

# SHERWOOD SCIENTIFIC FLAME PHOTOMETERS

ANALOGUE, DIGITAL,  
SINGLE OR MULTICHANNEL,  
AUTOMATED SYSTEMS  
AND DEDICATED  
SOFTWARE



# SHERWOOD SCIENTIFIC FLAME PHOTOMETERS

Sherwood Scientific entered the Flame Photometer market with the model 410, having acquired the manufacturing rights to the design from Corning. We have made some significant updates to the original Corning design which is now over 20 years old, but retained all of the key features which have resulted in the model 410's respected place in the market. It has been the best performing low temperature single element Flame Photometer available for a long time. The dual channel model 420, developed at Sherwood, has many of the 410's attributes (ease of use,

maintenance and stable flame design) enhanced with auto-flame optimisation, internal standard referencing and on-board firmware to improve sample throughput and precision. The model 425 expands upon the capability of the model 420 with an additional detector and filter for Calcium determination. The model 360 is the most recent addition to the range and represents the combination of Sherwood's experience of manufacturing the models 410 and 420, two of the most highly successful Flame Photometers with changes in marketplace demands.

## SINGLE CHANNEL, ANALOGUE & DIGITAL FLAME PHOTOMETERS

### MODEL 360 FLAME PHOTOMETER

The model 360 retains at its heart, the well respected mixing chamber and burner design which give the model 410 its renowned stability and performance a solid foundation to add the model 420's auto flame optimisation technology to, ease of maintenance has been retained as a key feature and in response to current market trends five filters for Sodium, Potassium, Lithium, Calcium and Barium are standard. Available as a single channel analogue unit in a competitively priced build design, the model 360 makes our proven stable flame and easy to maintain designs available to a greater number of analysts who will gain a better analytical experience than they currently do from operating low cost units.

The model 360 will enhance flame photometry as a cost effective analytical technique and help preserve its place in the analyst's tool kit, a fitting aim for the latest addition to a line of Flame Photometers which can be traced to EEL (Evans Electro Selenium Ltd) who developed the first commercial model 100 Flame Photometer in the late 1940s.



### MODEL 410 FLAME PHOTOMETER

The model 410 classic with its robust design, outstanding performance and reliability, has been upgraded and is now available either as the model 410 Industrial and model 410 Clinical. Both versions come with a digital interface fitted as standard.

#### Model 410 Industrial

Flame Photometry is the technique of choice for the measurement of Na, K and Ca in all sample types in: Mineral Extraction, Oil industry, Paper industry, Pharmaceuticals, Soil analysis, Utilities, Food & Beverage, Chemical Manufacture and Fertilisers. The model 410 Industrial with digital output also has an optional Lineariser built-in to allow higher concentrations of sodium (<40 ppm) to be directly measured using a single point calibration. The model 410 Industrial is delivered with Na, K and Ca filters and 1000 ppm standards for each of these analytes (6 x 100 ml)

#### Model 410 Clinical

For clinical samples, flame photometry is the most sensitive and robust method for the determination of Na, K and Li. The model 410 Clinical is delivered with Na, K and Li filters and an appropriate multi-element calibrator in mmol/L. (1 x 100ml). The Clinical instrument is also fitted with a Lineariser, allowing direct, straight line, calibration of clinically significant concentrations of Sodium, as well as Potassium and Lithium following suitable dilution. The model 805 diluter, used in-conjunction with the model 410 Clinical Flame Photometer, gives nominal sample dilution ratios of 1:200 and 1:50. It has been designed to give consistent dilution of calibrator and samples to the flame photometer.

The model 410 Industrial and Clinical flame photometers can be further enhanced by the use of the 410 BlueNotes™ software and model 860 autosampler. Fully integrated and automated systems are possible via our update and automate modules and packages.



# SHERWOOD SCIENTIFIC FLAME PHOTOMETERS

## DUAL CHANNEL, DIGITAL FLAME PHOTOMETERS



Developed from the single channel model 410 with the objective of improving productivity and analytical performance of the laboratory when measuring Sodium and Potassium. The biggest improvement is dual channel operation, allowing both Sodium and Potassium to be calibrated, measured and displayed simultaneously. The model 420 retains many of the model 410's attributes: ease of use, ease of maintenance and stable flame design but is enhanced with auto flame optimisation, internal standard referencing and on-board firmware to achieve significant improvement in sample throughput and precision. The time taken to set up and calibrate the instrument is much reduced; achieved by automatic ignition and optimisation of the flame conditions. The analytical performance is improved by the use of a Lithium Internal Standard signal which reduces fluctuation in flame conditions and dilution errors. The internal standard feature (Reference Mode) can be turned off if required.

