FLAME PHOTOMETER FP8000 SERIES

DETERMING THE CONCENTRATION OF ALKALINE AND EARTH ALKALINE ELEMENTS IN THE LABORATORY AND PROCESS ANALYSIS

FLAME PHOTOMETER FP8000 SERIES

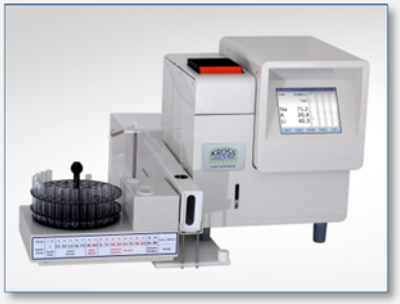
The A.KRÜSS **flame photometers** allow simple and cost-effective determination of alkali and alkaline earth element concentrations in aqueous solutions. They are mainly used in laboratory and process operations.

With the **FP8000 series** A.KRÜSS Optronic presents worldwide unique measuring devices for simultaneous measurement of the elements Na, K, Ca and Li. Five measurement channels are available to be individually configured. Thanks to the proven measurement procedure as well as to modern device electronics and innovative process control, our flame photometers achieve highly accurate and reproducible results. The devices can cope with about 300 measurements per hour and thus clearly demonstrate the international top position!

KEY FEATURES

- Economic, robust and durable solution for use in laboratory and process operations
- Maximum operational safety through intelligent security mechanisms
- Flame photometry simultaneous measurement of up to five alkaline and alkaline earth elements
- Fast measurement: up to 300 measurements per hour – international top position!
- User administration with two authorisation levels
- Traceability of all measured data and device-specific data
- Complete traceability of measurement results
- Extensive interfacing options and comfortable handover of measurement results
- Compliance with international norms and standards such as GMP / GLP and 21 CFR Part 11

SOLUTIONS FOR VARIOUS NEEDS

	FP8400	FP8500	FP8600	FP8700
APPLICATIONS	Standard version for Laboratory Economic entry solution	Version for Process Remote control of multiple devices via centre process computer	Version with automated sample feed	Version with automated sample feed and dilution
				
SAMPLER			✓	✓
DILUTER				✓
MIXER				✓
VALVE BOX		✓		

EQUIPMENT AND FIELDS OF APPLICATION

	FP8400	FP8500	FP8600	FP8700
DETERMING CONCENTRATION	Determining the concentrations of alkaline and alkaline earth elements in aqueous solutions for laboratory and process operations Na, K, Ca, Li - Propane or acetylene			
EQUIPMENT	Basic device	Basic device+	Basic device +	Basic device +
		External valve box with control unit (Online Measurement)	Sampler and external sample table and control unit	External automation system consisting of: sampler, diluter and mixer
FIELDS OF APPLICATION	Laboratory analysis Quality control and evidence Food laboratories Examination offices Chemical development	Process analysis Process monitoring	Quality control and evidence Food laboratories Examination offices	Quality control and evidence Food laboratories Examination offices
	For operation with low sample throughput Very high precision	Recommended for online measurements Designed for automated continuous measurements	Automated procedures for operation with high sample throughput Undiluted samples Little support from users needed High precision	Automated procedures for operation with high sample throughput Diluted samples Little support from users needed High precision Small amount of sample

EASY HANDLING AND OPERATING COMFORT

OPERATION

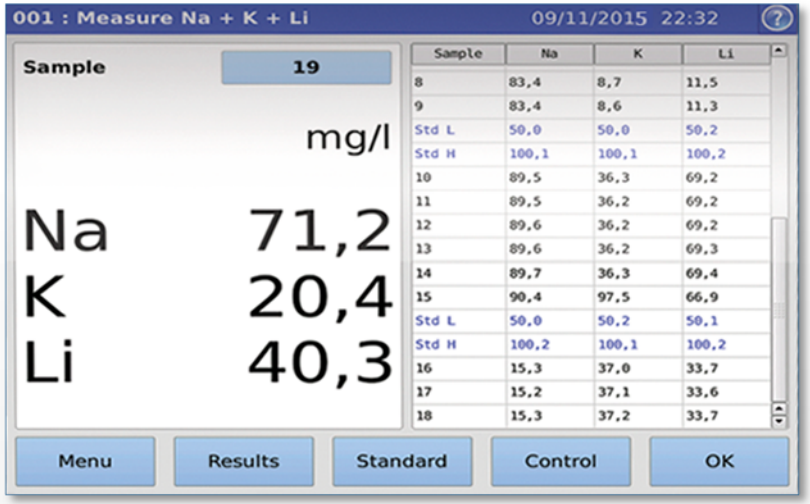
Our flame photometers are easy and intuitive to use on a large touchscreen display and with USB mouse.
The FP8000 series is designed for using propane or acetylene as fuel gas.
Purified and dried compressed air is required for operation.

