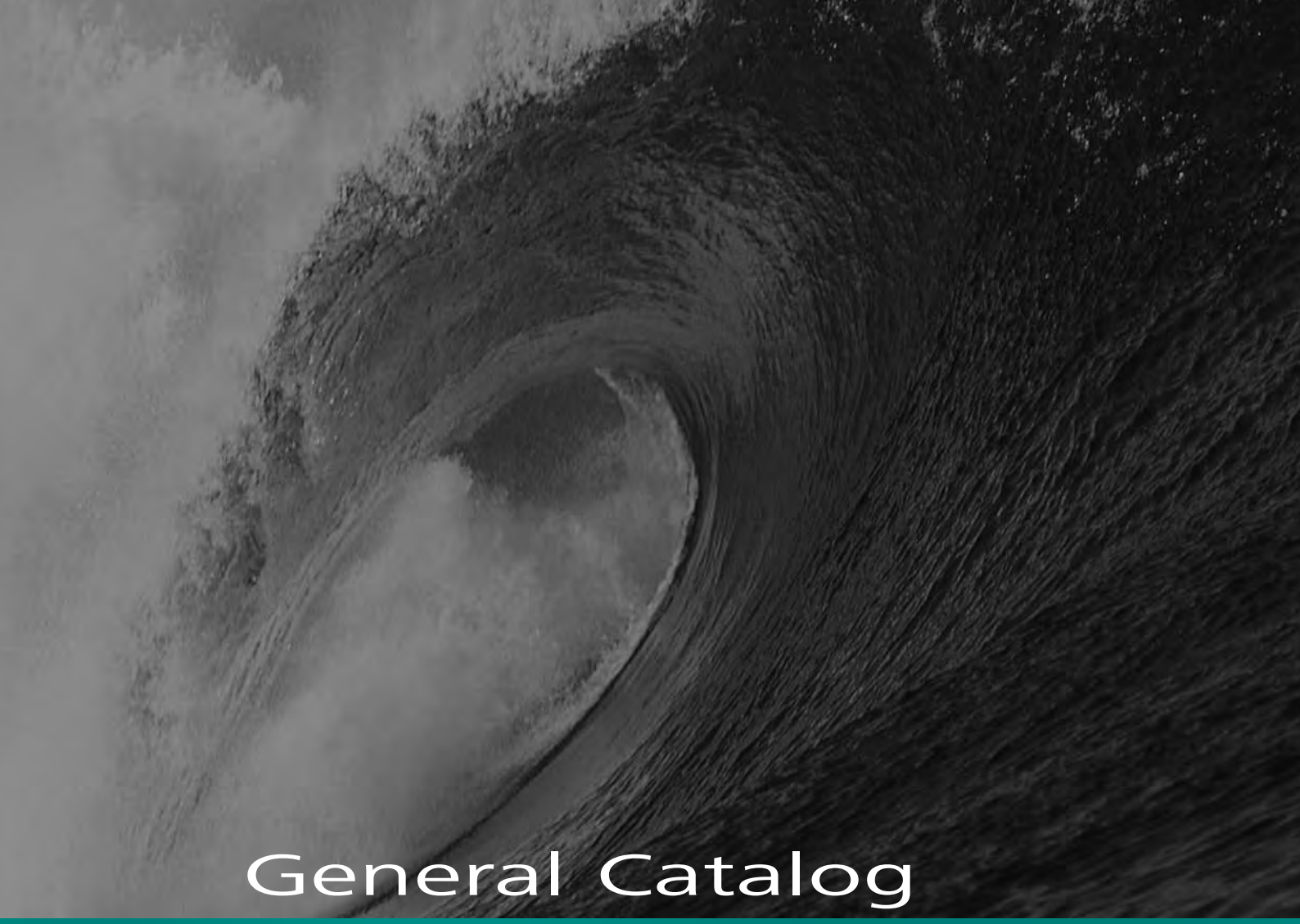


General Catalog

The Whole World of Ion Analysis

Metrohm

Ion Analysis

really easy with Metrohm

Metrohm AG is the only company whose range of products covers all important methods of ion analysis:

- Titration (potentiometric, thermometric and Karl Fischer),
- VA trace and ultratrace analysis, and
- Ion chromatography.

The individual analytical methods do not compete with one another, but complement each other in an optimal way.

In addition, Metrohm also offers:

- pH, ion and conductivity meters,
- Stability measuring instruments,
- CVS instruments for determining additives in electroplating baths,
- Software for networks and individual instruments,
- Dosing and liquid handling systems,
- Automation for sample preparation and analysis, as well as
- Sensors, columns and numerous accessories.

With the new ProcessLab product group, Metrohm now also offers systems for direct on-site (atline) process control.

Contents

pH/conductivity measurement

Potentiometric and thermometric titration

Karl Fischer titration

Dosing

Automation for titrations

Polarography, voltammetry and CVS

Stability measurement

ProcessLab

Ion chromatography

pH/Conductivity measurement

pH/Conductivity measurement

pH measurement is one of the most common determinations carried out in laboratories all over the world. Metrohm can look back on a long tradition in this field. Our range of pH meters contains a suitable instrument for every requirement. In addition to straightforward pH meters, our offer also comprises combined pH/ion meters and a state-of-the-art conductivity meter.

Measuring instruments

Comparison of Metrohm pH meters

	826	827	780	781	867
Measuring range					
pH	0 ... 14 (-13 ... +20)		0 ... 14 (±20)		0 ... 14 (-13 ... +20)
mV	±1200		±2200		±1200
Temperature Pt 1000 [°C]	-150 ... +250		-150 ... +250		-150 ... +250
Temperature NTC [°C]	-5 ... +250		-20 ... +250		-5 ... +250
Concentration	–		–	10^{-38}... 10^{+38}	10^{-21}... 10^{+20}
Resolution: pH	0.001		0.001		0.001
Resolution: U [mV]	0.1		0.1		0.1
Resolution: T [°C]	0.1		0.1		0.1
pH-calibration (number of buffers)	3		9		5
Stability control (drift display)	x		x		x
Plot function pH/mV/T versus time	–		x		x
Automatic buffer recognition	x		x		x
Saving of calibration data incl. graph	only data		x		x
Automatic temperature compensation	x		x		x
Automatic electrode test	–		x		x
Remote stirrer control	–		x		x
Handling of intelligent dosing elements	–		–		x
Automatic standard addition	–		–	Dosimat	Dosino/Dosimat
Touch Control with color display or PC-Control	–		–		x
Method memory	–		x		x
Result memory	x		x		x
Print out according to GLP/ISO	x		x		x
GLP/GMP and FDA compliance (21 CFR Part11)	–		–		x
Additional input for intelligent electrodes	–		–		x
Ipol or Upol integrated polarizer	–		–		x
Printer connection	IrDA		RS232		USB
2 USB connections for sample processor, printer, ...	–		–		x
MSB connection	–		1 (stirrer)		4 (stirrer, Dosino)
Sample processor (optional)	–		remote		USB
Line operation with 100 ... 240 V, 50/60 Hz	Battery only	x	x		x
Lablink	–		–		x
Language	English		German/English/Spanish/French		PC-Control / Touch Control: German/English/Spanish/French *tiamo*™: German/English

826 pH mobile

The 826 pH mobile is a handy and very easy-to-use pH meter with a wireless infrared interface for data transfer to a printer or PC. Numerous functions, e.g. input possibilities for user or sample identification, 3-point calibration with automatic buffer recognition and various monitoring functions allow GLP-compliant working in virtually any location. The memory function can store up to 200 measured values with date, time and sample identification; these can be called up or transmitted to a printer or PC at any time. If the 6.0228.020 Primatrode is used then the 826 pH mobile meets the requirements of protection code IP 67, i.e. even brief immersion in water will not harm the instrument. Power supply is from four LR6, UM3 or AA batteries; in normal operation up to approx. 750 working hours are possible.

Ordering information

2.826.0010	826 pH mobile
2.826.0020	826 pH mobile with Primatrode
2.826.0110	826 pH mobile with carrying case

826 pH mobile

827 pH lab

The 827 pH lab is a handy and very easy to use pH meter with wireless infrared interface for daily routine work in the lab. Numerous functions, e.g. the possibility of entering user and sample identification, 3-point calibration with automatic buffer recognition, automatic measurement and various monitoring functions make GLP-compliant working perfectly easy. The memory function can store up to 200 measured values with date, time and sample identification; these can be called up or transmitted to a printer or PC at any time.

Ordering information

2.827.0114	827 pH lab / 230 V EU / with Primatrode
2.827.0115	827 pH lab / US / with Primatrode
2.827.0117	827 pH lab / AUS / with Primatrode
2.827.0119	827 pH lab / UK / with Primatrode

827 pH lab

780 pH Meter

The 780 pH Meter offers numerous possibilities for pH measurements at the highest level. In addition to the general pH, potential and temperature measuring functions, the 780 pH Meter is equipped with automatic stirrer control, multi-point calibration with up to 9 buffers, a method memory and various monitoring functions for calibration and service. The automatic GLP-compliant electrode test allows an objective evaluation of the electrode and leaves nothing to chance. Reliable and reproducible results are therefore guaranteed. The large backlit multi-line display provides a good overview and facilitates individual settings. The bidirectional RS 232 interface permits data transfer to a printer or PC. A sample changer can be connected via the optional 6.2148.010 Remote Box.

Ordering information

2.780.0010	High-precision 780 pH Meter

Options

2.140.0200	Impact printer CUSTOM DP40-S4N
2.801.0040	801 Magnetic Stirrer with stand
2.802.0040	802 Propeller rod stirrer for 804 Titration stand
2.804.0040	804 Ti Stand with stand
6.2134.110	Cable RS232 DB9 f - DB9 m
6.2148.010	Remote Box MSB

780 pH Meter

781 pH/Ion Meter

The 781 pH/Ion Meter offers numerous possibilities for pH and ion measurement at the highest level. In addition to the general pH, ion, potential and temperature measuring functions, the 781 pH Meter is equipped with automatic stirrer control, multi-point calibration with up to 9 buffers (pH mode), a method memory and various monitoring functions for calibration and service. The automatic GLP-compliant electrode test for pH glass electrodes allows an objective evaluation of the electrode and leaves nothing to chance. Reliable and reproducible results are therefore guaranteed. The large backlit multi-line display provides a good overview and makes individual settings easier. The bidirectional RS 232 interface permits data transfer to a printer or PC. A sample changer can be connected via the optional 6.2148.010 Remote Box.

Three different modes are available for ion measurement: direct measurement, standard addition or sample addition. With fully automatic standard addition using an optional Dosimat only the concentration of the standard and the required number of addition steps needs to be entered, the pH/Ion Meter takes care of the rest. Up to 19 standards can be used for calibration for direct measurements.

Ordering information

2.781.0010	781 pH/Ion Meter

Options

2.140.0200	Impact printer CUSTOM DP40-S4N
2.801.0040	801 Magnetic Stirrer with stand
2.802.0040	802 Propeller rod stirrer for 804 Titration stand
2.804.0040	804 Ti Stand with stand
6.2134.110	Cable RS232 DB9 f - DB9 m
6.2148.010	Remote Box MSB

781 pH/Ion Meter

867 pH Module

With the 867 pH Module pH and ion measurement is possible at the highest level. It can be used as a stand-alone instrument together with an 840 Touch Control or as an extension to a Titrando system.

In addition to the measurement of pH, temperature, mV, I_{pol}, U_{pol} and concentration, standard additions (manual, dos, autodos) can be carried out as well as liquid handling functions (add, prep, empty). The 867 pH Module allows the use of both intelligent electrodes – «iTrodes» – and conventional electrodes. A polarized measuring input is also present.

The 867 pH Module is a modern pH/ion meter with automatic stirrer control and the possibility of using intelligent dosing elements.