Readings on both channels are linear over the working range of the model 420. There are several monitoring and control functions included in the firmware driving the model 420 thus measurements can only be made after blanking and calibration. The model 420 can operate in Continuous or Peak mode. In Continuous mode the instrument displays the current value on each channel and through the analogue ports. An instantaneous reading can be printed at any time. In Peak mode the model 420 automatically detects a stable reading for transfer to a printer or computer and the display is frozen until the next sample is introduced. The model 425 expands upon capability of the model 420 with addition of an additional detector and filter for Calcium determination. It also offers the our "301 mode" feature which allows connection to a number of the more popular continuous flow systems. Both the 420 and 425 have RS232 output for printer or computer connection and are compatible with our model 860 Autosampler for unattended sample analysis. Both models may be used with the model 805 continuous flow diluter, again in conjunction with or without the model 860 Autosampler.

### A FEW EXAMPLE APPLICATION AREAS

Na with K	Essential clinical elements for electrolyte balance in Hospital Labs, Animal metabolic testing in Pharma Companies and QC of Infusion fluids and ISE calibration standards.
Ca with Na	QC in Paper Mills and Cement manufacture
Ca with K	Soil testing, Fruit juices, Biological samples (with pre-treatment) and Food Samples

### MEASURING CALCIUM

The model 425 has the additional channel for Calcium, which has been requested by many customers. It should be noted however that because most modern-day flame photometers use a propane /air flame there is not sufficient energy to break the calcium phosphate bond which may occur within, particularly, clinical samples. In these samples a pre-treatment protocol must be used. Sherwood has a method, see: [www.sherwood-scientific.com/apps/f003m.html](http://www.sherwood-scientific.com/apps/f003m.html)

With other Calcium samples, chelation with EDTA or extraction with Mehling's 3 solution may be indicated. Another application which can be problematical is infusion fluids with low Calcium and high Sodium concentrations: again sample pre-treatment is required to reduce Sodium interference— please ask for further information.

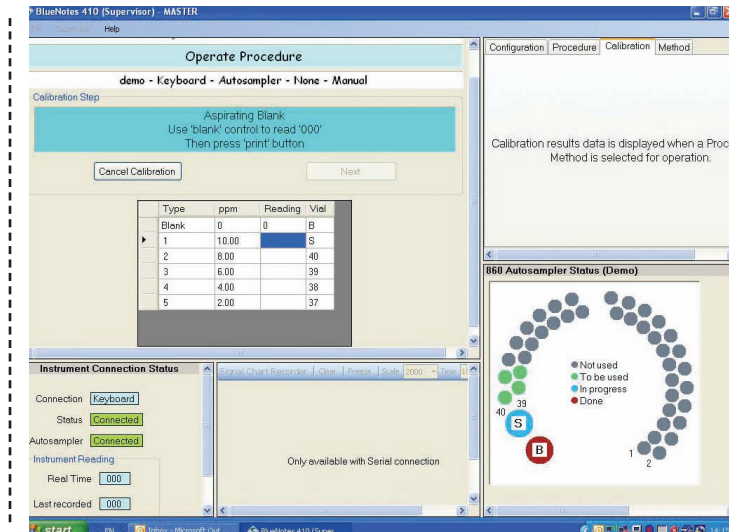
# SHERWOOD SCIENTIFIC FLAME PHOTOMETERS

## ACCESSORIES

### 410 BLUENOTES SOFTWARE EVERYTHING VISIBLE ON ONE OPERATIONAL PAGE

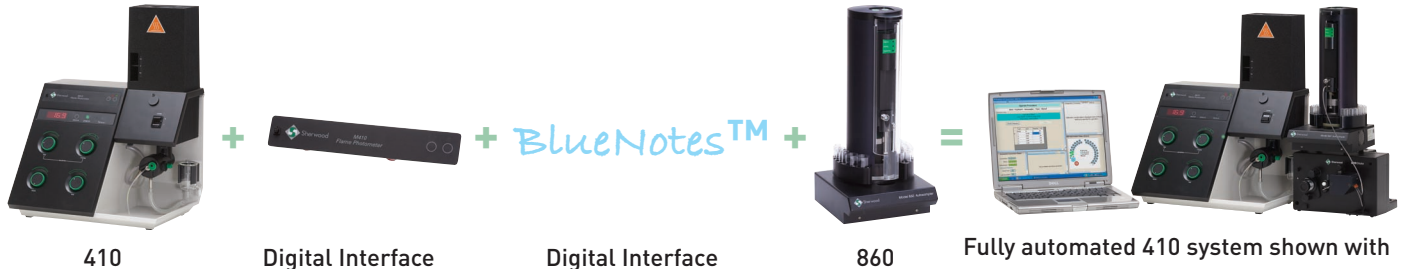
With the 410 BlueNotes™ software package you can:

- Use real names and sample numbers in your reports
- Perform Multipoint calibrations with curve fit
- Automatically correct for instrument drift
- Save calibration curves
- Save methods
- Archive results
- Prepare and print professional reports
- Use Automatic Peak Selection facility to assess stability of readings
- Automate analyses with addition



410 BlueNotes is a package designed not just for data collection, storage, manipulation and report generation; it can also improve throughput, enhance precision and extend the utility of the model 410

### UPDATE, AUTOMATE AND FUTURE-PROOF AVAILABLE MODULES AND PACKAGES



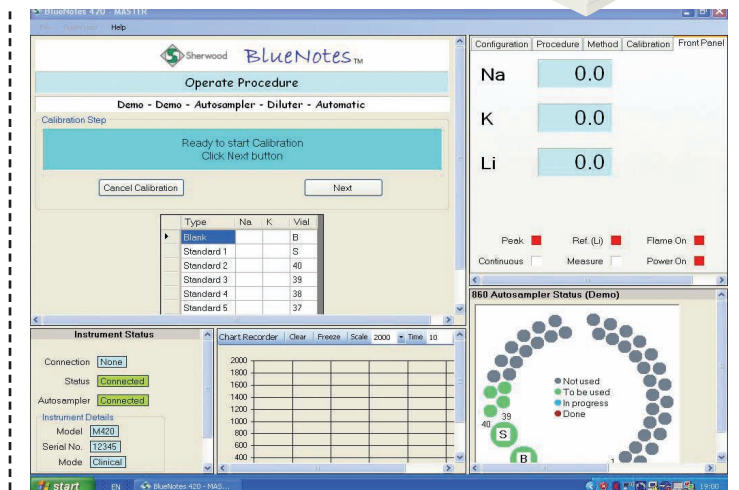
Serial Printer: For those who just require a simple printed record of results with a time and date stamp, we have a available a serial printer which can connect via RS232 to the digital interface in either of the model 410's or to the RS232 port on the rear panel of the dual channel model 420 or 425



### MULTI CHANNEL BLUENOTES SOFTWARE

our latest enhancement for our model 420 and 425 flame photometers.

This package allows collection and viewing of signals from all four (M425) detectors simultaneously. It allows a choice of Lithium or Potassium as an internal standard reference. Single or multipoint calibrations are possible and automatic report generation is standard. You just have to provide a PC and printer.



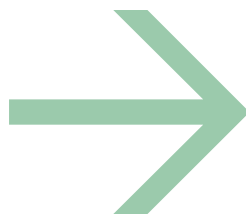
# SHERWOOD SCIENTIFIC FLAME PHOTOMETERS

## THE MODEL 805 CONTINUOUS FLOW DILUTER

- Dual Rotor for Reproducible Ratios
- Positive Pumping for accurate measurements
- Uptake from original sample vessel
- Fibrin clot remover
- Excellent overall system performance

The model 805 Diluter is compatible with all models of Sherwood Scientifics' Flame Photometers. It features two pump mechanisms, one for sample and one for diluent, which are permanently linked to ensure reproducible dilution ratios.

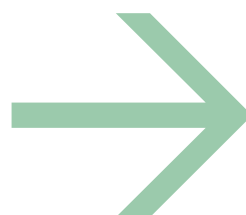
Designed for the 200:1 ratio used for diluting Na and K solutions from clinical samples, it can also be used for a 50:1 ratio for clinical Lithium samples. When used with models 420 or 425 Flame Photometers the diluter can add automatically Lithium Internal Standard at the optimal concentration



## THE MODEL 860 AUTOSAMPLER

- 40 sample capacity
- Separate positions for Blank and Calibrant
- Designed for use with all Sherwood Flame Photometers
- Works with or without Sherwood Model 805 diluter
- Works with 410 BlueNotes™ Software.