CALIBRATION, SAMPLES, CONTROLS AND STANDARDS

Aqueous samples, controls and standards can be measured manually or automatically. Calibration is carried out via the standards.
Measurement results can be checked with the controls.
For reviewing, emission and concentration values of calibration are presented in graphed and tabulated order.

USER ADMINISTRATION

All devices feature a user administration with two authorization levels, which can selectively be activated or deactivated.



MEASUREMENT PRINCIPLE, FUNCTIONALITY, INNOVATIVE PROCESS CONTROL

MEASUREMENT PRINCIPLE OF FLAME PHOTOMETERS

The flame photometers of the FP8000 series apply a relative measurement method according to the principle of flame atomic emission spectroscopy (F-AES).

FUNCTIONALITY OF THE FP8000 SERIES

The FP-8000 devices come with five independent measurement channels and another, separate channel for monitoring the flame. The five measurement channels can be fitted with appropriate filters. The devices do not necessarily need a guideline, measurement can be done both with and without reference element.

INNOVATIVE PROCESS CONTROL

The flame photometers can be used as table top device or be integrated into a process environment via analogue current interface.

Several locally separated units can be controlled via one centre process computer.

The units are designed for 24-hour operation.

right hand: FP8500
above: back view connections

HIGH SAFETY STANDARD FOR MAXIMUM OPERATIONAL SAFETY

Various safety mechanisms ensure particularly high operational safety. Such as a safety circuit for interrupting the supply of gas preventing leakage of unburned gases, or as a flame recoil blocker preventing the backward burning of an extinguished flame.

SOME ESSENTIAL SAFETY MECHANISMS

Automated ignition

- Controlled and safe ignition sequence

Optical infrared flame monitoring

- Continuous monitoring of flame via infrared sensor

Continuous monitoring of gas pressure

- Fuel, Oxidant and Cooling air

HIGH SAFETY STANDARD FOR MAXIMUM OPERATIONAL SAFETY

SOME ESSENTIAL SAFETY MECHANISMS

Automated gas shut down

- In case of an extinguished flame
- In case of regular system shut down
- In case of power breakdown
- In case of low fuel-gas, oxidant or cooling air pressure
- The monitoring of the safety functions is performed by an independent safety circuit

Exhaust emission

- To avoid injury due to hot exhaust gases, exhaust gas temperatures are held at a cooling air temperature below 50 °C

INTERFACES AND DATA EXPORT

RS-232	USB	ETHERNET
Serial ASCII printer	USB flash drive Barcode scanner Keyboard Mouse	Network printer Network share LIMS

- Print-out on serial ASCII printer at RS-232 interface
- Print-out on network printer in PDF or GS format
- Print-out as PDF on USB flash drive or to network share
- Export of the measurement results in HTML or CSV format on
- USB flash drive or to network share
- Easy integration into existing networks (DHCP client) or a LIMS

SERVICE AND MAINTENANCE – YOUR BENEFITS AS AN A.KRÜSS CUSTOMER

- On site services by A.KRÜSS Optronic or certified service partner: :
  - Service
  - Maintenance
  - Initial installation and commissioning
  - DQ/IQ/OQ/PQ
  - Calibration and adjustment
- Calibration and adjustment with defined standard solutions
- Maintenance contracts, calibration certificates
- Individual training and application consulting on site
- Customer-specific customisation of devices (e. g. optimisation of measuring range)
- Spare parts and accessories directly from the manufacturer