The instrument has 2 USB interfaces for the connection of USB printers, autosamplers or barcode readers and 4 MSB interfaces for connecting stirrers or 800 Dosinos (for the addition of auxiliary solution or standard addition).

Whether operated by Touch Control as a stand-alone pH meter or by PC Control or ***tiamo™*** (from 2.0), the 867 pH Module complies with GLP and FDA requirements.

Ordering information

2.867.0010	867 pH Module
2.867.0110	867 pH Module with Touch Control
2.867.0210	867 pH Module with tiamo 2.0 light

Options

2.801.0040	801 Magnetic Stirrer with stand
2.802.0040	802 Propeller rod stirrer for 804 Titration stand
2.804.0040	804 Ti Stand with stand
2.800.0010	800 Dosino
6.2151.000	Cable USB A - mini-DIN 8P

Conductometer
856 Conductivity Module

The 856 Conductivity Module can be used as a stand-alone instrument in combination with an 840 Touch Control or as an extension to a Titrando system.

With the help of the optional 6.2103.160 Adapter box the classical Metrohm conductivity measuring cells can continue to be used with the instrument.

Thanks to the galvanically separated measuring input pH and conductivity can be determined in the same beaker without interference.

The Conductivity Module has 2 USB interfaces for connection of USB printers, barcode readers or sample changers and 4 MSB interfaces for stirrers or 800 Dosinos.

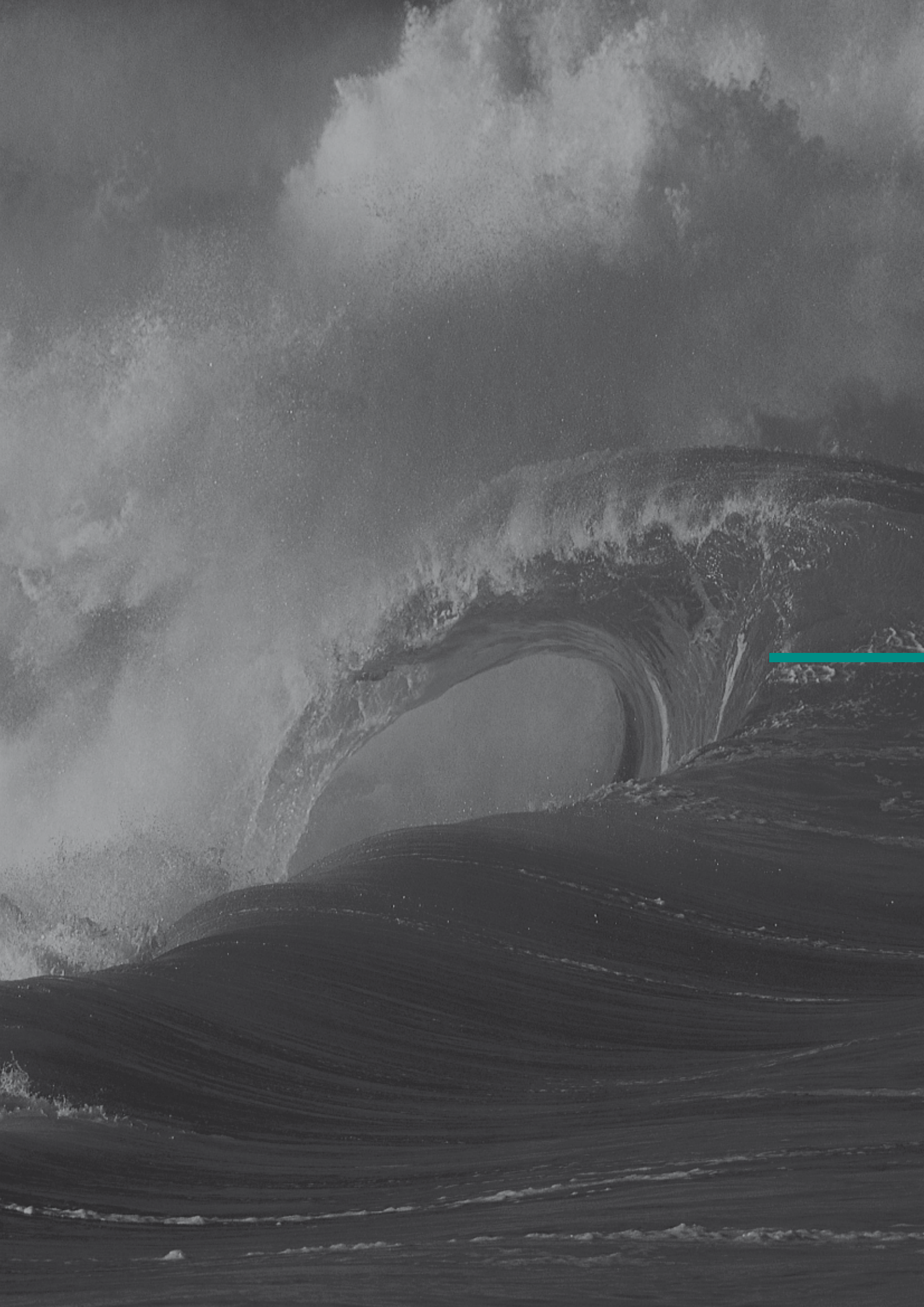
Whether operated by Touch Control as a stand-alone pH meter or by PC Control or ***tiamo***™ (from 2.0), the 856 Conductivity Module complies with GLP and FDA requirements.

Ordering information

2.856.0010	856 Conductivity Module
2.856.0110	856 Conductivity Module with Touch Control
2.856.0210	856 Conductivity Module with tiamo 2.0 light

Options

2.801.0040	801 Magnetic Stirrer with stand
2.802.0040	802 Propeller rod stirrer for 804 Titration stand
2.804.0040	804 Ti Stand with stand
6.0915.100	Conductivity measuring cell, c=0.7 cm^{-1} (5-Ring) with integrated Pt1000
6.0915.130	Conductivity measuring cell, c=1.0 cm^{-1} (5-Ring) with integrated Pt1000
6.2324.100	Conductivity Standard 100 µS/cm, 5 x 30 mL
6.2324.000	Conductivity standard 100 µS/cm, 250 mL
6.2301.060	KCl ion standard 250 mL
6.2103.160	ADAPTER 4 X BU B/STECKER N
6.2151.000	Cable USB A - mini-DIN 8P



Potentiometric and thermometric titration

Potentiometric and thermometric titration

Despite the introduction of numerous other methods, titration – one of the oldest analytical methods – has not become any less important today. This is not just a result of the unique advantages of the method, but also of modern developments in titration techniques. As the market leader in titration, Metrohm offers a wide range of titrators.

Potentiometric titrators

Thermometric titration

Potentiometric Titrators – Overview

Potentiometric Titrators	Titrino Plus			Titrando								
	870	877	848	890	841	842	888	808	809	835	836	857
Intelligent Sensor «iTrodes»	–	–	–	–	–	–	yes	–	–	–	–	yes
Volumetric Karl Fischer Titration	yes	–	–	yes	yes	–	–	–	–	yes	yes	yes
Ion Measurement / Standardaddition	–	–	–	–	–	–	–	yes	yes	yes	yes	yes
pH Measurement	–	yes	yes	–	yes	yes	yes	yes	yes	yes	yes	yes
Endpoint Titration	–	yes	yes	–	yes	yes	yes	yes	yes	yes	yes	yes
Dynamic Equivalence Point Titration	–	–	yes	–	–	–	yes	yes	yes	yes	yes	yes
Monotonic Equivalence Point Titration	–	yes	yes	–	–	–	yes	yes	yes	yes	yes	yes
Liquid Handling	–	–	–	–	–	yes	–	yes	yes	yes	yes	yes
STAT Titration	–	–	–	–	–	yes	–	–	–	yes	yes	yes
Dosino Technology	–	–	–	–	yes	yes	–	–	yes	–	yes	yes
Software Control	–	–	–	yes	yes	yes	yes	yes	yes	yes	yes	yes
Touch Control	–	–	–	yes	yes	yes	yes	yes	yes	yes	yes	yes
Live Display	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Report Printing / LIMS	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Balance Connection via RS232	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Titrando family

Depending on the model, the Titrando supports the titration modes DET (dynamic equivalence point titration), MET (monotonic equivalence point titration), SET (titration to one or two predefined endpoints), KFT (volumetric Karl Fischer titration) and pH-STAT.

Ion meter
With the measuring modes MEAS pH and MEAS CONC not only pH, potential and temperature can be measured. Direct concentration determination and standard addition is also possible with ion-selective electrodes.

Comprehensive liquid handling
Basic operations in daily laboratory work, such as pipetting, transferring, dosing, dispensing and diluting become perfectly easy thanks to the liquid handling functions of the Titrando. No matter whether you connect the Dosino directly to the Titrando or carry out operations using a USB Sample Processor, both systems guarantee the highest accuracy and precision in the range from 10 µL to 100 mL.

Measuring input
The measuring interface of the Titrando features a high-impedance input and an input for polarizable electrodes, as well as a separate reference input and an input for a Pt 1000 or NTC temperature sensor. The resolution of the inputs is 0.1 mV or 0.001 pH. Up to two galvanically separate measuring interfaces can be installed.

MSB connection
With the four built-in MSBs (Metrohm Serial Bus) up to 4 Dosinos or Dosimats, 4 magnetic or rod stirrers and 4 remote boxes for automation can be controlled. This means that the modular Titrando system is the most flexible titration system on the market. Plug-and-play functionality saves the manual configuration of peripheral devices; the Titrando automatically recognizes the connected device.

USB connection
For communication with balances, printers and other USB-capable devices two USB ports are available. Laboratory balances can be connected via an RS-232 converter.

The Dosino – dosing on a minimum footprint
With the Titrando dosing is carried out with a Dosino and an intelligent dosing unit which is mounted directly onto the reagent bottle. A data chip contains all the information on the reagent and dosing unit that is required for titration. The dosing unit can be exchanged in no time at all. Each dosing unit has its own serial and cylinder numbers and comes with its own individual certificate.

Intelligent electrodes «iTrodes»
The built-in memory chip makes it possible to store important sensor data such as article and serial number, calibration data, calibration history, working life and calibration validity. All sensor data is read in automatically on connection to an 857 Titrando. This prevents editing confusion or errors. If the type of electrode is different from that defined in the method, then the user is informed. Monitoring functions allow the exclusion of electrodes whose calibration data lies outside the limits or whose calibration has expired. If the sensor is used with different instruments, then the calibration data stored in the chip makes the electrode transferrable; it no longer needs to be recalibrated each time that it is used with different instruments.

Operation – it's your choice
Touch Control is an ergonomic and modern operating unit. You can hold it in your hand, put it on the bench or mount it on the wall. Of course, the Titrando can be operated from virtually any PC. If using the PC Control software you can operate the Titrando by mouse click. Look and operation are practically identical to Touch Control. Methods and determinations are 100% compatible.In addition to the PC Control software, the new ***tiamo***™ titration software is also available. In addition to the standard functions for controlling a Titrando, ***tiamo***™ offers numerous other functions, such as a client-server database or real parallel titration.

Automation without limits
Increasing numbers of samples, complicated sample preparation steps and unattended overnight operation soon call for the use of a sample changer. The Titrando has the necessary intelligence for controlling sample changers. No matter whether large or small sample capacity, one or two workstations, measuring out the sample, sample preparation, liquid handling, rinsing and calibrating the electrodes – the new USB Sample Processors offer a high degree of automation at an economic price perfomance ratio.

Titrando

888 Titrando with Touch Control (2.888.0110)

High-end titrator with built-in buret drive. Dynamic (DET) and monotonic (MET) titration, endpoint titration (SET), measurements. With four MSB connections, one measuring interface (also for intelligent electrodes «iTrodes») and USB connection. Including 840 Touch Control, 801 magnetic stirrer, exchange unit 20 mL and combined pH electrode «Ecotrode plus».