The models 420 and 425 Flame photometers were designed to interface bi-directionally with the Model 860, control sits in the flame photometer. The model 410 our single channel instrument Digital Interface, requires our 410 BlueNotes™ software to run the M860 Auto sampler



## MODEL 851 AND 855 COMPRESSORS

We have two specially designed Air Compressors available for use with Sherwood's Flame Photometers. The model 851 and the model 855 (shown), which has a water-cooled trap for operations in humid atmospheres. Both provide a dedicated, clean, dry air supply which is vital to achieving stable flame conditions and constant sample delivery; essential to achieving good precision of results.



## FUEL GAS REGULATORS

We can supply fuel gas regulators to fit gas cylinders. The Dual channel flame photometers require a supply of greater than one bar of pressure. Only the M410's and M360 work with natural gas supplies.

# SHERWOOD SCIENTIFIC FLAME PHOTOMETERS

## ORDERING INFORMATION PART NUMBERS

STOCK CODE	DESCRIPTION	MODEL
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### INSTRUMENTS

36000009	M360 (Five Element) Analogue Flame Photometer	M360
47541201	M410 INDUSTRIAL Digital Flame Photometer	M410
47541301	M410 CLINICAL Digital Flame Photometer	M410
47542000	M420 2-CHANNEL CLINICAL Digital Flame Photometer	M420
47542100	M420 2-CHANNEL INDUSTRIAL Digital Flame Photometer	M420
47542500	M425 FOUR-ELEMENT Digital Flame Photometer	M425

### ACCESSORIES

86000009	M860 AUTOSAMPLER - 40 PLACE	All Digital units
47541100	M805 DILUTOR, CONTINUOUS FLOW	All
42586000	Multi-element BlueNotes SOFTWARE	420/425

### 410 INSTRUMENT UPGRADE/AUTOMATION

41086001	DIGITAL INTERFACE/LINEARISER	M410 classic Retrofit all
41086002	BlueNotes UPGRADE for M410 (41086001 + 41066000)	existing M410's, see
41086003	BlueNotes UPGRADE/AUTOMATION PACKAGE (86000009 + 41086002)	notes below
41066000	M410 BlueNotes SOFTWARE	M410 Industrial + Clinical
41086004	BlueNotes AUTOMATION PACKAGE (86000009 + 41066000)	

NOTE: When ordering these products you must state the Serial Number of the flame photometer to which they will be fitted.

85101000	AIR COMPRESSOR M851/115V	All
85101001	AIR COMPRESSOR M851/230V	All
85501000	AIR COMPRESSOR+WATER TRAP M855/115V	All
85501001	AIR COMPRESSOR+WATER TRAP M855/230V	All
00108234	REGULATOR, PROPANE, PRIMARY ASSEMBLY	All
00108439	REGULATOR, BUTANE, PRIMARY ASSEMBLY	All
00108732	REGULATOR, CAMPING GAZ	All
47708400	REGULATOR, FOR DISPOSABLE PROPANE CYLINDERS	All
40020001	RESTRICTOR, BUTANE/PROPANE ASSEMBLY	M410
41019002	REG. KIT, NATURAL GAS INC FILTER	M410
00108233	REGULATOR, PROPANE, FRENCH	
47356903	PRINTER ASSEMBLY	M410/M420/M425
00192492	GUIDE TO FLAME PHOTOMETRY	ALL

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# SHERWOOD SCIENTIFIC FLAME PHOTOMETERS

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## PERFORMANCE INSTALLATION

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Note: do not install a Flame Photometer beneath overhanging cupboards. There must be at least 1 metre of clear space above the chimney. For optimum performance, installation should be in accordance with the following conditions:

- The environment must be clean and free from dust.
- The instrument must be placed on a strong, level worktop, free from vibration. Approximately 500mm x 500mm of bench space is required, which includes an area in front for solutions and clearance at the rear for fuel and air tubing, with clear access to the mains supply switch.
- Avoid sites that expose the instrument to direct sunlight or draughts.
- To meet the specification the ambient temperature must be within the range +10°C to +35°C and the maximum relative humidity must not be more than 85%, non-condensing.

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## ELECTRICAL SUPPLY

An A.C. supply between 90V and 240V  $\pm$ 10%, at 50Hz or 60Hz, is required.

