



# AAS PLUS

ATOMIC ABSORPTION SPECTROPHOTOMETER

## TRUE DOUBLE BEAM WITH BACKGROUND CORRECTION ULTRA FAST AAS

MS AAS Plus is fully integrated automated and PC controlled atomic absorption spectrophotometer with dual atomizer flame & GTA and Hydride.

- Double beam optics /Single beam operation.
- Automatic calibration detection with correction

## AAS Plus Atomic Absorption Spectrophotometer

**system.** The system comprises of automatic 8 lamp (dual active) HCL turret and automatic variable spectral bandpass.

The system uses state-of-art, ultra-fast lamp modulation up to 1024 Hertz coupled with wide range segmented solid state CMOS CCD detector, true double beam optics and Deuterium lamp background correction results into extreme stable and reproducible results.

### General Specification

#### Features

- Real Time true double beam spectrophotometer with working wavelength range from 185.0 to 930.0nm with reading up to 3.0 ABS. Inert gas Purge required between 185-190.0 nm .
- Ultra-fast modulation up to 1024 Hz
- Sensitivity > 0.95 ABS for 5.0 mg/L copper solution with RSD <0.5%
- Automatic EHT optimization & selection

#### Monochromator

- Littro design with precision motorized drive for wavelength selection

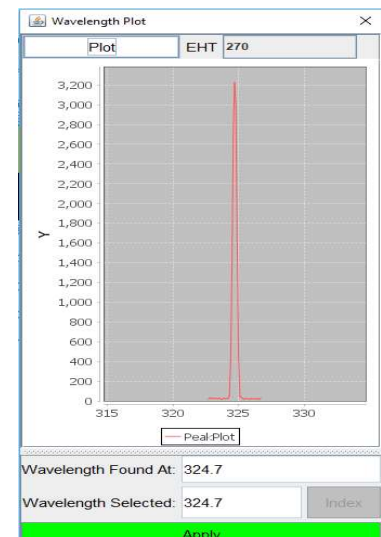
- Original 30.0x30.0x6mm Holographic Diffraction dual blazed grating with ruling density of 1800 lines/mm covers wave length 185 – 900nm.
- Reciprocal Linear Dispersion of 1.6/0.8 nm/mm, accuracy 0.5 nm or( better 0.01nm.)
- Wave length repeatability 0.2 nm or better (0.005 nm), Resolution 0.005 nm
- Front-surfaced, reflective optics with protective coating to ensures years of service with minimal loss of transmittance
- Littro design Wide focal length -260.0 mm
- Continuously variable spectral bandwidth from 0.1nm to 2.0nm ( 6 step programmed)
- automated slit selection 0.1-2.5 from 0.2, 0.3, 0.5,0.7, 0.8,1.2 ,2.0,2.5 nm or wider.
- Baseline stability  $\pm 0.002$  Abs /30min,
- Detector Sold state CCD CMOS

#### Atomizer

- PTFE inert atomizer for both flame and VFA; accommodating titanium 100mm Air-Acetylene burner &

## WINDOWS BASED ANALYSIS SOFTWARE

50mm Nitrous Oxide – Acetylene burner



### Auto search&Peak detection view

Powerful Windows© based software(CFR compliant) displays HCL spectral peak as easy to use graphical interface and allows user to change/select different peak by just a click of mouse!

#### Physical Dimensions:

865.0mm (L) x 525.0mm (W) x 410.0mm (H)  
65KG (instrument only)\*

#### Power Requirements:

AC 230  $\pm$  10% with proper ground earth.

#### Environmental Requirements:

Temperature Range: 15c – 40c  
Humidity: 0% - 80%

#### Output:

USB standard, Optional WIFI, Bluetooth, Ethernet when used standalone touch screen Windows based controller

HCL System

- Software controlled 8 lamp automatic HCL turret
- Inbuilt dedicated 8 channel HCL Lamp supply
- 3 dimensional optical path optimization system
- Dual active support to enable secondary lamp warmup
- Supports coded and un-coded HCL Lamps
- Inbuilt lamp library with preconfigured wavelength, spectral bandwidth and oxidant user selectable
- User selectable preferred wavelength and spectral bandwidth selection



Background Correction System

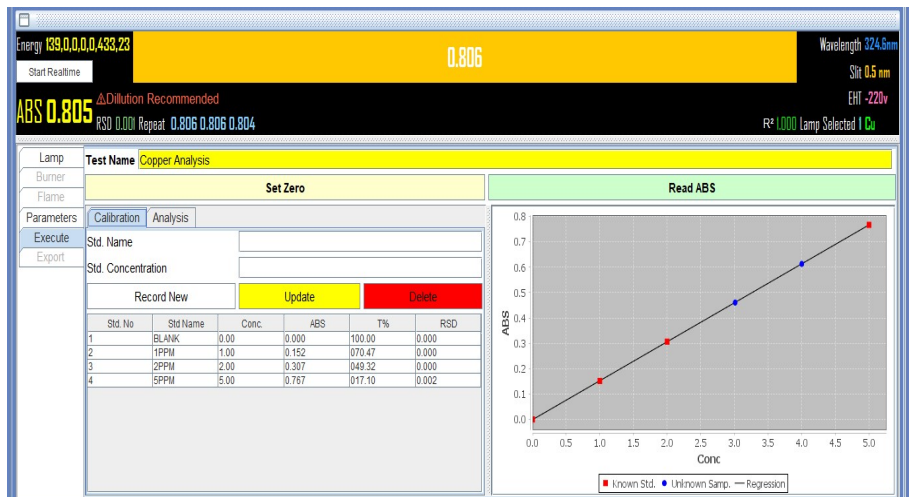
- Deuterium arc lamp with 1024 Hz modulation performs background correction from 185.0 to 425.0 nm upto 2.5 Abs.
- Inbuilt Deuterium arc lamp current optimization control unit