888 Titrando mit *tiamo*™ light (2.888.0210)

High-end titrator with built-in buret drive. Dynamic (DET) and monotonic (MET) titration, endpoint titration (SET), measurements. With four MSB connections, one measuring interface (also for intelligent electrodes «iTrodes») and USB connection. Including titration software *tiamo*™light, 801 magnetic stirrer, exchange unit 20 mL and combined pH electrode «Ecotrode plus».

808 Titrando (2.808.0010)

- Potentiometric titration
- Intelligent dosing elements
- Sample Processor control
- Liquid handling with the unique Dosino
- Complies with GMP/GLP and FDA regulations such as 21 CFR Part 11
- USB interfaces for sample changer, printer, PC keyboard, barcode reader…
- Machine-readable PC/LIMS report
- Client-server database thanks to ***tiamo™***
- Parallel titration with ***tiamo™***

High-end titrator with built-in buret drive. Dynamic (DET) and monotonic (MET) titration, endpoint titration (SET), measurements with ion-sensitive electrodes (MEAS CONC), dosing functions (DOS), liquid handling. With four MSB connections, one measuring interface, USB connection.

808 Titrando (2.808.0020)

- Potentiometric titration
- Intelligent dosing elements
- Sample Processor control
- Liquid handling with the unique Dosino
- Complies with GMP/GLP and FDA regulations such as 21 CFR Part 11
- USB interfaces for sample changer, printer, PC keyboard, barcode reader…
- Machine-readable PC/LIMS report
- Client-server database thanks to ***tiamo***™
- Parallel titration with ***tiamo***™

High-end titrator with built-in buret drive. Dynamic (DET) and monotonic (MET) titration, endpoint titration (SET), measurements with ion-selective electrodes (MEAS CONC), dosing functions (DOS), liquid handling. With four MSB connections, two galvanically separate measuring interfaces, USB connection.

809 Titrando (2.809.0010)

- Potentiometric titration
- Intelligent dosing elements
- Space-saving dosing with the unique Dosino
- Sample Processor control
- Liquid handling with the unique Dosino
- Complies with GMP/GLP and FDA regulations such as 21 CFR Part 11
- USB-interfaces for sample changer, printer, PC keyboard, barcode reader…
- Machine-readable PC/LIMS report
- Client-server database thanks to ***tiamo***™
- Parallel titrations with ***tiamo***™

High-end titrator for up to four 800 Dosino dosing systems. Dynamic (DET) and monotonic (MET) titration, endpoint titration (SET), measurements with ion-selective electrodes (MEAS CONC), dosing functions with monitoring (DOS), liquid handling. With four MSB connections, one galvanically separate measuring interface, USB connection.

809 Titrando (2.809.0020)

- Potentiometric titration
- Intelligent dosing elements
- Space-saving dosing with the unique Dosino
- Sample Processor control
- Liquid handling with the unique Dosino
- Complies with GMP/GLP and FDA regulations such as 21 CFR Part 11
- USB interfaces for sample changer, printer, PC keyboard, barcode reader…
- Machine-readable PC/LIMS report
- Client-server database thanks to ***tiamo***™
- Parallel titration with ***tiamo***™

High-end titrator for up to four 800 Dosino dosing systems. Dynamic (DET) and monotonic (MET) titration, endpoint titration (SET), measurements with ion-selective electrodes (MEAS CONC), dosing functions with monitoring (DOS), liquid handling. With four MSB connections, two galvanically separate measuring interfaces, USB connection.

835 Titrando (2.835.0010)

- Potentiometric and Karl Fischer titration
- STAT titration
- Monitored dosing in synthesis lab
- Interruption-free dosing in tandem operation
- Intelligent dosing elements
- Sample Processor control
- Lab Link for Intranet and Internet
- Liquid handling with the unique Dosino
- Complies with GMP/GLP and FDA regulations such as 21 CFR Part 11
- USB interfaces for sample changer, printer, PC keyboard, barcode reader…
- Machine-readable PC/LIMS report
- Client-server database thanks to ***tiamo***™
- Parallel titration with ***tiamo***™
- Automatic reagent exchange with the unique Dosino

High-end titrator with built-in buret drive. Dynamic (DET) and monotonic (MET) titration, endpoint titration (SET), enzymatic and pH-STAT titrations (STAT), Karl Fischer titration (KFT), measurements with ion-sensitive electrodes (MEAS CONC), dosing functions with monitoring (DOS), liquid handling. With four MSB connections, one galvanically separate measuring interface, USB connection.

835 Titrando (2.835.0020)

- Potentiometric and Karl Fischer titration
- STAT titration
- Monitored dosing in synthesis lab
- Interruption-free dosing in tandem operation
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- Sample Processor control
- Lab Link for Intranet and Internet
- Liquid handling with the unique Dosino
- Complies with GMP/GLP and FDA regulations such as 21 CFR Part 11
- USB interfaces for sample changer, printer, PC keyboard, barcode reader…
- Machine-readable PC/LIMS report
- Client-server database thanks to ***tiamo***™
- Parallel titration with ***tiamo***™
- Automatic reagent exchange with the unique Dosino

High-end titrator with built-in buret drive. Dynamic (DET) and monotonic (MET) titration, endpoint titration (SET), enzymatic and pH-STAT titrations (STAT), Karl Fischer titration (KFT), measurements with ion-selective electrodes (MEAS CONC), dosing functions with monitoring (DOS), liquid handling. With four MSB connections, two galvanically separate measuring interfaces, USB connection.

836 Titrando (2.836.0010)

- Potentiometric and Karl Fischer titration
- STAT titration
- Monitored dosing in synthesis lab
- Interruption-free dosing in tandem operation
- Intelligent dosing elements
- Sample Processor control
- Lab Link for Intranet and Internet
- Liquid handling with the unique Dosino
- Complies with GMP/GLP and FDA regulations such as 21 CFR Part 11
- USB interfaces for sample changer, printer, PC keyboard, barcode reader…
- Space-saving dosing with the unique Dosino
- Machine-readable PC/LIMS report
- Client-server database thanks to ***tiamo***™
- Parallel titration with ***tiamo***™
- Automatic reagent exchange with the unique Dosino

High-end titrator for up to four 800 Dosino dosing systems. Dynamic (DET) and monotonic (MET) titration, endpoint titration (SET), enzymatic and pH-STAT titrations (STAT), Karl Fischer titration (KFT), measurements with ion-selective electrodes (MEAS CONC), dosing functions with monitoring (DOS), liquid handling. With four MSB connections, one galvanically separate measuring interface, USB connection.

836 Titrando (2.836.0020)

- Potentiometric and Karl Fischer titration
- STAT titration
- Monitored dosing in synthesis lab
- Interruption-free dosing in tandem operation
- Intelligent dosing elements
- Sample Processor control
- Lab Link for Intranet and Internet
- Liquid handling with the unique Dosino
- Complies with GMP/GLP and FDA regulations such as 21 CFR Part 11
- USB interfaces for sample changer, printer, PC keyboard, barcode reader…
- Space-saving dosing with the unique Dosino
- Machine-readable PC/LIMS report
- Client-server database thanks to ***tiamo***™
- Parallel titration with ***tiamo***™
- Automatic reagent exchange with the unique Dosino

High-end titrator for up to four 800 Dosino dosing systems. Dynamic (DET) and monotonic (MET) titration, endpoint titration (SET), enzymatic and pH-STAT titrations (STAT), Karl Fischer titration (KFT), measurements with ion-selective electrodes (MEAS CONC), dosing functions with monitoring (DOS), liquid handling. With four MSB connections, two galvanically separate measuring interfaces, USB connection.

842 Titrando (2.842.0010)

- Potentiometric SET titration
- STAT titration
- Monitored dosing in synthesis lab
- Interruption-free dosing in tandem operation
- Intelligent dosing elements
- Sample Processor control
- Lab Link for Intranet and Internet
- Liquid handling with the unique Dosino
- Complies with GMP/GLP and FDA regulations such as 21 CFR Part 11
- USB interfaces for sample changer, printer, PC keyboard, barcode reader…
- Space-saving dosing with the unique Dosino
- Machine-readable PC/LIMS report
- Client-server database thanks to ***tiamo***™
- Parallel titrations with ***tiamo***™

High-end titrator for up to four 800 Dosino dosing systems. Endpoint titration (SET), enzymatic and pH-STAT titrations (STAT), dosing functions with monitoring (DOS), liquid handling. With four MSB connections, one galvanically separate measuring interface, USB connection.

857 Titrando (2.857.0010)

High-end titrator for use of intelligent electrodes – iTrodes – and up to four 800 Dosino dosing systems. Dynamic (DET) and monotonic (MET) titration, end-point titration (SET), enzymatic and pH-STAT titrations (STAT), dosing functions with monitoring (DOS), liquid handling. With four MSB connections, one measuring interface («iTrodes» only), USB connection.

857 Titrando (2.857.0020)

High-end titrator for use of intelligent electrodes – iTrodes – and up to four 800 Dosino dosing systems. Dynamic (DET) and monotonic (MET) titration, end-point titration (SET), enzymatic and pH-STAT titrations (STAT), Karl Fischer titration (KFT), measurements with ion-selective electrodes (MEAS CONC), dosing functions with monitoring (DOS), liquid handling. With four MSB connections, two measuring interfaces (one exclusively for iTrodes plus a combined one for iTrodes and conventional potentiometric electrodes), USB connection.

Surf Titrando Ionic (2.809.1010)

The Surf Titrando Ionic is based on the 809 Titrando and offers you a complete package for the most common analyses of ionic surfactants. Apart from the titration software ***tiamo***™ light and determination methods described in detail, you will also receive comprehensive accessories for your titrations.

Surf Titrando Two Phase (2.809.1020)

The Surf Titrando Two Phase is based on the 809 Titrando and offers you a complete package for the most common analyses of ionic surfactants. Apart from the titration software ***tiamo***™ light and determination methods described in detail, you will also receive comprehensive accessories for your titrations.

Surf Titrando NIO (2.809.2010)

The Surf Titrando NIO is based on the 809 Titrando and offers you a complete package for the most common analyses of ionic surfactants. Apart from the titration software ***tiamo***™ light and determination methods described in detail, you will also receive comprehensive accessories for your titrations.

Plate Titrando (2.809.2020)

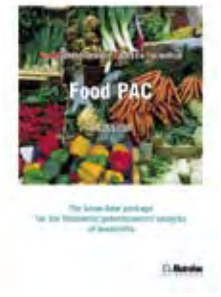
The Plate Titrando is based on the 809 Titrando and offers you a complete package for the most common analyses of plating baths. Apart from the titration software ***tiamo***™ light and determination methods described in detail, you will also receive comprehensiive accessories for your titrations.

Oil Titrando (2.809.3010)

The Oil Titrando is based on the 809 Titrando and offers you a complete package for the most common analyses of petrochemical products. Apart from the titration software ***tiamo***™ light and determination methods described in detail, you will also receive comprehensive accessories for your titrations.

Food Titrando (2.809.4010)

The Food Titrando is based on the 809 Titrando and offers you a complete package for the most common analyses of foods. Apart from the titratoin software ***tiamo***™ light and determination methods described in detail, you will also receive comprehensive accessories for your titrations.



Pharm Titrando (2.836.1020)

The Pharm Titrando is based on the 836 Titrando and offers you a complete package for the most common analyses of pharmaceutical products. Apart from the titration software ***tiamo***™ full and determination methods described in detail, you will also receive comprehensive accessories for your titrations.