FEATURES AND SPECIFICATIONS

- Economic, robust and durable solution for use in laboratory and process operation
- Flame photometry simultaneous measurement of up to five alkaline and alkaline earth elements
- Use as table top unit or integration into a process environment (analogue current interface)
- TFT-Display with integrated touchscreen, 8,4“ (21 cm), 800x600 Pixel
- Easy and intuitive operation, available in German and English language (others on request)
- Aqueous samples, controls and standards are measured manually or automatically
- Graphic and tabular presentation of emission and calibration curves
- Method Management: create an arbitrary number of methods to enable the respectively desired parameters to each sample
- Available method parameters: elements, concentration, calibration, controls, comment
- Fast measurement: up to 300 measurements per hour
- User administration: optional setup, two authorisation levels can be activated or deactivated depending on the particular requirements
- Integrated measured data storage: document all measured values of the last 999 measurements in circular buffer
- Seamless documentation: complete recording of all measured data as well as system or method settings
- Spare parts and accessories directly from the manufacturer
- Measurement principle: F-AES flame atomic emission spectroscopy
- Maximum operational safety through intelligent security mechanisms

TECNICAL DATA IN ppm

		FP8400	FP8500	FP8600	FP8700
MEASURING RANGE	Na	0,01-4500 ppm	0,01-4500 ppm	0,01-4500 ppm	0,1-45000 ppm
	K	0,02-4500 ppm	0,02-4500 ppm	0,02-4500 ppm	0,2-45000 ppm
	Li	0,02-3000 ppm	0,02-3000 ppm	0,02-3000 ppm	0,2-30000 ppm
	Ca	0,30-3000 ppm	0,30-3000 ppm	0,30-3000 ppm	3,0-30000 ppm
DETECTION LIMIT	Na	0,01 ppm	0,01 ppm	0,01 ppm	0,1 ppm
	K	0,02 ppm	0,02 ppm	0,02 ppm	0,2 ppm
	Li	0,02 ppm	0,02 ppm	0,02 ppm	0,2 ppm
	Ca	0,03 ppm	0,03 ppm	0,03 ppm	0,3 ppm
PRECISION	Na	0,2 % at 40 ppm	0,2 % at 40 ppm	0,2 % at 40 ppm	0,6 % at 40 ppm
	K	0,2 % at 40 ppm	0,2 % at 40 ppm	0,2 % at 40 ppm	0,6 % at 40 ppm
	Li	0,2 % at 40 ppm	0,2 % at 40 ppm	0,2 % at 40 ppm	0,6 % at 40 ppm
	Ca	0,2 % at 40 ppm	0,2 % at 40 ppm	0,2 % at 40 ppm	0,6 % at 40 ppm
ACCURACY	Na	1 % at 40 ppm	1 % at 40 ppm	1 % at 40 ppm	1 % at 40 ppm
	K	1 % at 40 ppm	1 % at 40 ppm	1 % at 40 ppm	1 % at 40 ppm
	Li	1 % at 40 ppm	1 % at 40 ppm	1 % at 40 ppm	1 % at 40 ppm
	Ca	1 % at 40 ppm	1 % at 40 ppm	1 % at 40 ppm	1 % at 40 ppm