System – Automatic Gas Box Standard

- Fully software controlled with oxidant and fuel monitoring
- Inbuilt safety interlocks such as correct burner, oxidant and fuel pressure, liquid level in drain, flame detection, programmable (gas management system) for fuel & oxidant gas.
- Safe shutdown from all operating modes even in case of sudden power failure – Acetylene operation
- Safety systems provide indication for main power control, ensure correct operating fuel gas and oxidant pressure are maintained to check flow rate. control on use of incorrect burner head /Multiple sensors monitoring burner head,
- siphon system and gas management system (GMS) automatic ignition and shut down of flame, incl. in case of power outage or gas pressure drop nebulizer – Burner system with quick – lock for easy replacement & All safety interlocks built – in and additional features like burner head interlock, nebulizer/end cap interlock and drain interlock built in.. provision to upgrade.

Powerful Windows Based Analysis Software

- Automatic initialization and self-diagnostics on startup
- Large LCD type display shows all critical information simultaneously
- CFR21 part 11 complaint software with database support to capture all events and results generated by the software
- Provision to digitally sign pdf document using secured token
- Automatic Lamp, EHT and spectral bandwidth selection based on analysis
- Organization setup with users and roles based functionality, up to 15 standards.
- Built in modules to operate Lamp system, Burner position and Flame characteristics
- Powerful analysis setup with



- adjustment of replicates, integration time and programmable read delay
- Tab based format for easy navigation
- Calibration curve linear & square fit
- Control software, data acquisition data storage report generation
- Standard supply Air Acetylene burner, Rapture film, fuse, Fitting nuts.

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## Accessories:

### Hydride generator accessory:

Computer controlled Hydride, VGA accessory for trace level of hydride forming element i.e. As, Se, Hg, Sb, Sn etc. Electrical heating element capable of reaching a temperature of >950 deg. Controlled through AAS software, Dual peristaltic pump: variable flow 0.3 to 5 ml/min, Precision Gas flow controller: 0.1 ml to 15 l/min, Reagent mixture: PTFE corrosion resistant. Electric Controlled Heating from 200 to 1200 degree C.

**Auto sampler:** AAS auto sampler with dual tray each can take 67 vials.. Independent sample and standard locations. Connects to instrument directly, Easy removal and reloading of tray, via csv file, from other position option available

### Graphite Furnace:

Very fast & Precisely controlled atomization Superior signal to noise ratio. Minimal running cost. Gas consumption due to Special cavity design Auto sample dispenser with user friendly programmable method development. The temperature range of ambient to 3000° C is computer controlled with a maximum ramp rate of 2000°C/sec. It is an automated graphite furnace system used with MOTRAS AAS PLUS atomic absorption spectrophotometer. The Unit is stand-alone configuration consists of Atomic absorption spectrophotometer, Graphite tube power supply atomizer head, sample dispenser and software. Sample dispenser is an essential component of system, dispenses up to 80 µL in increment of 1 µL. It accommodates 32 sample and 10 standards

## Specifications

System	The system is PC based AAS operating in the 185 – 900 nm wavelength range and giving a sensitivity of > 0.980 abs for 5 micro- gram/ ml aqueous copper standard solution with air- acetylene flame. It has a visible display of the detector's energy gain in digital energy form convenient to the operator, simultaneous background correction (Deuterium) with attenuator, provision for automatic calibration using more up to 20 standards and recalibration with single standard, and operate on 220+/-10 Volts, 50 Hz AC Single power supply 600VA. AAS software driven.
Data Processing	PC Data processing / auto control system
Photometric System:	Double Beam & Single beam real time shared true double beam optics, long term stability to withstand thermal and mechanical variations, blazed at 250 nm Littro Monochromator of 260 mm focal length and 1800 lines/mm, RLD 1.6 nm/mm, accuracy of 0.5 nm, repeatability of 0.1 nm, spectral band pass appropriate for effective measurements of all environmentally relevant metals, and reduced height available for all the slit widths. Wavelength 185 to 900 nm. Argon purging required below 190nm connection are provided.
Chopper Technology	Real Time Chopper Positioning System –RTCPs®
Band width / Slit	0.0 to 2.0 nm (automatic) continuously selectable at increment of 0.1nm
Monochromator & Grating	Littro Monochromator with blazed at 250 nm holographic grating 1800 lines / mm sourced from Richardson U.S.A.Echell
Detector	Wide range segmented solid state CMOS- CCD detector (Optional PMT)
Lamp turret	8 lamps turret automatic controlled through software Optional 4/10 lamps automatic turret through