Input units and software

840 Touch Control (2.840.0100)

- Touch Control with large color display
- Intuitive operation
- Expert and routine dialog
- «Quick Access» (direct parameters)
- Sample Processor control
- Lab Link for Intranet and Internet
- Online help
- Standard user methods, method and calculation formula templates
- Complies with GMP/GLP and FDA regulations such as 21 CFR Part 11
- Wireless communication via Bluetooth for printer, balance…

Operating element for Titrandos, USB Sample Processors and 846 Dosing Interface. Touch-sensitive color display. Simple and intuitive user guidance. Compliant with 21 CFR Part 11. Two PCMCIA card slots. Standard dialog language English; one further language can be retrofitted. Including CompactFlash card with adapter, demo version of the PC Control Software.

Titrando Software PC Control 4.1 (6.6050.310)

PC software for controlling Titrandos, USB Sample Processors, 846 Dosing Interface, 847 USB Lab Link and 857 Titrando with intelligent sensors. Simple and intuitive user guidance. Method and data compatible with Touch Control. Compliant with 21 CFR Part 11. Standard dialog languages English and German; one further language can be retrofitted. Including hardware dongle. The 6.2151.000 Cable is required for connecting the Titrando to a PC.

tiamo™ 1.2 Light (6.6056.121)

PC program for controlling a titration system.

- Up to two instruments can be connected.
- Graphical method editor with numerous templates
- Layout Manager for display adjustment
- Professional database with recalculation
- Powerful report generator
- No parallel titration, no data export
- 1 License
- Dialog language English, German, simplified Chinese, traditional Chinese, Korean, Russian, Polish or Italian

tiamo™ 1.2 Full (6.6056.122)

Program for controlling complex titration systems.

- Graphical method editor with numerous templates
- Layout Manager for display adjustment
- Professional database with recalculation
- Export to LIMS, NuGenesis, Cyberlab etc.
- Powerful report generator
- Complies with FDA 21 CFR Part 11
- Parallel titration
- 1 License
- Dialog language English, German, simplified Chinese, traditional Chinese, Korean, Russian, Polish or Italian

tiamo™ 1.2 Multi (6.6056.123)

Client/server program controlling complex titration systems.

- Graphical method editor with numerous templates
- Layout Manager for display adjustment
- Client/server database
- Professional database with recalculation
- Export to LIMS, NuGenesis, Cyberlab etc.
- Powerful report generator
- Complies with FDA 21 CFR Part 11
- Parallel titration
- 3 Licenses
- Dialog language English, German, simplified Chinese, traditional Chinese, Korean, Russian, Polish or Italian

Titrando - optional accessories

800 Dosino (2.800.0010)

Drive with write/read hardware for intelligent dosing units. With fixed cable.

802 Propeller rod stirrer for 804 Titration stand (2.802.0040)

Rod stirrer with 6.1909.010 Propeller stirrer.

804 Ti Stand without stand rod (2.804.0010)

Titration stand and controller for 802 Rod Stirrer. 804 Ti Stand together with 802 Rod Stirrer provides an alternative to the magnetic stirrer. Without accessories.

804 Ti Stand with stand (2.804.0040)

Titration stand and controller for 802 Rod Stirrer. 804 Ti Stand together with 802 Rod Stirrer provides an alternative to the magnetic stirrer. Ti Stand with base plate, support rod and electrode holder.

805 Dosimat (2.805.0010)

Dosing device for Titrando and Sample Processor with read/write hardware for intelligent Exchange Units. With permanently attached cable. Without Exchange Unit.

846 Dosing Interface (2.846.0010)

USB controller for up to four 700/800 Dosinos or 685/805 Dosimats for dosing or liquid handling tasks. A Touch Control or the connection to a PC with PC Control or ***tiamo***™ is necessary.

847 USB Lab Link (2.847.0010)

847 USB Lab Link – rapid network connection for Titrando.

856 Conductivity Module (2.856.0010)

Conductivity measuring module as additional measuring input for Titrando systems or stand alone unit in combination with a 840 Touch Control.

867 pH Module (2.867.0010)

Module for pH/ion measurement as upgrade to a Titrando or stand alone unit in combination with a 840 Touch control.

Titrino plus

The Titrino plus, the new entry-level titrator from Metrohm in the potentiometric titration sector, primarily captivates with its attractive price-performance ratio. A large live display with titration curve, the plug-and-play functionality of exchange unit, stirrer and USB printer, a high-precision measuring input, operation by mouse click – the Titrino plus offers considerably more than you would expect in this price category. With its operator dialog tailored to the needs of the routine user, the Titrino plus instruments are so simple to use that only a short familiarization period is required. Their robustness makes them the ideal titrators for routine determinations in day-to-day laboratory use.

Potentiometrc titration
The 877 Titrino plus supports the titration modes MET (monotonic equivalence point titration) and SET (titration to one or two predefined endpoints). The 848 Titrino plus additionally supports the titration mode DET (dynamic equivalence point titration).

Live Curve for real time control
All Titrino plus models feature a display with live curve, thus the user is always informed about the current state of the titration.

Highest precision thanks to new measuring input
The Titrino plus is, like the Titrando high-end titrator, equipped with a high-resolution measuring input that guarantees results of the highest precision.

Easiest installation
Installing a Titrino plus is easy. Exchange unit, stirrer and USB compact printer are recognized and configured automatically upon connection.

Mouse or keys – choose your favorite!
The Titrino plus can be controlled either by mouse-click or keyboard.

For communication with **balances or printers** a USB port is available. This opens up the world of USB-capable color printers for report printout and other USB-capable devices. Laboratory balances can be connected with the aid of an RS 232 converter.

Intelligent exchange unit for more comfort
The chip of the intelligent Metrohm exchange unit automatically provides the titrator with the data (cylinder volume, type of reagent, titer expiry date...) that is required for carrying out an error-free titration. This means that you are always titrating under optimal conditions and, for example, do not have to repeat measurements because of an expired titer.

Titrino plus

848 Titrino plus (2.848.0010)

Compact titrator for dynamic (DET) and monotonic (MET) titrations with automatic equivalence point recognition as well as endpoint titrations (SET).

848 Titrino plus

Food/Beverage Titrino plus (2.848.1010)

The Food/Beverage Titrino plus offers you a complete package for the most common analyses in the food branch. Apart from almost 100 determination methods described in detail, you also receive all the accessories required for your titrations.

848 Titrino plus

Salt Titrino plus (2.848.2010)

The Salt Titrino plus offers you a complete package for analysing chloride in various samples. Apart from several determination methods described in detail, you also receive all the accessories required for your titrations.

848 Titrino plus

Oil Titrino plus (2.848.3010)

The Oil Titrino plus offers you a complete package for analysing the total acid number (TAN) or total base number (TBN) of petroleum products. Apart from the determination methods described in detail, you also receive all the accessories required for your titrations.

848 Titrino plus

877 Titrino plus (2.877.0010)

Compact titrator for potentiometric endpoint titrations (SET) and monotonic titrations with automatic equivalence point determination (MET).

877 Titrino plus

Titrino plus - optional accessories

USB Thermal printer NEO's (2.141.0100)

Compact printer with USB interface, paper width 60 mm (40 characters). Including 6.2151.120 USB cable.

USB Thermal printer Neo's

801 Magnetic Stirrer with stand (2.801.0040)

Magnetic stirrer with base plate, support rod and electrode holder for use with Titrino plus, Titrandos, Sample Processors, 805 Dosimat and 780/781 pH Meters. With permanently attached cable for MSB (Metrohm Serial Bus).

802 Propeller rod stirrer for 804 Titration stand (2.802.0040)

Rod stirrer with 6.1909.010 Propeller stirrer.

804 Ti Stand without stand rod (2.804.0010)

Titration stand and controller for 802 Rod Stirrer. 804 Ti Stand together with 802 Rod Stirrer provides an alternative to the magnetic stirrer. Without accessories.

804 Ti Stand with stand (2.804.0040)

Titration stand and controller for 802 Rod Stirrer. 804 Ti Stand together with 802 Rod Stirrer provides an alternative to the magnetic stirrer. Ti Stand with base plate, support rod and electrode holder.

869 Compact Sample Changer (2.869.0010)

- Economic automation
- Space-saving
- Different method templates
- Easy to use
- A total of 12 positions
- Live-Display

The 869 Compact Sample Changer provides automation on a minimum footprint.

869 Compact Sample Changer

859 Titrotherm

859 Titrotherm – thermometric titration with Thermoprobe

Thermometric titration is a versatile determination method and an ideal complement to potentiometric titration. In principle it is suitable for any reaction that produces a sufficiently large temparature change in the sample solution. It is particularly suitable for application in which

- no suitable potentiometric sensor is available,
- no suitable reference electrode exists,
- the sample would affect or even destroy the indicator electrode,
- no suitable solvent is available for potentiometry.

The 859 Metrohm Titrotherm combines innovative sensor technology with the titration know-how from Metrohm. The temperature sensor (Thermistor) is based on semiconductor technology and has a response time of 0.3 s and a resolution of 10^{-5} K. This makes the Thermoprobe the ideal sensor for thermometric titrations, as it can follow each temperature change rapidly and precisely.

The Dosino technology from Metrohm has defined a new standard in volumetric titration. The dosing unit with its drive motor is mounted on the reagent bottle and guarantees maximum precision with minimum space requirements.

The Titrotherm software allows the screen contents to be adapted to suit the particular method parameters and this makes rapid access to important commands or parameters possible. Endpoints are determined by calculating the first and second derivatives of the titration curve; with additional optimization parameters reproducibility can be further improved.

Optionally the 859 Titrotherm can be automated by using an 814 USB Sample Processor.

Ordering information

2.136.0010	859 Titrotherm

Options

6.9011.020	Thermoprobe for 859 Titrotherm
6.9011.030	Adapter cable for 859/Plug F
6.9011.040	HF resistant Thermoprobe for 859 Titrotherm

859 Titrotherm

Karl Fischer titration

Karl Fischer titration

Never has Karl Fischer titration been so easy. Water traces can be determined just as easily as high water contents (up to 100%). For each sample and for each application you will find the perfect instrument for obtaining precise and accurate results.

Karl Fischer titration

Introduction to Karl Fischer titration

Karl Fischer water determination is one of the most frequently used laboratory methods worldwide. In contrast to other water determination methods it is specific, fast and the amount of apparatus required is very small.

With an application range of **0.1% to 100% water, volumetric Karl Fischer titration** is used in a wide variety of industries. The advantage of volumetry is that not only liquid samples but also solid or pasty samples can be put directly into the titration vessel. No matter whether you want to determine water in food, cosmetics or pharmaceutical products, with Metrohm KF titrators you are always right.

As far as quantities in the trace range (**10 µg to 10 mg water absolute**) are concerned, **coulometry** is the optimal method to determine water in liquids, solids and gases. Coulometry is also an absolute method and therefore requires no titer determination.

For difficult samples we can offer you intelligent solutions for **sample preparation,** e.g. the KF oven technique or sample pulverization with a homogenizer included in the system.

With a high sample throughput the use of automated systems pays for itself very quickly. Metrohm **KF automation** offers you sophisticated techniques for both volumetric and coulometric KF titration.

Volumetric KF titrators – tabular

Technical specification	870 KF Titrino Plus	890 Titrando	841 Titrando
Volumetric Karl Fischer titration (KFT)	yes	yes	yes
Titration to preset pH/mV endpoint (SET)	–	–	yes
pH calibration and pH measurement (CAL, MEAS)	–	–	yes
Real-time curve display	yes	yes	yes
Predefined methods	yes	yes	yes
Parallel titration	–	–	yes (*tiamo*)
Inputs, interfaces			
Second, galvanically separated measuring interface	–	–	option
Automated reagent exchange with Dosino	–	yes	yes
MSB-port for connection of further Dosinos (addition of auxiliary solution,…)	–	3	4
MSB-port for connection of further Dosinos (Titration)	–	–	4
Attachment of stirrer	yes	yes	yes
Sample changer connection	–	yes	yes
Attachment of printer, balance, …	USB (1)	USB (2)	USB (2)
Optional interfaces	RS 232C	RS 232C	RS 232C
Software			
tiamo™	–	yes	yes
PC Control or Touch Control	–	yes	yes

Karl Fischer Titrando
841/890 Titrando

Karl Fischer titrators for the modern titration lab

Due to their **simple and intuitive user guidance,** the KF Titrandos are the optimal instruments both for **routine work** and **for demanding applications in development laboratories**. With the KF Titrando you have a titration system than can be adapted to meet all imaginable requirements without any compromises at all.