TECNICAL DATA IN mmol/l

		FP8400	FP8500	FP8600	FP8700
MEASURING RANGE	Na	0,0004-200 mmol/l	0,0004-200 mmol/l	0,0004-200 mmol/l	0,004-2000 mmol/l
	K	0,0005-110 mmol/l	0,0005-110 mmol/l	0,0005-110 mmol/l	0,005-1100 mmol/l
	Li	0,0028-420 mmol/l	0,0028-420 mmol/l	0,0028-420 mmol/l	0,028-4200 mmol/l
	Ca	0,0075-75 mmol/l	0,0075-75 mmol/l	0,0075-75 mmol/l	0,075-750 mmol/l
DETECTION LIMIT	Na	0,0004 mmol/l	0,0004 mmol/l	0,0004 mmol/l	0,0004 mmol/l
	K	0,0005 mmol/l	0,0005 mmol/l	0,0005 mmol/l	0,0005 mmol/l
	Li	0,0028 mmol/l	0,0028 mmol/l	0,0028 mmol/l	0,0028 mmol/l
	Ca	0,0075 mmol/l	0,0075 mmol/l	0,0075 mmol/l	0,0075 mmol/l
PRECISION	Na	0,2% at 1,74 mmol/l	0,2 % at 1,74 mmol/l	0,2 % at 1,74 mmol/l	0,6 % at 1,74 mmol/l
	K	0,2% at 1,03 mmol/l	0,2 % at 1,03 mmol/l	0,2 % at 1,03 mmol/l	0,6 % at 1,03 mmol/l
	Li	0,2% at 5,71 mmol/l	0,2 % at 5,71 mmol/l	0,2 % at 5,71 mmol/l	0,6 % at 5,71 mmol/l
	Ca	0,2% at 1,00 mmol/l	0,2 % at 1,00 mmol/l	0,2 % at 1,00 mmol/l	0,6 % at 1,00 mmol/l
ACCURACY	Na	1% at 1,74 mmol/l	1 % at 1,74 mmol/l	1 % at 1,74 mmol/l	1 % at 1,74 mmol/l
	K	1% at 1,03 mmol/l	1 % at 1,03 mmol/l	1 % at 1,03 mmol/l	1 % at 1,03 mmol/l
	Li	1% at 5,71 mmol/l	1 % at 5,71 mmol/l	1 % at 5,71 mmol/l	1 % at 5,71 mmol/l
	Ca	1% at 1,00 mmol/l	1 % at 1,00 mmol/l	1 % at 1,00 mmol/l	1 % at 1,00 mmol/l

TECNICAL DATA

	FP8400	FP8500	FP8600	FP8700
CALIBRATION	Linear with 2 standards			
	Non linear with 6-8 standards, cubic approximation			
DRIFT				
REFERENCE	Lithium guide line with 35 mmol/l			
SAMPLE VOLUME	< 2,5 ml	< 2,5 ml	< 2,5 ml	< 0,25 ml
COMBUSTION GAS	Propane: recommended for alkaline elements			
	Butane: possible substitute for propane			
	Acetylene for flame photometry: recommended for alkaline earth elements			
DISPLAY	TFT-Display with integrated 8,4“ TFT touchscreen, 800x600 Pixel			
INTERFACES	2 x USB flash drive 1 x Ethernet 1 x RS-232 for printer	2 x USB flash drive 1 x Ethernet 1 x RS-232 for printer Upgrade 4-20 mA analogue, passive current interface	2 x USB flash drive 1 x Ethernet 1 x RS-232 for printer	2 x USB flash drive 1 x Ethernet 1 x RS-232 for printer
ACCESSORIES	24 character plain paper printer			
	Pressure reducing station with filter unit			
	Various standards and system solutions			
	Spare parts and accessories directly from the manufacturer			
UPGRADEABILITY	Retrofit kits to other models available			

COMPLIANCE WITH INTERNATIONAL NORMS AND STANDARDS

21 CFR Part 11
GMP / GLP

	SOME SELECTED DIN STANDARDS
DIN EN 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use Part 1: General requirements
DIN EN 61010-2-061	Safety requirements for electrical equipment for measurement, control, and laboratory use. Particular requirements for laboratory atomic spectrometers with thermal atomization + ionization
DIN EN 61000-3-2	Electromagnetic compatibility (EMC) – Limits for harmonic current emissions (Equipment input current)
DIN EN 61000-4-2	Electromagnetic compatibility (EMC) Testing and measurement techniques Electrostatic discharge immunity test
DIN EN 61000-4-4	Electromagnetic compatibility (EMC) Testing and measurement techniques Electrical fast transient / burst immunity test
DIN EN 61000-4-5	Electromagnetic compatibility (EMC) Testing and measurement techniques Surge immunity test
DIN EN 50082-1	Electromagnetic compatibility (EMC) Generic immunity standard Residential, commercial and light industry
DIN EN 55011	Industrial, scientific and medical equipment Radio-frequency disturbance characteristics – Limits and methods of measurement

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