

Specifications

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MODEL 5100 PC SPECTROMETER

Dimensions	Spectrometer	120 cm wide 62 cm high 63 cm deep
Weight	Spectrometer	Approximately 175 kg (385 lb.).
Power Requirements	Spectrometer	115 or 230 volts \pm 10%, 50 or 60 Hz, 250 watts (300 watts with optional background corrector).
Photometer	Optics	double beam; time and space-shared; vapor-tight photometer cover with fused silica UV transmitting windows.
	Type	"AC" system (lamp emission modulated, flame emission continuous).
	Detector	Two-beam detection via single photomultiplier tube.
	Optional Background Corrector	double beam; deuterium arc and tungsten halide sources permit simultaneous atomic absorption and background or background-only measurements.

Monochromator	Design	Czerny-Turner.
	Focal Length	408 mm.
	Spectral Range	At least 180 to 899 nm first order coverage.
	Gratings	UV: holographically-ruled, 2880 lines/mm, 84 x 84 mm area blazed at 210 nm. Visible: holographically-ruled, 1440 lines/mm, 84 x 84 mm area blazed at 580 nm.
	Reciprocal Linear Dispersion	Approximately 0.65 nm/mm in UV, 1.3 nm/mm in visible.
	Slits	5 software-selectable slits.
	UV Bandwidths	Approximately 0.03, 0.07, 0.2, 0.7 and 2.0 nm.
	Visible Bandwidths	Approximately 0.06, 0.14, 0.4, 1.4 and 4.0 nm.
	Slit Heights	Two heights: one optimum for flame work; one optimum for HGA Graphite Furnace work.
Flame Gas Controls	Operation	Software-controlled oxidant selection; oxidant and fuel monitoring and control with automatic pressure, burner head, flame and burner drain sensing.
	Safety	Burner head and burner drain system safety interlocks. Interlocks provide automatic shutoff of gases if flame is not detected or if fuel or oxidant flows or flow ratios are outside acceptable limits.
	Gas Sequencing	Automatic ignition sequence for nitrous oxide-acetylene flame.

Burner System	Burner Chamber	Dual-option, premix design using a high-strength, Ryton ^R mixing chamber, internally coated with polypropylene to resist chemical attack. Angled to help drainage. Uses impact bead (for optimum sensitivity and detection limits for most elements determined using an air-acetylene flame) or a flow spoiler (for optimum performance for most elements determined using a nitrous oxide-acetylene flame and for solutions having a high dissolved solids content). Separate fuel and oxidant lines. Separate auxiliary oxidant inlet.
	Nebulizer	Adjustable, stainless steel nebulizer. Optional corrosion-resistant nebulizers.
	Burner Head	10 cm (4 inch), titanium, single-slot burner head for use with air-acetylene flame. Optional 5 cm (2 inch), titanium, single-slot burner head for use with a nitrous oxide-acetylene flame.
	Burner Mount	Provides horizontal, vertical and rotational adjustment.
Sample Area	Dimensions	25 cm wide 18 cm deep.
	Design	Opens to the front via two hinged, removable flame shields.
Optional Motorized Turret	Capacity	Six hollow cathode lamps or electrodeless discharge lamps.
	Lamp Coding	Hollow cathode lamps with digital coding are optional. Digital code read by computer for lamp selection.

MODEL 5100 ZEEMAN FURNACE MODULE (optional)

The Model 5100 Zeeman Furnace Module includes the Optical Interface, Zeeman expansion module with HGA-600 workhead and AC electromagnet, HGA-600 Programmer/Power Supply and all required cabling and connections to interface with the Model 5100 PC Spectrometer.

Zeeman System Including HGA-600 Programmer/ Power Supply	Power Requirements	220/240 V $\pm 10\%$ (internally switchable); 50/60 Hz, 2 outlets (220V).
	Power Consumption	Approximately 3.6 kW for a tube temperature of 2700°C at 220 V, 20 amp circuit breaker. Approximately 3.5 kW additionally for magnet. Separate 20 amp circuit breakers.
	Temperature Range	Continuously programmable from ambient to 3000°C.
	Time Range	Continuously programmable from 9-999 s for ramp plus hold time in a single step.
	Required Inert Gas	Argon or nitrogen. Inlet pressure min 300 kPa (3 bar). Max. gas consumption 1.5L/min (instrument's flow rates are calibrated with argon).
	Coolant	Tap water, filtered industrial water on recirculating system. Water consumption, max 2.5 L/min.
	Remote Controls	Zeeman magnet Baseline Read function Recorder chart (both background and ZAA signals) and pen drive Pneumatic furnace opening and closing -Automated sample introduction with AS-60 autosampler (optional)
	Magnetic Field	8 Kgauss at 220 V, 16 A.