An electrode test and the specially created parameter «Safety stop» prevent the cell from overflowing during conditioning, i.e. conditioning is stopped after a certain time or the addition of a certain amount of KF reagent **(Laboratory safety)**. The sophisticated control algorithm of the Titrando is adapted to the characteristics of the Karl Fischer reaction and guarantees results of the highest precision.

Choose your favorite! Both the 841 Titrando and the 890 Titrando can be used either as a stand-alone system with Touch Control or via a PC using the ***tiamo***™ software.

841 Titrando

In addition to the Karl Fischer mode (KFT), the 841 Titrando also features the SET mode, thus allowing titrations to a predefined endpoint. The instrument is also suitable for high-precision pH measurements.

Thanks to the four MSB connections up to four 800 Dosino dosing systems can be connected to the 841 Titrando. These can be used for titration, but also for the automated addition of sample, standard and auxiliary solutions such as solubility promoters. All liquid handling commands are also available.

Because of its special properties the 800 Dosino is the optimal dosing system for KF titration. Thanks to the «Empty» command the Dosino can be completely emptied; as a result opening and cleaning the dosing unit is no longer necessary. In contrast to the exchange unit, repeated rinsing before titer adjustment is no longer necessary; you save both time and reagents.

890 Titrando

The 890 Titrando offers the same high-end features as the 841 Titrando, but is limited to the KF mode and titrates only with the well-proven exchange unit. In addition up to three 800 Dosino dosing systems can be connected and used for the automated addition of sample, standard and auxiliary solutions. All liquid handling commands are also available.

Ordering information

2.841.0010	841 Titrando
2.890.0110	Titrando 890 with Touch Control
2.890.0210	890 Titrando with ***tiamo***™ light

Options

2.803.0010	803 TI Stand with stirrer and pump
6.2061.010	Bottle holder for Dosinos
2.840.0100	840 Touch Control
6.6050.310	Titrando Software PC Control 4.1
6.6056.121	***tiamo***™ 1.2 Light
6.6056.122	***tiamo***™ 1.2 Full
6.6056.123	***tiamo***™ 1.2 Multi
6.3026.150	Exchange unit / 5 mL
6.3026.210	Exchange unit / 10 mL
6.3026.220	Exchange unit / 20 mL
2.800.0010	800 Dosino
6.3032.120	Dosing unit complete / 2 mL
6.3032.150	Dosing unit complete / 5 mL
6.3032.210	Dosing unit complete / 10 mL
6.3032.220	Dosing unit complete / 20 mL

841 Titrando with 803 Ti Stand and Touch Control

870 KF Titrino plus

- Straightforward installation
- Easy operation due to predefined methods
- Excellent precision thanks to the high-resolution measuring input
- Live curve for recognizing side-reactions
- Overflow protection for increased operating safety
- Compact USB printer as an option

The favorably priced 870 Titrino plus is Metrohm's new Karl Fischer titrator for volumetric water determination. It can be used to determine water contents from a few ppm up to 100% reliably and accurately in solid, liquid and gaseous samples. With its operating interface designed for routine users, the 870 Titrino plus is so easy to use that it only requires a short familiarization period. Due to its robustness, it is also the ideal titrator for routine determinations. **Titration vessel and electrode** are included in delivery.

Very simple installation
Installation of the 870 Titrino plus is simple. As soon as they are connected, the exchange unit, stirrer and compact USB printer are recognized and configured automatically.

Ready-to-use methods simplify your work
You only have to decide whether you want to carry out a titer, blank value or water determination and then start the titration by pressing just one key.

870 KF Titrino plus with 803 Ti Stand and reagent organizer

Ordering information
2.870.0010 870 KF Titrino plus

Formulas included
The appropriate calculation formulas for each method are stored in the titrator.

Mouse or keyboard – choose your favorite!
The 870 Titrino plus is the first titrator that can be controlled either by mouse-click or keyboard – the choice is yours.

Highest precision thanks to new measuring input
Just like the Titrando high-end titrator, the new KF titrator is also equipped with a high-resolution measuring input that guarantees results of the highest precision.

The live curve allows you to recognize side-reactions
Metrohm KF titrators feature a display with live curve as standard. This allows you to recognize side-reactions in good time and take measures to suppress them.

New parameters improve working safety
Great importance has been given to working safety: The new titrator allows safe handling of Karl Fischer reagents. The new safety parameter «Conditioning options» prevents the titration cell from overflowing.

Optional:

Intelligent Exchange Unit for more convenience
The chip of the intelligent Metrohm Exchange Unit automatically provides the titrator with all the data (cylinder volume, type of KF reagent, expiry date of titer, etc.) that is necessary to carry out an error-free titration. This means that you always titrate under optimal conditions.

The 803 KF Titration Stand
The 803 KF Titration Stand is used for stirring and for exchanging the used working medium. The built-in pump aspirates off the used titration solution and adds new working medium without you having to open the cell.

KF Coulometer
756/831 KF Coulometer

The Metrohm KF Coulometers are suitable for precise water determinations in the trace range (1ppm...10%). They are available with two different types of generator electrodes. The diaphragm-less generator electrode requires only one reagent and is practically maintenance-free. The use of the generator electrode with diaphragm is preferred for the following applications: very low water content (< 100 µg water absolute), when ketone reagents are used or with a high content of solubility promoter (> 10%).

With or without printer – choose as you prefer! The 756 KF Coulometer is equipped with a built-in thermal printer. However, just like the 831 KF Coulometer, you can also connect an external printer or connect the instrument to a PC, in which case you can choose between the Metrodata Vesuv and ***tiamo***™ software.

With our KF Coulometers you receive a complete titration cell and extensive accessories. KF Coulometers with the diaphragm generator electrode are delivered with the 728 Magnetic Stirrer as part of the accessories.

Convincing arguments:

- Live curve for early recognition of possible side-reactions
- Simple operation due to dialog in German, English, French, Spanish, Italian, Portuguese and Swedish.
- Expert or routine mode selectable
- Internal memory for up to 100 methods

Ordering information

2.756.0010	756 KF Coulometer including generator electrode with diaphragm
2.756.0110	756 KF Coulometer including diaphragmless generator electrode
2.831.0010	831 KF Coulometer including generator electrode with diaphragm
2.831.0110	831 KF Coulometer including diaphragmless generator electrode

Options

2.728.0010	728 Magnetic Swing-out Stirrer without stand
2.703.0010	703 Titration Stand with Stirrer and Pump
6.5617.000	Reagent changing equipment
2.700.0020	700 Dosino
2.140.0200	Impact printer CUSTOM DP40-S4N

- With 2 x RS 232C (DB9) data interfaces for connection of balance, printer and PC
- Possibility of connecting a PC keyboard and barcode reader
- Optional: automatic reagent exchange using dosing unit and Dosino

756 KF Coulometer with 728 Magnetic Stirrer and additional equipment for automatic reagent exchange

Thermal sample preparation
KF oven

The KF oven opens up new possibilities for water determinations in samples that are either insoluble, cause side reactions or for any other reasons cannot be placed directly into the titration vessel. Using the oven method, these problems can be avoided, as the water is separated from the sample matrix.

How the oven technique works: The samples are placed in the oven in hermetically sealed sample vials. Heating the sample releases the water, which is transferred in a stream of carrier gas to the KF cell, where the Karl Fischer titration takes place.

Sample preparation: Sample preparation for the oven technique is very simple. All that has to be done is weighing out the sample into the vial and then sealing it. Hermetically sealing the vial with a septum also reliably prevents moisture absorption from the atmosphere.

Field of application: The oven method is suitable for liquid and solid samples and can be used with both volumetric and coulometric KF titrators.

Advantages of the oven method at a glance:

Reproducible analysis conditions for all samples
– benefit: much higher precision of the results

- Reduction of manual preparation steps to a minimum
- Considerable savings in time

774 Oven Sample Processor, 831 KF Coulometer

Ordering information
2.774.0010 774 Oven Sample Processor
2.860.0010 860 KF Thermoprep

- No contamination of the oven by the sample, so no carryover or memory effects
- Improved water release from the sample, because the carrier gas does not just pass over the sample but is led directly through it
- Lower reagent consumption, as the titration solution only needs to be changed at infrequent intervals

860 KF Thermoprep:

KF oven with manual sample addition for water release from difficult samples. **With extensive accessories, including 100 sample vials, 100 septum seals, 1 crimping tongs.**
Optionally it is possible to modify the oven of the 860 KF Thermoprep so that you can not only use Metrohm standard sample vials, but also your own vials.

774 Oven Sample Processor:

- Sample changer for driving off the moisture for subsequent coulometric or volumetric Karl Fischer water determination
- Removable sample rack for 36 sample vials
- Temperature gradient for determining the optimal heating temperature
- Digital temperature and gas flow display
- Simple and free programming of individual methods
- Memory for approx. 10 methods, 5 of which are preprogrammed methods for general applications
- Simple operation thanks to dialog in German, English, French and Spanish
  With separate keyboard, *tiamo*™ 1.2 full software and extensive accessories, consisting of: 1000 sample vials 1000 septum seals, 1 crimping tongs.

KF homogenizer
Polytron PT 1300 D

With the PT 1300 D you can pulverize and homogenize samples directly in the titration cell. Because sample preparation is carried out directly in the sealed titration vessel, any alteration to the water content caused by atmospheric humidity is eliminated. Depending on the dispersing tool and type of sample, rotor speeds between 7000 and 30 000 rpm can be set steplessly and exactly. As the Polytron 1300 D is controlled directly either by the Metrohm ***tiamo***™ software or PC or Touch Control the speed can be varied during the measurement; as a result stirring with an additional magnetic stirrer is not necessary.

Examples of applications for the Polytron 1300 D in sparingly soluble substances:

Candies:

Water content is a critical factor during the manufacture of candy. It determines both the properties of the candy and its taste.

Pharmaceuticals:

The water content of medicaments influences their active substance release. In pharmaceutical analyses it is therefore an important parameter. With the Titrando/Polytron system tablets are dissolved in the KF reagent in a short time regardless of their coating.

Ordering information

2.136.0100	Polytron PT 1300 D

Options

6.9012.000	Dispersing aggregate for Polytron 115 mm
6.9012.010	Dispersing aggregate for Polytron 157 mm

Meat:

Meat usually has a high water content which is normally enclosed in cells. This water can only be released by pulverization with a high-frequency homogenizer.

Dried plant material:

In plant material, such as tobacco, the majority of the water is enclosed in cells. The easiest way of releasing it is by using a high-frequency homogenizer.

841 Titrando 841 with Polytron high-frequency homogenizer

Automated coulometric KF titrations

MATi 4 is a fully automated system for coulometric KF titrations with high sample throughput. The sample rack of the 815 Robotic USB Sample Processor XL accommodates up to 160 samples in 6 mL vials. The 786 Swing Head, transfer version, together with an 800 Dosino transfers the samples to an external coulometric cell where the KF titration takes place. The system is controlled by the ***tiamo***™ titration software.

Ordering information

MATi 04	Automated coulometric KF titrations

Automated volumetric KF titrations

Fully automated system for volumetric Karl Fischer water determination in up to 24 samples. The system is controlled by Touch Control and consists of an 814 USB Sample Processor, an 841 Titrando and numerous accessories.

The samples are weighed out into beakers, sealed to protect them against atmospheric moisture and placed on the rack. Prior to titration the samples are dissolved in a known amount of KF working medium and the water content is then titrated in a second step.

