Technical Data

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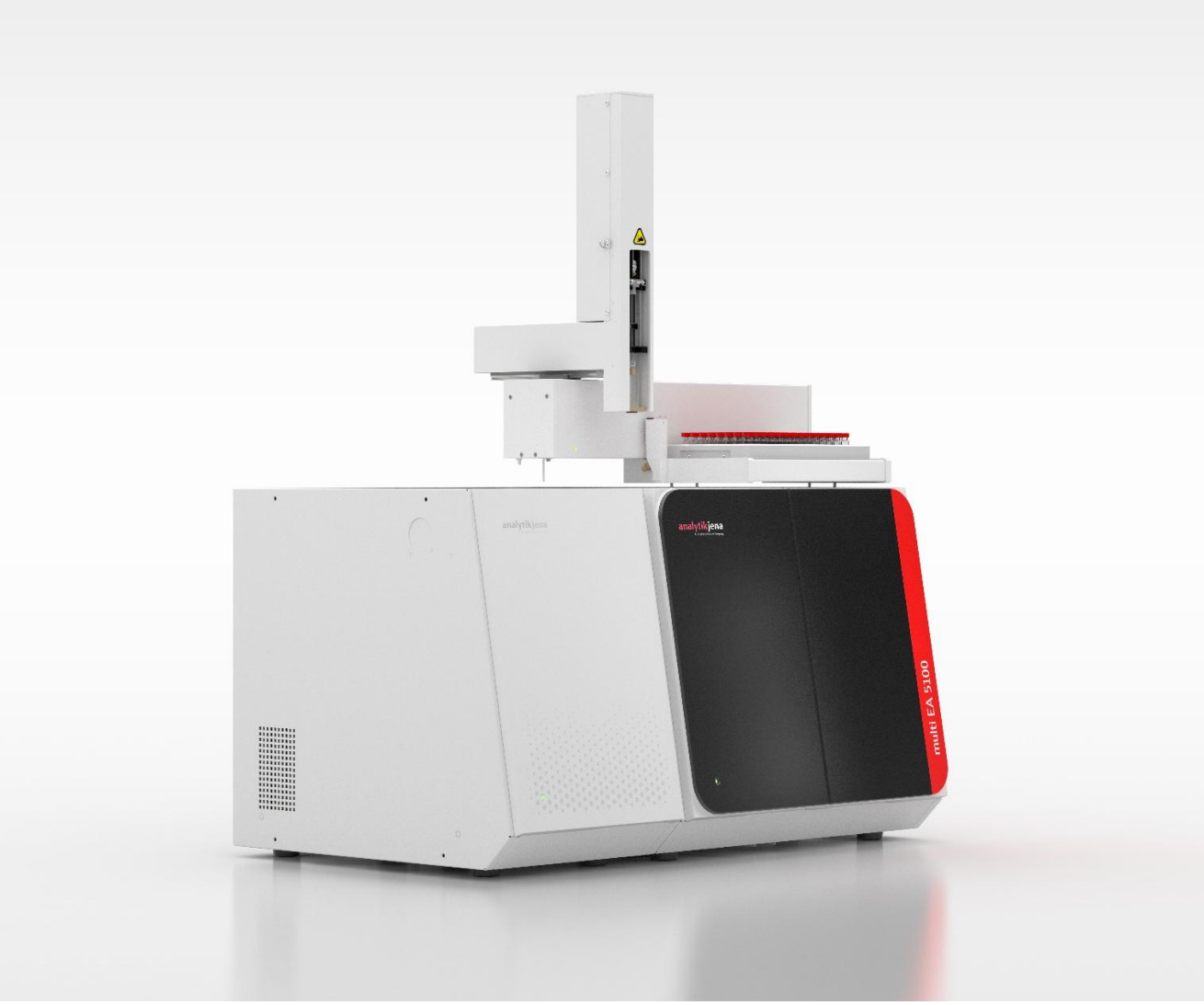
An Endress+Hauser Company

multi EA 5100
C/N/S/X Elemental Analyzer



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Technical Data
C/N/S/X Elemental Analyzer multi EA 5100

General

- Multi-matrix analyzer for liquids, solids, gases
- Multi-element analysis, determination of carbon, nitrogen, sulfur and chlorine in one analysis cycle, no system refitting required
- Easy to use, a library with preset standard compliant methods simplifies work and saves valuable analysis time
- Outstanding robustness and sensitivity combined with best service and cost-effective 24/7 high-throughput analysis
- Extendable for the preparation of samples by pyrohydrolytic combustion to enable AOF, EOF, TOF determination and halogen speciation by suitable, not included detection systems (e.g., IC, ISE, MAS, photometry, titration, potentiometry etc.).