	Optical Interface	A control knob on the interface allows the operator to change over from AA to Zeeman operation by simply turning a knob.
	Operation	From the spectrometer via an IEEE-488 interface.
	Microprocessor System	Motorola 6809 with 24 Kb EPROM, 2 Kb RAM.
	Technical Standard	Complies with the requirements for technical instrument stipulated by IEC348, VDE0411, and CSA 22.2 No. 151.
	Radio Interference Suppression	Complies with legal requirements of FRG (VDE0871, grade B).
	Ambient Temperature Range	10-40°C
Power Requirements	Zeeman Magnet	220/230 volts, 50/60 Hz, 3.5kVA.
	HGA-600 Programmer/ Power Supply	200/210/220/230/240 +10% (internally switchable), 50/60 Hz, 3.6 kVA for a tube temperature of 2700°C.
Dimensions	Zeeman Furnace Module	60 cm wide 50 cm high 50 cm deep
	HGA-600 Programmer/ Power Supply	60 cm wide 33 cm high 57 cm deep
Weight	Zeeman Furnace Module	Approximately 40 kg (88 lb)
	HGA-600 Programmer/ Power Supply	Approximately 58 kg (128 lb)

HGA-600 GRAPHITE FURNACE

Power Requirements	206, 220 or 240 VAC \pm 10%; 50 Hz or 60 Hz
Power Consumption	Approximately 3.6 kVA for a furnace temperature of 2700°C.
Dimensions (Power Unit)	42 cm wide 33 cm high 60 cm deep
Weight	Approximately 65 kg (143 lb).
Temperature Range	Programmable from ambient (20°C) to 3000°C in increments of 10°C.
Required Inert Gas	Argon or nitrogen Minimum pressure 300 kPa (3 bar; 43 psig) Maximum pressure 450 kPa (4.5 bar; 65 psig) Maximum consumption: 1500 mL/min. Automatic gas shut-down in standby mode.
Water Coolant	Mains water or filtered industrial water. Maximum consumption 2.5 L/min.
Isothermal Temperature	20-3000°C in increments of 10°C.
Ramp Time	0-99 s in increments of 1 s. Zero ramp time selects maximum power heating.
Hold Time	0-99 s in increments of 1 s.
Internal Gas Stream	0-300 mL/min in increments of 10 mL/min. - Changeover to an alternate gas is possible.
Output Voltage	Maximum 11 V _{eff} (continuous control of the effective voltage).

Safety Features	Automatic protection against data transfer errors, operation with open furnace, malfunctioning of the temperature sensor, program errors, electrical supply failure, tripped power circuit breaker, low gas inlet pressure, overheated furnace or transformer, graphite tube breakage.
Operation	From the 5100 PC software via an IEEE-488 interface.
Microprocessor System	Motorola 6809 with 24 Kb EPROM and 2 Kb RAM.
Technical Standard	Complies with the requirements for technical instruments stipulated in IEC 348, VDE 0411, and CSA File 45 111.
Radio Interference Suppression	Complies with legal requirements of the FRG (VDE 0871, grade B).
Ambient Operating Range	10 to 40°C

AUTOSAMPLERS (optional)

AS-60 Furnace Autosampler	Dimensions (sample table assembly)	28 cm wide 20 cm high 45 cm deep	
	Weight (sample table assembly)	Approximately 6 kg (13 lb).	
	Sample Tray Capacity	Locations for 40 sample cups. One additional container for blank or other solution Locations named zero to 40.	
	Standard Containers	Up to 40 sample cups (depending on the number of reference solutions). 1.5 and 3.0 mL size cups available.	
	Optional Containers	5 containers for additional reagent solutions (matrix modifiers), 25 mL capacity, permitting up to 20 mL to be withdrawn.	
	Minimum Sample Requirement	Approx. 0.1 mL.	
	Dispensable Sample Volume	1-99 uL, selectable in increments of 1 uL.	
	Dispensable Reagent Volume	1-99 uL, selectable in increments of 1 uL.	
	Precision	5 uL	+2% relative standard deviation
		10 uL	+2% relative standard deviation
		20 uL	1% relative standard deviation
		50 uL	0.5% relative standard deviation
	Accuracy	5 uL	+5%
		10 uL	+5%
		20 uL	+3%
		50 uL	+2%

Maximum Dispensable Volume	125 uL (sample solution + reagent solution + blank + reference solution).
Flushing volume	1.4 mL/cycle, fixed; 2 or 3 flushes/cycle available.
Control	By controller via IEEE-488 data bus. Interface and autosampler electronics integrated in HGA 600 Power Unit.
Programming:	By 5100-PC software
Power Supply:	Via the HGA Power Unit.

AS-51 Flame Autosampler

Sample Trays:	Removable for quick change.
Sample Tray Capacity:	Up to 54 solutions, samples, and standards.
Containers:	54 tubes, 15 mL capacity. Wash beaker 400 mL capacity.
Control:	From the 5100 PC software via an IEEE-488 interface.
Power Supply:	115V, 230V, 50/60 Hz.
Dimension:	33 cm wide x 33 cm high x 36 cm deep.
Weight:	4.5 kg (10 lb).