This method is particularly suitable for samples that dissolve quickly in the KF working medium. The solubility can also be improved by the use of a suitable solubility promoter.

Ordering information

MATi 10	Automated volumetric KF titrations

Dosing

Dosing

Liquid handling – the exact measuring out and transfer of liquid media – is one of the most important working steps in every routine laboratory. Dosing instruments from Metrohm allow many of these working steps to be carried out with superior accuracy and reproducibility.

Dosing devices

The Dosimats at a glance

	876 Dosimat plus	876 Manual Titrator	865 Dosimat plus
Steps per cylinder volume	10 000 Pulses	10 000 Pulses	10 000 Pulses
Printer connection (USB)	yes	yes	yes
Remote Interface	yes	yes	yes
Balance Connection via RS232	yes (6.2148.030)	yes (6.2148.030)	yes (6.2148.030)
Intelligent Exchange unit	yes	yes	yes
Push Button Cable	yes	yes	yes
Manual Dosing (DOS)	yes	yes	yes
Manual Titration	yes	yes	yes
Extended Dosing (XDOS)	yes	yes	yes
Content Dosing (CNT D)	–	–	yes
Liquid Transfer (LQT)	–	–	yes
Tandem Dosing (with 805 Dosimat)	yes	yes	yes
Including 801 Magnetic Stirrer and Stand	–	yes	–

865 Dosimat plus

Dispensing Unit for manual titration and dosing applications. Including push-button cable for manual dispensing control and 6.3026.220 Exchange Unit 20 mL.

A wide variety of instruments can be connected to the USB interface of the Dosimat plus; with a USB hub you can even connect several devices simultaneously (keyboard, mouse, USB compact printer or standard USB DIN A4 printer, USB stick for methods and data backup). The optional 6.2148.030 RS 232/USB Box allows laboratory balances to be connected.

The Dosimat plus is suitable for a wide range of applications with its four dosing modes:

DOS (Dosing)

Push-button dosing, particularly suitable for carrying out manual titrations with a color indicator. From the added volume the result can be automatically calculated and a report printed out. Different calculation variables can be defined as parameters beforehand.

XDOS (Extended Dosing)

Adding a fixed volume: the volume and the dosing rate are predefined.
Time-controlled dosing: the volume and the time are predefined.
Dosing by dosing rate: the dosing rate and the time are predefined.

Ordering information

2.865.0010	865 Dosimat plus

Options

6.3026.110	Exchange unit / 1 mL
6.3026.150	Exchange unit / 5 mL
6.3026.210	Exchange unit / 10 mL
6.3026.220	Exchange unit / 20 mL
6.3026.250	Exchange unit / 50 mL

If continuous dosing without interruption is required then the 865 Dosimat plus can be operated in tandem mode together with an 805 Dosimat.

CNT D (Content dosing):

This mode is used for the preparation of standards and other solutions. From the size of the starting substance (solid or stock solution) and the predefined target concentration, the 865 Dosimat plus automatically determines the volume of solvent to be added. After completing the dosing, a report featuring all the relevant information about the prepared solution can be printed out.

LQT (Liquid transfer):

This mode is used for pipetting and diluting liquids.

865 Dosimat plus

876 Dosimat plus

876 Dosimat plus for manual titration and dosing applications. Including push-button cable for manual dispensing control and 6.3026.220 Exchange Unit 20 mL.

A wide variety of instruments can be connected to the USB interface of the Dosimat plus; with a USB hub you can even connect several devices simultaneously (keyboard, mouse, USB compact printer or standard USB DIN A4 printer, USB stick for methods and data backup). The optional 6.2148.030 RS 232/USB Box allows laboratory balances to be connected.

With its two dosing modes the Dosimat plus is ideal for handling classical dosing tasks in the laboratory.

DOS (Dosing)

Push-button dosing, particularly suitable for carrying out manual titrations with a color indicator. From the added volume a result can be automatically calculated and a report printed out. Different calculation variables can be predefined as parameters.

XDOS (Extended Dosing)

Adding a fixed volume: the volume and the dosing rate are predefined.
Time-controlled dosing: the volume and the time are predefined.
Dosing by dosing rate: the dosing rate and the time are predefined.

Ordering information

2.876.0010	876 Dosimat plus

Options

6.3026.110	Exchange unit / 1 mL
6.3026.150	Exchange unit / 5 mL
6.3026.210	Exchange unit / 10 mL
6.3026.220	Exchange unit / 20 mL
6.3026.250	Exchange unit / 50 mL

If continuous dosing without interruption is required then the 876 Dosimat plus can be operated in tandem mode together with an 805 Dosimat.

876 Dosimat plus

876 Manual Titrator

Manual Titrator with result calculation for titrations with color indicator, with automatic stopcock switching and refill. Including push-button cable for manual dispensing control, Exchange Unit 20 mL and magnetic stirrer.

A wide variety of instruments can be connected to the USB interface of the Dosimat plus; with a USB hub you can even connect several devices simultaneously (keyboard, mouse, USB compact printer or standard USB DIN A4 printer, USB stick for methods and data backup). The optional 6.2148.030 RS 232/USB Box allows laboratory balances to be connected.

With its two dosing modes the Dosimat plus is ideal for handling classical dosing tasks in the laboratory.

DOS (Dosing)

Push-button dosing, particularly suitable for carrying out manual titrations with an indicator. From the added volume a result can be automatically calculated and a report printed out. Different calculation variables can be predefined as parameters.

XDOS (Extended Dosing)

Adding a fixed volume: the volume and the dosing rate are predefined.
Time-controlled dosing: the volume and the time are predefined.

Ordering information

2.876.0110	876 Manual Titrator plus

Options

2.801.0040	801 Magnetic Stirrer with stand
2.802.0040	802 Propeller rod stirrer for 804 Titration stand
2.804.0010	804 Ti Stand without stand rod
2.804.0040	804 Ti Stand with stand
6.3026.110	Exchange unit / 1 mL
6.3026.150	Exchange unit / 5 mL
6.3026.210	Exchange unit / 10 mL
6.3026.220	Exchange unit / 20 mL
6.3026.250	Exchange unit / 50 mL

Dosing by dosing rate: the dosing rate and the time are predefined.

If continuous dosing without interruption is required then the 876 Dosimat plus can be operated in tandem mode together with an 805 Dosimat.

876 Manual Titrator

846 Dosing Interface

The 846 Dosing Interface can be seamlessly integrated as a system component and control device in any Metrohm Titrando system. The interface can be operated either by Touch Control or personal computer running PC Control or ***tiamo***™ software.

Liquid handling tasks such as pipetting, transferring, dosing, dispensing and diluting are perfectly easy thanks to the new liquid handling functions of the Dosing Interface. The system guarantees superior accuracy and precision in the range from 10 µL to 100 mL, i.e. across four quantitative dimensions.

The control device has four MSB connections (MSB = Metrohm Serial Bus) enabling auxiliary and peripheral devices to be operated. These include one each of a dosing drive (700/800 Dosino or 685/805 Dosimat), a stirrer or titration stand, a Remote Box etc. In addition two USB connections are available allowing, for example, a printer, balance, keypad, barcode reader, USB Sample Processor or other control device to be connected.

Ordering information

2.846.0010	846 Dosing Interface
2.800.0010	800 Dosino

Options

6.3032.120	Dosing unit complete / 2 mL
6.3032.150	Dosing unit complete / 5 mL
6.3032.210	Dosing unit complete / 10 mL
6.3032.220	Dosing unit complete / 20 mL
6.3032.250	Dosing unit complete / 50 mL
6.2061.010	Bottle holder for Dosinos
6.2065.000	Stacking frame for 846 Dosing Interface.

846 Dosing Interface with 840 Touch Control

Automation for titrations

Automation for titrations

Automation in potentiometry and sample preparation is much more than just changing sample beakers. With Metrohm you can choose how far you want to automate your analyses. From a simple sample changer up to a fully automated sample preparation station – almost nothing is left to be desired. ¨

Automation at the highest level – as powerful and efficient as a robot!

Automation in titration

Introduction to automation

The automation of potentiometric measuring methods has gained enormously in importance as these days single determinations are hardly ever sufficient. In contrast to a manual determination, a fully automatic determination is more precise, reliable and saves time.

Facing **large numbers of samples**, users are soon forced to think about automating frequent and identical analyses, as this allows qualified personnel to be used more efficiently. Even with small series or many different analyses, automation can be used to achieve faster and more reproducible results.

A uniform **sample preparation** procedure, which can only be guaranteed by a fully automated system, ensures that results remain identical even over a longer period of time – regardless of the user. Typical preparation steps in daily laboratory routine such as liquid handling (pipetting, transferring), diluting, adding, thermostatting, degassing, milling, filtering, filling off and many more can also be carried out fully automatically just like the subsequent analytical determination.

An issue not to be neglected is the **safety** of the laboratory workers. The routine handling of typical laboratory equipment (pipets, burets, etc.) and the use of aggressive chemicals requires the technician's full concentration. The use of automated systems with sample preparation minimizes contact with hazardous substances and solvents and in this way makes an enormous contribution to safety at work.

Metrohm offers a large selection of instruments for automating your analytical and sample preparation procedures. On the following pages you will find more information about different sample changers and fully preconfigured analysis systems.

Sample changer overview

				
	869 Compact Sample Changer	**814 USB Sample Processor**	**815 Robotic USB Sample Processor XL**	**855 Robotic Titrosampler**
Implemented measuring input	–	–	–	yes
Work stations	1	1/2	1/2	1
Automatic rack recognition	yes	yes	yes	yes
Removable racks	–	yes	yes	yes
Titration / Measurement on the Rack	yes	yes	yes	yes
Standard racks	11 x 120 ml	12 x 250 ml 16 x 150 ml 22 x 120 ml 24 x 75 ml	28 x 280 ml 34 x 150 ml 59 x 120 ml 100 x 75 ml 160 x 6 ml	28 x 280 ml 34 x 150 ml 59 x 120 ml 100 x 75 ml 160 x 6 ml
Thermostated racks	–	–	yes	yes
Beaker sensor	–	yes	yes	yes
Splash protection	yes	yes	yes	yes
Drip tray	–	yes	yes	yes
max. number internal pumps	–	2/4	2/4	2
max. number external pumps	2	2/4	2/4	1
Swing Head connector	–	1/2	1/2	1
External positions	–	1/2	1/2	1
Pipetting / Sample transfer	–	yes	yes	yes
Rod stirrer connector	1	1/2	1/2	1
MSB connector	–	3	3	3
Remote connector	yes	optional	optional	optional
USB connector	–	2	2	2
Mini-USB connector	yes	–	–	–
Stand alone	yes	optional	optional	optional
PC Control™	–	yes	yes	yes
tiamo™	–	yes	yes	yes

869 Compact Sample Changer

- Economic automation
- Space-saving
- Different method templates
- Easy to use
- A total of 12 positions
- Live-Display

The 869 Compact Sample Changer provides automation on a minimum footprint.

The 869 Compact Sample Changer provides quick and easy automation of Titrino / Titrino plus applications.

For multiple determinations and **small series** of samples, this sample changer is exactly the right choice. With a total of 12 positions a wide range of titrations can be carried out fully automatically and the electrode rinsed or conditioned between determinations. In order to keep titrant and solvent consumption as low as possible, narrow sample beakers are used as standard, thus allowing a waste-efficient and fast titration procedure.

The large and clearly arranged **live display** informs about the status of the sample series and allows you to interrupt the series to determine samples with higher priority. As lab space is expensive and rare the 869 Compact Sample Changer needs only the bench space of a typical analytical balance.

Ordering information
2.869.0010 869 Compact Sample Changer

Different **method templates** can be used to draw up and save application-specific methods. The fact that only four parameters need to be set is well worth mentioning. In addition, the methods can also be printed out or saved electronically via a USB (OTG) connection. Communication between the Compact Sample Changer and Titrino / Titrino plus takes place via remote signals without an additional control box or PC being required.