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## AIR

All flame photometers require a clean (oil free), dry, pulse-free air supply capable of delivering up to 6 litres per minute of air at a minimum of 1 bar or 15 psi pressure. For a Sherwood specified compressor see the accessories page in this brochure or on our web-site.

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## FUEL

A supply of Propane, Butane or Propane/Butane mixture regulated at the cylinder to 2.1kg/cm<sup>2</sup> (30psi), flow rate at least 0.4 litres per minute. (NB. Propane only, gives the best results for Ca) Primary regulators to fit cylinders are available as optional accessories from Sherwood Scientific

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## WASTE CONTAINER

A sink or waste container, sited to the right of the instrument, will ensure the minimum length of waste tubing. Do not use a waste container with high sides, as this will cause the drain tube to be lifted above the level of the constant head drain and poor drainage has a detrimental affect on performance.

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## PERFORMANCE

Calcium there is a significant background interference from Sodium: The emission of a 100ppm Calcium solution will be increased by approximately 20% in the presence of a 10ppm Sodium solution.

This will be reduced to 13% if a Lithium internal standard reference is used.

For a full specification sheet for the Model of interest contact: [info@sherwood-scientific.com](mailto:info@sherwood-scientific.com)

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## DESIGN FEATURES:

- Ease of use with large, accessible, "upfront" work area for calibrator and sample presentation
  - Gas control/flame optimisation
  - Ease of maintenance with "no-tools" approach to removing; mixing chamber, burner stem and burner
  - Element filters easily accessible for cleaning and/or replacement
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## SAFETY FEATURES

Sherwood Scientific Flame Photometers feature as standard:

- Optical "flame-on" and air pressure detectors for instant fail safe flammable gas containment,
  - "Cool" chimney· Full CE Compliance.
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# INTRODUCTION AND HERITAGE



Based in Cambridge, a centre of Scientific Excellence in the UK, Sherwood Scientific Ltd is a manufacturing company with a history of successful innovations and developments designed to provide continual improvement and added value to its product range.

Sherwood Scientific Ltd produces a world renowned product range including CHROMA Colorimeters, Flame Photometers and Chloride Analysers; whose origins can be traced back to the 1950s, with continuous

developments since then by Corning prior to acquisition of all manufacturing and design rights by Sherwood in the 1990's. Sherwood Scientific Ltd also manufactures the MICROWELDER gas generator based flame welding system used in jewellery, electronics and acrylic sign manufacturing; a programmable Laboratory Fluid Bed Dryer; and the world's most sensitive Magnetic Susceptibility Balance. These products have a history which can be traced back to the Johnson Matthey Instrument division.

# SHERWOOD SCIENTIFIC PRODUCT RANGE

## Flame Photometers

We have a complete range of Flame Photometers; from single channel to multi-channel, analogue to digital, computer controlled and automated analysis packages for Sodium, Potassium, Lithium, Calcium, Barium, Cesium, Rubidium and Strontium analysis  
**Clinical and Industrial Chloride analysers**

We also manufacture Clinical and Industrial Chloride analysers based on coulometric titration technology; offering the best available means of Chloride determination in food, pharmaceutical and industrial products etc. In addition clinical chloride measurement is also possible for example, with samples as small as 20ul of sweat as may be required for Cystic Fibrosis confirmations.

## CHROMA colorimeter range

Our CHROMA colorimeter range has wide utility. These fully open, programmable units, with three absorption unit capability across the whole wavelength range may be utilised with any commercially

available test kits for water quality monitoring, clinical chemistry measurements and many other colorimetric determinations.

## Model 501 Fluid Bed Dryer

The bench top, lab-scale, programmable Model 501 Fluid Bed Dryer offers a microprocessor controlled base unit with the widest range of tub materials and configurations; with inlet and outlet filters to match a broad variety of sample types and particle sizes. With in-tub temperature and humidity feedback capability coupled to a powerful software package providing real-time drying condition feedback and display; this unit allows rapid development of drying protocols and understanding of material drying behaviour.

## Magnetic Susceptibility Balances

For those engaged in study of the magnetic properties of materials, our Magnetic Susceptibility Balances offer unsurpassed sensitivity and reliability. We truly are world leaders in this field of analytical chemistry



Sherwood Scientific is represented by a worldwide distributor network. Our distributors and their customers attend courses on existing and new products at Sherwood's facility in Cambridge. Sherwood can also be contacted via the Internet where news of products, applications and other information is available. For more information and a list of our distributors in your locality visit our website and/or send an email.