Options

	Carbon	Nitrogen	Sulfur	Sulfur	Chlorine
Measuring principle	NDIR Spectrometry	Chemo-luminescence	UV Fluorescence	Coulometry	Coulometry
Operation range (relative)	100 wt-% (organics) 10,000 mg/L (water)	10,000 mg/L	10,000 mg/L	40,000 mg/L	100,000 mg/L
Operation range (absolute)	500 mg C	100 µg N	100 µg S	200 µg S	1.00 mg Cl
Limit of detection (relative)	100 µg/L (organics) 200 µg/L (water)	10 µg/L	5 µg/L	600 µg/L	50 µg/L ("high sensitive")
Limit of detection (absolute)	50 ng C (organics) 100 ng C (water)	0.4 ng N	0.2 ng S	0.2 µg S	10 ng Cl ("high sensitive")

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Standard Compliance

Element	Parameter	Parameter
Carbon (by NDIR)	TC, TOC, TIC, NPOC, EC, OC	▪ VDI 2465 part 2 (NDIR, elemental carbon/organic carbon in soot, particulate emission) ▪ ISO 8245 (TOC, DOC, water) ▪ DIN EN 1484 (NDIR, TOC/DOC, water)
Sulfur (by UVFD)	TS	▪ ASTM D5453 (UVFD, light hydrocarbons, fuels, oils) ▪ ASTM D6667 (UVFD, LPG, gaseous hydrocarbons) ▪ DIN EN 17178 (UVFD, LPG) ▪ ASTM D7183 (UVFD, aromatic hydrocarbons) ▪ ASTM D7551 (UVFD, gaseous hydrocarbons, LPG & NG) ▪ DIN EN 15486 (UVFD, ethanol) ▪ DIN EN ISO 20846 (UVFD, petroleum products) ▪ GOST R EN ISO 20846 (UVFD, petroleum products) ▪ JIS K 2541-06 (UVFD, crude oil and petroleum products) ▪ SH/T 0689 (UVFD, light hydrocarbons, motor fuel & oils) ▪ UOP 987-Part A (UVFD, very volatile liquid hydrocarbons)
Sulfur (by coulometry)	TS	▪ ASTM D3120 (Coulometry, light petroleum hydrocarbons) ▪ ASTM D3246 (Coulometry, LPG) ▪ DIN EN ISO 16591 (Coulometry, petroleum products) ▪ JIS K 2541-02 (Coulometry, crude oil and petroleum products) ▪ JIS K 2240 (Coulometry, LPG) ▪ JPI-55-20-82 (Coulometry, light oil and petroleum products) ▪ SH/T 0253 (Coulometry, liquid petroleum products)
Nitrogen (by CLD)	TN	▪ ASTM D5762 (CLD, horizontal operation mode, petroleum products) ▪ ASTM D4629 / IP 379/88 (CLD, trace contents, liquid petroleum hydrocarbons) ▪ ASTM D6069 (CLD, aromatic hydrocarbons) ▪ ASTM D7184 (CLD, ultra-traces, aromatic hydrocarbons) ▪ DIN 51444 (CLD, petroleum products) ▪ JIS K 2609 (CLD, crude oil and petroleum products) ▪ UOP 936 (CLD, LPG) ▪ UOP 971 (CLD, light aromatic hydrocarbons) ▪ UOP 981 (CLD, very volatile liquid hydrocarbons)

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Chlorine (by coulometry)	TX, TOX, TCl	▪ ASTM D5808 (TCl, aromatic hydrocarbons) ▪ ASTM D4929 Method B (TOX, crude oil) ▪ ASTM D7457 (TCl, aromatic hydrocarbons) ▪ IP 9076 / EPA 9076 (TCl, new and used petroleum products) ▪ DIN EN 14077 (TX, petroleum products) ▪ DIN 51408-2 (TX, mineral oil hydrocarbons) ▪ UOP 779 (TX, petroleum products) ▪ UOP 910 (TX, LPG and gases) ▪ GB/T 18612 (TOX, crude oil)
Halogens (by coulometry)	AOX/TOX, EOX	▪ EPA 9020 B (AOX, drinking and ground water) ▪ EPA 1650B, EPA 450.1, SM 5320 B (DOX in water) ▪ DIN EN ISO 9562 (AOX, water) ▪ DIN EN 16166 (AOX, sludge, soil, bio waste) ▪ OENORM EN 15171 (AOX, sludge) ▪ DIN 38409-H22 (SPE-AOX, water) ▪ DIN 38414-S18 (AOX, sludge and sediments) ▪ EPA 9023 (EOX, solids) ▪ DIN 38414-S17 (EOX, sludge and sediments) ▪ OENORM M 6614 (EOX, water) ▪ NEN 6402 (EOX, water)
Sample preparation* (pyrohydrolytic sample combustion step)		▪ DIN 38409-59 (AOF, AOCl, AOBr, AOI, water)** ▪ ISO 18127 (AOF, AOCl, AOBr, AOI, water)** ▪ EPA 1621 (AOF, water)** ▪ EN 17813 (F, Cl, Br, S in environmental solids) ▪ ASTM D7359 (F, Cl, S in hydrocarbons) ▪ ASTM D8150 (TOCl in crude oil) ▪ ASTM D8247 (F, Cl in coal) ▪ UOP 991 (F, Cl, Br in liquid organics) etc.