The titration head of the Sample Changer can accommodate an 802 Rod Stirrer and two additional electrodes. The rod stirrer can be connected directly to the instrument and is also controlled by it. Titrant and auxiliary solution can be added from the already mounted buret tips. On request the 869 Compact Sample Changer can be retrofitted with rinsing and aspiration pumps.

Despite its highly competitive price, the 869 Compact Sample Changer offers maximum safety. The splash protection prevents the operator from accidental contact with chemicals.

869 Compact Sample Changer

USB Sample Processor
814 USB Sample Processor

These days single determinations are no longer adequate!

In laboratories single determinations no longer conform with the requirements. Each and every result must be confirmed by multiple determinations in order to satisfy **today's strict quality standards**. An «automatic» titrator without sample changer is therefore basically just a semi-automatic titrator because it is not able to carry out a double or three-fold determination automatically: each titration requires the user to take action, which is both tedious and time-consuming.

The benefits of a sample changer are not just found in the time saved by lab personnel: automatic systems control operation sequences and thus improve **reproducibility and accuracy**. Errors can be reduced to a minimum. The system processes the prepared samples irrespective of the time of day. No matter whether automatic sample preparation, liquid handling or sample processing – this Sample Processor generation masters everything that used to be the exclusive domain of laboratory robots.

Thanks to their compact design even complex tasks can be carried out reliably on the smallest possible footprint. Depending on the user's preference, the 814 USB Sample Processor can be controlled by **Touch Control**, **PC Control** or via the ***tiamo***™ titration software. The examples of methods provided make drawing up your own methods perfectly easy.

Ordering information

2.814.0010	814 USB Sample Processor (1T/1P)
2.814.0020	814 USB Sample Processor (1T/2P)
2.814.0030	814 USB Sample Processor (1T/0P)

USB Sample Processor with sample rack for 12 x 250 mL

Robotic USB Sample Processor
815 Robotic USB Sample Processor XL

Maximum sample throughput with minimal effort!

Considering the **large number of samples** and ever more complicated sample preparation steps, the use of robots is becoming increasingly important, even in analytical laboratories. The more working steps that have to be carried out per sample, the more worthwhile is the professional automation of these steps. This is not just about transferring liquids from one beaker to the next in order to analyze the sample – the simplification of the whole analytical procedure from sample preparation up to carrying out multiple determinations is what customers expect today.

Reproducibility and accuracy are the essentials in analyses and thus represent one of the main challenges for automation. Basic operations in modern automation such as **pipetting, transferring, taking aliquots, dosing and dispensing** have become perfectly easy thanks to the Robotic Sample Processor generation.

Using the 786 Swing Head a **maximum number of sample vessels can always be placed** on the rack, so that series that are as large as possible can be processed. Depending on the vessel sizes used and the application, this maximum is between 28 and 160 positions (standard racks).

Thanks to the compact design more complex tasks can also be carried out reliably. **Processing the samples in parallel** is easy with the Robotic Sample Processor XL. While the pipetted sample volume is being titrated at an external work station (option), the pH of the already prepared samples can be determined or the next sample prepared, for example. In this way the time per analysis is reduced to a minimum.

The Sample Processor can be controlled by **Touch Control**, **PC Control** or by the ***tiamo***™ titration software. The examples of methods supplied make method creation perfectly easy.

Ordering information

2.815.0010	815 Robotic USB Sample Processor XL (1T/1P)
2.815.0020	815 Robotic USB Sample Processor XL (1T/2P)
2.815.0030	815 Robotic USB Sample Processor XL(1T/0P)
2.815.0110	815 Robotic USB Sample Processor XL (2T/2P)
2.815.0120	815 Robotic USB Sample Processor XL (2T/4P)
2.815.0130	815 Robotic USB Sample Processor XL (2T/0P)

815 Robotic USB Sample Processor XL with two work stations and one sample rack for 100 x 75 mL

Robotic Titrosampler
855 Robotic Titrosampler

The most discrete titrator in the world – invisible and yet so flexible.

With the 855 Robotic Titrosampler a new dimension of automation has been opened. The successful **combination** of high-performance titrator and perfect laboratory automation at robot level covers an extremely wide range of applications. Due to this combination of automation and titration up to 40% of the normally required space can be saved – while retaining identical functionality and flexibility.

The more demanding the application, the more working steps are necessary before carrying out the determination proper. The time-consuming **sample preparation** can be left to the Robotic Titrosampler. No matter whether pipetting, transferring or simply diluting with solvent – there are hardly any limits to your wishes. With up to three buret connections integrated in the instrument the Robotic Titrosampler offers sufficient capabilities for liquid handling tasks.

A high-performance titrator based on the **proven Titrando technology** is already built into the Robotic Titrosampler. With the **accuracy and precision** of the Titrando the Robotic Titrosampler also has the STAT mode in addition to the usual titration modes. Dynamic (DET) and monotonic (MET) titration, endpoint titration (SET), enzymatic and pH-Stat titration (STAT), measurements with ion-selective electrodes (MEAS CONC), liquid handling (LQH, DOS) are all perfectly easy with the Robotic Titrosampler.

855 Robotic Titrosampler «BASIC»

Ordering information

2.855.0010	855 Robotic Titrosampler «BASIC» (1T/1P)
2.855.0020	855 Robotic Titrosampler «BASIC» (1T/2P)

With the variety of possible combinations and numerous different applications that can be carried out in the laboratory today it is essential that the traceability of each individual sample can be guaranteed. The Robotic Titrosampler 855, with its connections for intelligent dosing units, offers **gapless documentation** of your analyses.

The system is controlled via the handy **Touch Control**, the simple and well-laid-out PC system **PC Control** or using the state-of-the-art ***tiamo***™ titration software.

Automated systems

Profit from more than 60 years of experience!

Metrohm offers far more than just a large variety of different individual instruments from which you can choose according to your requirements. Based on 60 years of experience in application we have put together complete systems that selectively meet different requirements. You can choose your Metrohm automated laboratory system quickly and easily – secure in the knowledge that we provide anything that you need.

848 Titropackage plus

The compact and economical system for the automation of potentiometric analyses on the smallest possible footprint! The combination of routine titrator and very compact sample changer requires very little space and can be brought into operation in a very short time.

MATi systems

These systems (**MATi** = **M**etrohm **A**utomated **Ti**tration) have been designed for various standard applications and offer maximum convenience and flexibility. A total of eight different fully automated systems provides the perfect basis for analyzing your samples.

Robotic Analyzers

The Robotic Analyzer family consists of different packages, each of which covers a standard application. Each of these packages offers the perfect framework for solving your particular application. The heart of the package is always the unique 855 Robotic Titrosampler, the space-saving combination of a titrator built into a sample changer. Depending on the application, this titrating analyzer is equipped with all the necessary accessories for solving your specific application problem.

Because of the immense flexibility offered by Metrohm automation, the systems can be adapted and extended customer-specifically on request.

848 Titropackage plus

- Economic automation
- Space-saving
- Over 120 predefined titration methods
- Real-time curve
- Direct connection of balances and printers
- Easy to use
- A total of 12 positions

Compact and economic system for automating potentiometric determinations in a minimum of space.

Titropackage plus contains everything needed for the quick installation of and familiarization with the system. Many predefined titration methods combined with the easy control allow it to be used directly. The system consists of an 848 Titrino plus, 869 Compact Sample Changer, 802 Rod stirrer with stirring propeller, the Ecotrode Plus and further accessories.

Titrino plus

Titrino plus, Metrohms new entry class in potentiometric titration, chiefly impresses by its almost unbelievable price-performance ratio. A large live display with titration curve, the plug-and-play functionality of Exchange Unit, stirrer and USB printer, a high-precision measuring input, operation by mouse-click – Titrino plus offers considerably more than you would expect in this price category. With their operating dialog tailored to the needs of routine users, the Titrino plus instruments are so easy to use that only a short familiarization period is required. Their robustness also makes them the ideal titrators for routine determinations in day-to-day laboratory work.

Ordering information
2.848.0110 848 Titropackage plus

Compact Sample Changer

For multiple determinations and **small series** of samples this sample changer is exactly the right choice. With a total of 12 positions a wide range of titrations can be carried out fully automatically and the electrode rinsed or conditioned between determinations. In order to keep titrant and solvent consumption as low as possible, narrow sample beakers are used as standard, thus allowing a waste-efficient and fast titration procedure. The large and clearly arranged **live display** informs about the status of the sample series and allows the series to be interrupted for the determination of samples with higher priority. As lab space is both scare and expensive, the 869 Compact Sample Changer needs only the bench space of a typical analytical balance.

848 Titropackage plus

Fully automated water analysis

Fully automated and PC-controlled water analysis system based on the 836 Titrando and the 815 Robotic USB Sample Processor XL. The system is equipped with a dosing device allowing the quick and precise dosing of 100 mL water samples. After the conductivity measurement the sample is transferred to an external cell for determining the pH value, alkalinity plus Ca and Mg content. 59 samples can be placed on a rack. The fully automated water analysis system is controlled by the ***tiamo***™ titration software.

Ordering information

MATi 01	Fully automated water analysis

Automated TAN/TBN Analysis

Computer-controlled and fully automated titration system for direct potentiometric determination of TAN/TBN in oil products carried out by an 836 Titrando. Sample handling and sample preparation is povided by the 815 Robotic USB Sample Processor XL equipped with the 786 Swing Head. The system is controlled by the ***tiamo***™ titration software .

Ordering information

MATi 02	Automated TAN/TBN Analysis

Non-aqueous titrations

Non-aqueous titration of pharmaceutical ingredients in series of up to 59 samples of 120 mL each carried out by an 836 Titrando, fully automated by an 815 Robotic USB Sample Processor XL that controls the 772 Pump Units for effective rinsing and aspiration. The system is controlled by the ***tiamo***™ titration software complying with FDA requirements.

Ordering information

MATi 03	Non-aqueous titrations

Automated coulometric KF titrations

MATi 4 is a fully automated system for coulometric KF titrations with high sample throughput. The sample rack of the 815 Robotic USB Sample Processor XL accommodates up to 160 samples in 6 mL vials. The 786 Swing Head, transfer version, together with an 800 Dosino transfers the samples to an external coulometric cell where the KF titration takes place. The system is controlled by the ***tiamo***™ titration software.

Ordering information

MATi 04	Automated coulometric KF titrations

System for up to 12 samples

MATi 6 is a potentiometric automation system based on an 809 Titrando for 12 samples of 250 mL each with 840 Touch Control. The ideal choice for determinations such as acid-base, redox and halide titration directly in the sample, which is placed on an 814 USB Sample Processor.

Ordering information

MATi 06	System for up to 12 samples

System for up to 34 samples

Potentiometric automation system for acid/base/redox and halide titrations, carried out by an 809 Titrando in series of up to 34 samples handled by the 815 Robotic USB Sample Processor XL equipped with a 786 Swing Head (titration version). The system is controlled by the ***tiamo***™ titration software.

Ordering information

MATi 07	System for up to 34 samples

System for up to 100 samples

Automated Potentiometric Titration System for up to 100 samples. PC Control operated high performance automation system for potentiometric titrations carried out in an external titration vessel after delivery of an exact amount of sample through an 800 Dosino controlled by an 815 Robotic USB Sample Processor XL. The system is controlled by the ***tiamo*** titration software.

Ordering information

MATi 08	System for up to 100 samples

Automated volumetric KF titrations

Fully automated system for volumetric Karl Fischer water determination in up to 24 samples. The system is controlled by Touch Control and consists of an 814 USB Sample Processor, an 841 Titrando and numerous accessories.

The samples are weighed out into beakers, sealed to protect them against atmospheric moisture and placed on the rack. Prior to titration the samples are dissolved in a known amount of KF working medium and the water content is then titrated in a second step.