	software Optical axis adjustment Automatic for all lamp positions
Background correction	Background correction D2 arc lamp 190-425 nm modulation up to 1024 Hz. Zeeman BGA for GTA.
Sensitivity	>0.980 Absorbance for 5.0 mg/L Copper standard solution
Operation Modes	Absorption, Emission, Molecular Absorption, UV Scanning Spectrophotometer with background correction .
Burner head & control	High temperature burner head N <sub>2</sub> O 50 mm & 100 mm C <sub>2</sub> H <sub>2</sub> –Air Titanium Burner Head with three knob for fine adjustment.(Optional) Motorized Burner software controlled in X,Y,Z all three direction.
Integration Time	0.0 1 seconds to 150seconds
Accuracy	+ -0.004 ABS at 1.0 ABS Sensitivity :0.043 ppm copper with air acetylene flame
Dual Head Burner / Flame Atomizer/GTA	(Air-Acetylene and Nitrous Oxide-Acetylene system): PTEF spray chamber, Titanium burner with impact bead and flow spoiler, and remain unaffected from attacks by acid solutions and organic solvents (e.g. Methyl isobutyl Kenton, i.e., MIBK). The burner head adjustment in vertical and horizontal direction computer controlled and the position of the burner head also get stores with a defined and particular method. The nebulizer is able to provide manually adjustable uptake rates, and the material of the nebulizer is inert to acid solutions and organic solvents, such as MIBK.  Spray chamber capable of handling acids, alkalis
Nebulizer	Adjustable nebulizer with inert platinum/Rhodium/Iridium capillary , Capillary made of corrosion resistance inert material with Platinum[10%] and Iridium[10%] Sample feed range : 0.0 – 12.0 ml/min
Automatic Flame Control System & Interlocks	Independent display to program gas box and show real time digital flow rate, parameters and errors. Recall feature auto load previous program on start. Fully software controlled with oxidant and fuel monitoring. Inbuilt safety interlocks such as Correct burner, Oxidant and fuel pressure, Drain liquid level, Flame detection, Nebulizer sensor. Automatic ignition and extinguish.Safe shutdown from all operating modes in case of sudden power failure. Computer controlled oxidant selection with automatic gas sequencing and oxidant and fuel monitoring.Essential safety interlocks: mains voltage, burner type as well as its presence in position, air selector, flame sensor, liquid trap level, flash back, gas supply pressure, air supply and gas leak anywhere in the network of gas tubing's in the system. Provision for safe and automatic shutdown in case of power failure
Data station & processing	PC based-Automatic control system through AA Software
Software	Program capable of communicating with MS Window latest versions. Software for flame AA(air acetylene and nitrous oxide acetylene .Calibration curve and standard addition methods, Built-in Cook book, Interference warning, Necessary modules to set run and monitor all the accessories attached to the main unit . Built in diagnostics for performance verification, IQ, PO, OQ validation protocols.
Connectivity	Standard USB
Electrical Parameters	220 V +/- 10 V Basic unit 600VA
Dimension & Weight	868x525x520 mm (LXWXH) 70KG basic unit PC 5 KG and other accessories weight extra as per order
HCL	67 Elements single element & Multi-elements hollow cathode lamps AAS accepts coded and non-coded HCL
Vapor Hydride Generator VGA 1200ET	Software controlled Variable Flow controlled by stepper motor Dual pump Peristaltic pump, Electro thermal controlled heating , Fine inert gas controller flow meter, Hydride 110 mm quartz cell,110 mm Cold vapor Mercury closed cell. Ideal for ppb level analysis of vapor generation accessory offers an extremely sensitive procedure for analysis of metallic ion of As, Bi, Sb, Se, Te, Sn, Pb, ,Ge & HG controlled through AAS software. Dual peristaltic pump: variable flow 0.3 to 5 ml/min. Precision Gas flow controller: 0.1 ml to 15 ml/min. Reagent mixture: PTFE corrosion resistant. Controlled Heating: Electrical heating 200 to 1200 degree C.Require Argon/Nitrogen gas cylinder and regulator
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Auto sampler AS100	Ideal for low to medium sample application. Auto sampler provide fully automated feature of a proven Technology controlled through AAS software. Sample tray capacity 100 sample cups and 10 reagent cups. Material: Polypropylene Volume: 20ml for sample cup, 20ml for reagent cup.
Installation Accessory	As per site need- Oil free compressor with 20 L reservoir tank, auto on/off capable to deliver 25 l/min at 80 PSI pressure. 1 HP motor single phase 220 V operation, 15A line. Air Purifier- Moisture trap filter with regulator. Acetylene gas cylinder, Acetylene gas Regulator, Nitrous oxide gas cylinder, Nitrous gas heated Regulator, Exhaust Hood and Vent Assembly, UPS, NIST traceable CRM. Gas panel.

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