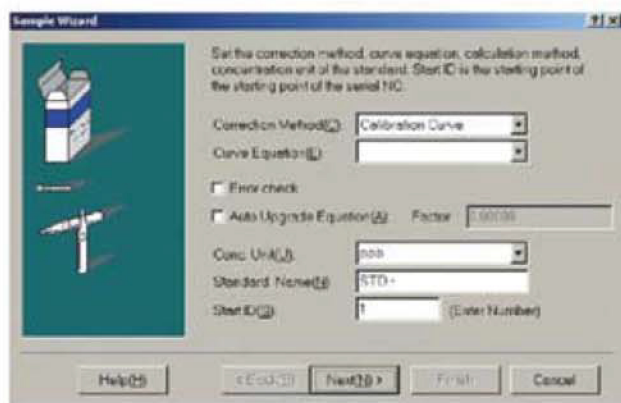


# Fully Automated Atomic Absorption Spectrophotometer Graphite Furnace System

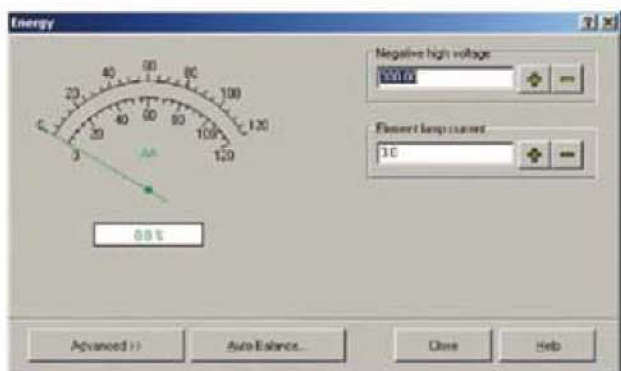
## Model AAS-4000



Ensure optimal peak position at the chosen analytical line by scanning the emissions spectra.



Each stage of analysis setup is made quick and simple by means of the Sample Wizard.



Obtain reliable and accurate results by using the Energy control feature to manually optimise atomiser position and setup,

Use the Auto-balance feature to ensure energy level, and optical alignments are optimised when using background correction.

No.	Method	Sample	No.	Conc. (ppb)	Area/Conc. Ratio	Std. Dev.	Std. Error	Conc.	Flow
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
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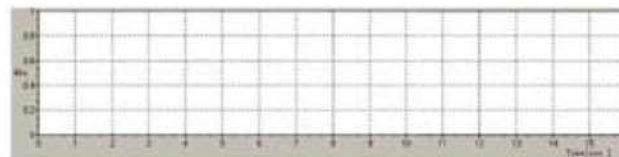
Use the sample table to perform quick measurements of both Standards and Samples.

Easily append the sample table to add new samples or even revise calibration curves either by manual introduction or using an Autosampler.



View up-to-date calibration curves in 1st, 2nd, or 3rd order using a standard calibration or standard addition.

Perform retrospective curve fits to ensure optimum correlation.



View real-time signal acquisition for flame, graphite furnace and hydride generation analysis.



## Fully Automated Atomic Absorption Spectrophotometer Graphite Furnace System

### Model AAS-4000

The AAS-4000 Autosampler is an accessory specifically designed for the AAS-4000 Atomic Absorption Spectrophotometer. The AAS-4000 can be used to automatically introduce standard and unknown samples to the atomizer for analysis. It can be used with both flame and graphite furnace instruments.



#### Graphite Analysis

- 76 sample positions (10 for standard samples, 6 for modifier solutions, 60 for unknown samples)
- Sample vial size 1.5ml
- Modifier vial size 12ml
- Pressure protection for wash
- Up to 3 modifier additions
- Position adjustments by AA-Win Pro software
- Reproducibility Cu <2.0%, Cd <2.0%

#### Nitrous Oxide/Acetylene Burner(500-023)



- Titanium alloy construction
- 50mm single slot
- Coded for safety
- Direct replacement for standard burner
- Designed for higher temperature flame
- Adjustment of burner rotation for sensitivity optimization

#### Acid resistant Nebuliser(500-010)



- Resistant to most acid samples
- Higher uptake rate for improved high solids samples
- Higher air pressure required
- Robust construction
- Fixed flow for easy installation

#### Air/Propane(LPG)Burner(500-030)



- Titanium Alloy construction
- 3 slot burner
- Coded for safety
- Direct replacement for standard burner
- Designed for lower temperature flame
- Adjustment of burner rotation for sensitivity optimization

#### Graphite Tube Without Platform(500-006)



- Pyrolytically coated graphite tube
- No platform fitted giving a faster response for refractory elements
- High quality long life tubes
- Can be used for larger samples <20ul



# Fully Automated Atomic Absorption Spectrophotometer Graphite Furnace System

## Model AAS-4000

### Hydride Unit(500-007)

- Universal design
- Full reaction cycle from press of start button
- Supplied with temperature controlled heated absorption cell
- Cell is easily installed with burner attachment
- Can be used for Mercury cold vapour analysis
- Sensitivity for most elements <math>< 1\text{ng}/\text{ml}</math>
- Only 2.0ml - 2.5ml per sample required
- RSD <math>< 3\%</math>
- Quick analysis <math>< 30</math> seconds per measurement

### Acetylene Flame Arrestor(GS-004)



- Direct fitting to gas regulator output
- Required for acetylene gas
- Non-resetting easy to replace

### Gas Regulators (GS-001,GS-002,GS-006,GS-007)



- Direct fitting to gas cylinder
- Comply to British Standards
- Supplied with hose fitting and crimp
- Various gas cylinder fittings available
- Regulators for Air, Acetylene, Nitrogen, Argon, Nitrous Oxide, LPG
- Specify fitment to European standard

### Hollow Cathode Lamp



- Sharp line source
- About 5000 milliampere-hours

### Water Circulator(GS-005)



- Cooling capacity 2000W
- Temperature range 0-50°C
- Temperature accuracy 1°C
- Maximum input power 1000W
- Fuse 10A
- Power 220V 50Hz
- Work Pressure 0~0.6MPa
- Rated flow rate 3.5L/min
- Rated lift 10M
- Tank capacity 32L
- Noisiness <math>< 65</math>
- Dimension(L×W×H) 600×400×900
- Weight 50Kg

### Air Compressor(GS-003)



- Rated discharge pressure: 0.3Mpa
- Output rate: 0.3-0.9m<sup>3</sup>/h (adjustable)
- Noise: smaller than 55dB
- Power supply: AC220V 50HZ
- Dimension: 400×300×620(mm)
- Ambient condition: ambient temperature less than 35°C Relative humidity less than 80%