* ICprep complies to the step of sample digestion acc. pyrohydrolysis, the detection by IC or other suited principles are NOT included in the ICprep
** for AOF enrichment on columns or acc. batch method, additional systems, such as APU series or AFU 3 are required

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Accessories for Sample Introduction

Liquids	**Semi-automatic:** Autoinjector AI (vertical / horizontal) and AI-EA (vertical) ABD Automatic Boat Drive (horizontal) **Automatic:** MMS 5100 resp. MMS-T Multi-Matrix Sampler (vertical) ABD Automatic Boat Drive + MMS 5100 resp. MMS-T Multi-Matrix Sampler (horizontal)
Gases	**Gaseous, expanded:** GSS Gas Sampling System **Gaseous, compressed:** GSS Gas Sampling System with adapter box or GSS/LPG combi module **Pressurized liquefied gases:** LPG 2.0 module or GSS/LPG combi module
Solids	**Semi-automatic:** ABD Automatic Boat Drive (horizontal) **Automatic:** ABD Automatic Boat Drive + MMS 5100 resp. MMS-T Multi-Matrix Sampler (horizontal)

Sample Digestion

Furnace temperature	≤ 1,100 °C
Sample quantities	
liquids	1 – 500 µL
solids	0.1 – 110 mg
gases	1 – 100 mL
LPG	1 – 50 µL
Power supply	100 – 240 VAC, 50/60 Hz, max. 16 A
Gas supply	Argon 99.996 % (4.6), Oxygen 99.995 % (4.5) (both, free of halogens and hydrocarbons)
Measuring time	Approx. 3 – 5 min (V) C/N/S, 3 – 8 min C/N/S (H) and Cl (V/H)

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Control and Data Evaluation

Control	PC
Control and analysis software	multiWin 5.X is classified as GAMP5 category 3
Operating system	Windows 11 (32 or 64 Bit) or higher
Minimum requirements PC	▪ Desktop PC, tower or laptop ▪ RAM: min. 8 GB ▪ Memory: min. 256 GB, SSD recommended ▪ Graphic resolution: min. 1280 x 1024 px. ▪ Interfaces: USB 2.0
Back-up	Fully automatic as well as manual back-up and restore functions
Export function	CSV, LIMS, PDF, multiWin
Method library	field-approved, ready-to-use standard methods for routine applications and selected environmental sum parameters included
Features	▪ Intuitive user guidance, self-explanatory menu navigation ▪ Self Check System – automatic monitoring, adaptation and regulation of important system parameters ▪ Plug-and-Start technology – automatic identification of active system configuration ▪ Trouble Shooting Assistant, implemented service and maintenance modules ▪ Predictive maintenance – maintenance interval timer ▪ Automatic and manual gas- and power-saving functions, standby, shutdown, gas-off, and automatic wake-up functions ▪ Multitasking – free evaluation of sample data even during running measurements ▪ Special host option allows to control two different multi EA 5100 systems at the same time with the same PC and software ▪ Implemented system performance checks – AQA and daily factor functions ▪ Calibration: single-point, multi-point and multi-range calibration; linear and quadratic regression models, automatic and manual blank correction function, statistical data

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Physical Data (Basic Unit)

Dimensions (W x H x D) (without PC and monitor)	Basic unit (vertical): 513 mm x 464 mm x 551 mm Basic unit incl. automatic boat drive (horizontal): 1073 mm x 464 mm x 551 mm Accessory module (detector resp. gas sampler) without basic unit: 296 mm x 464 mm x 492 mm
Weight (basic unit)	approx. 26 kg
Installation requirements	Ambient temperature: 23 – 35 °C Relative humidity: 10 – 90%
Power requirements	110–230 V (± 5%), 50 – 60 Hz as per IEC 38 and subsequent documents, fuse protection min. 16 A, electrical installations in compliance with VDE 100

The specifications are valid for proper operation of a suited configuration of the analyzer.

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