This method is particularly suitable for samples that dissolve quickly in the KF working medium. The solubility can also be improved by the use of a suitable solubility promoter.

Ordering information

MATi 10	Automated volumetric KF titrations

855 Robotic Analyzers

«Robotic Chloride Analyzer» (2.855.1010)

- Robotic Analyzer – everything forms a unified whole
- Years of experience in supplying complete packages
- Including optimal electrode and application information
- Space-saving due to compact flexibility
- Fully automatic sample preparation
- Highest level of control with simple programming

The complete package for the determination of chloride. Contains all the components required for a fully automatic chloride titration on the smallest possible footprint in a very short time. Instruments, accessories, software and application know-how – simply all-inclusive.

855 Robotic Chloride Analyzer

«Robotic Acid/Base Analyzer» (2.855.1020)

- Robotic Analyzer – everything forms a unified whole
- Years of experience in supplying complete packages
- Including optimal electrode and application information
- Space-saving due to compact flexibility
- Fully automatic sample preparation
- Highest level of control with simple programming

The complete package for the determination of acids or bases. Contains all the components required for a fully automatic acid/base titration on the smallest possible footprint in a very short time. Instruments, accessories, software and application know-how – simply all-inclusive.

855 Robotic Acid/Base Analyzer

«Robotic TAN/TBN Analyzer» (2.855.2010)

- Robotic Analyzer – everything forms a unified whole
- Years of experience in supplying complete packages
- Including optimal electrode and application information
- Space-saving due to compact flexibility
- Fully automatic sample preparation
- Highest level of control with simple programming

The complete package for the determination of TAN and/or TBN. Contains all the components required for a fully automatic TAN/TBN titration on the smallest possible footprint in a very short time. Instruments, accessories, software and application know-how – simply all-inclusive.

855 Robotic TAN/TBN Analyzer

«Robotic F-ISE Analyzer» (2.855.2020)

- Robotic Analyzer – everything forms a unified whole
- Years of experience in supplying complete packages
- Including optimal electrode and application information
- Space-saving due to compact flexibility
- Fully automatic sample preparation
- Highest level of control with simple programming

The complete package for the determination of the fluoride content. Contains all the components required for a fully automatic fluoride measurement on the smallest possible footprint in a very short time. Instruments, accessories, software and application know-how – simply all-inclusive.

855 Robotic Fluoride Analyzer

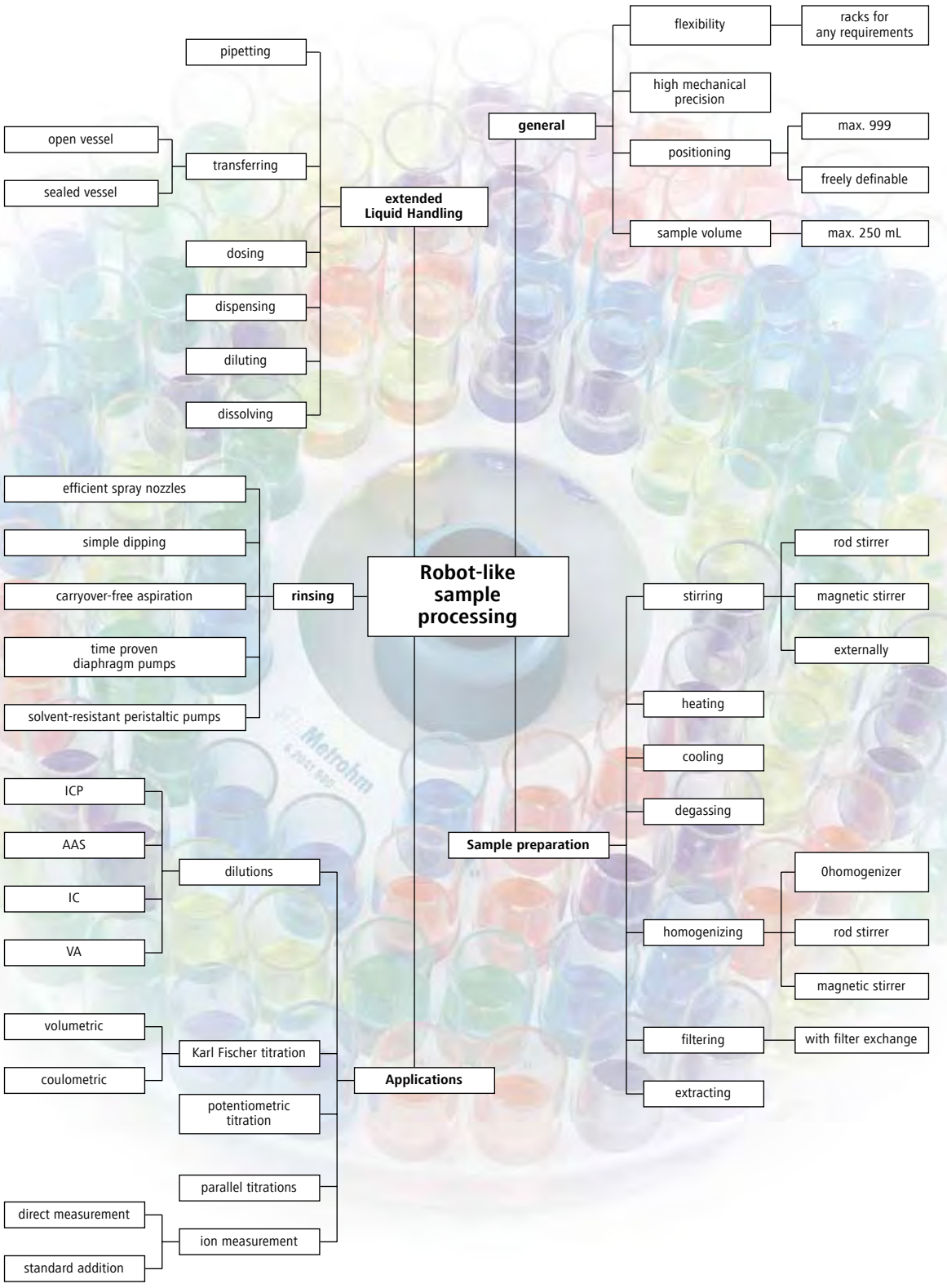
«Robotic Transfer Analyzer» (2.855.3020)

- Robotic Analyzer – everything forms a unified whole
- Years of experience in supplying complete packages
- Including optimal electrode and application information
- Space-saving due to compact flexibility
- Fully automatic sample preparation
- Highest level of control with simple programming

The complete package for the determination of acid and base content in very large numbers of samples. Contains all the components required for a fully automatic acid/base titration on the smallest possible footprint in a very short time. Instruments, accessories, software and application know-how – simply all-inclusive.

855 Robotic Transfer Analyzer

Sample preparation in overview



Systems for sample preparation
Robotic Soliprep

For a long time now Metrohm's automation program has given you the possibility of transferring titration applications to a fully automated system. The Robotic Soliprep is a new version of the proven 815 Robotic USB Sample Processor which makes daily routine work much easier. The primary field of application of the Robotic Soliprep systems is professional sample preparation.

The Robotic Soliprep family consists of three packages that cover various standard sample preparation steps. The **Robotic Titration Soliprep** gives you the possibility of homogenizing and titrating solid samples quickly and conveniently. Up to 59 samples can be processed in a single series; depending on the application the sample volumes can be between 50 and 100 mL. The sample only needs to be weighed out into the beaker and placed on the sample rack. The sample is then pulverized by the Polytron 1300 D. After homogenization the sample is titrated.

The **Robotic Filtration Soliprep** allows you to homogenize and filter solid samples quickly and comfortably . Up to 24 samples can be placed on the rack. The sample is then homogenized by the Polytron 1300 D. During the following preparation steps the Polytron tool is rinsed at the external rinsing station. After homogenization an aliquot of the sample is aspirated and then filtered through a standard syringe attachment filter (luer connection) . The Dosino used for sample transport forces the sample through the filter at a constant speed and thus ensures optimum filtration results. Needle and filter are changed for each sample and are safety ejected into the collection container after use.

Ordering information

2.815.1110	815 Robotic Titration Soliprep
2.815.2110	815 Robotic Flexible Soliprep
2.815.3110	815 Robotic Filtration Soliprep

The **Robotic Flexible Soliprep** allows you to homogenize, filter and dilute solid samples quickly and comfortably. Up to 10 samples can be placed on the rack. The further steps are carried out as described for the Robotic Filtration Soliprep. The filtrate can then be pipetted either directly or after additional dilution into septum-sealed vials (11.6 mm).

When the series has been processed the prepared samples can be easily removed from the rack in order to place them on the analyzer (e.g. IC or HPLC). The control of this preparation system is carried out by the proven and flexible ***tiamo***™ titration software, which can also document the individual preparation steps for each sample in a database.

815 Robotic Filtration Soliprep

Membrane pumps

Titration often requires the transfer of liquids. With automation in particular, the aspiration of the titrated sample solution is very convenient. After the pre-programmed rinsing and aspiration cycles have been carried out automatically, the sample beaker and electrodes are immediately ready for the next determination. The waste is transferred to a canister for convenient disposal.

The **823 Membrane Pump** is a very versatile pump. It has been specially designed for use in factories and laboratories and can be used for a wide range of applications. It is suitable for transferring all types of liquid media and, with its capacity of at least 450 mL/min, opens up a wide range of applications.

The **843 Pump Station** (Membrane) has two built-in membrane pumps. These can be controlled either via the interface by remote signals or manually by pressing keys.

Both instruments are available in different versions; these mainly differ in the accessories supplied with them.

Ordering information

2.823.0010	823 Membrane Pump Unit
2.823.0020	823 Membrane Pump Unit «Aspirate»
2.823.0030	823 Membrane Pump Unit «Rinse»
2.843.0020	843 Pump Station (Membrane)
2.843.0030	843 Pump Station (Membrane) – Rinse / Aspirate

843 Pump Station (Membrane)

Peristaltic pumps

Titration often requires the transfer of liquids. With automation in particular, the aspiration of the titrated sample solution is very convenient. After the pre-programmed rinsing and aspiration cycles have been carried out automatically, the sample beaker and electrodes are immediately ready for the next determination. The waste is transferred to a canister for convenient disposal. A membrane pump cannot be used with liquids that contain solids such as precipitated silver chloride.

Organic solvents represent a particularly critical medium. In this case the chemical resistance of the pump components limits the working range of the pump. This is not the case with the **772 Pump Unit** because the user has the possibility of using tubing made from different materials and can thus select tubing whose resistance is suitable for the medium to be pumped. The Pump Unit comes with with one piece of tubing for aqueous media and another one for organic solvents as standard.

The **843 Pump Station** (Peristaltic) has two built-in peristaltic pumps. These can be controlled either via the interface by remote signals or manually by pressing keys.

Both instruments are available in several versions; these mainly differ in the accessories supplied with them.

Ordering information

2.772.0110	772 Pump Unit
2.772.0120	772 Pump Unit «Aspirate»
2.772.0130	772 Pump Unit «Rinse»
2.772.0210	Pump Unit to 731/824
2.772.0220	Pump Unit to 731/824: Aspirate
2.772.0230	Pump Unit to 731/824: Rinse
2.843.0120	843 Pump Station (Peristaltic)
2.843.0130	843 Pump Station (Peristaltic) – Rinse / Aspirate

843 Pump Station (Peristaltic)

849 Level Control

- Increases laboratory safety
- Protects pumps from running dry
- For universal use
- Simple assembly and configuration

Additional equipment for Sample Processors for monitoring the filling level of rinsing or waste canisters via Remote. It prevents pumps from running dry and/or canisters from overflowing and is suitable for use with aqueous solutions, solvents and suspensions.

The Level Control can register both high liquid levels (e.g. warning that a waste container is about to overflow) and low liquid levels (e.g. storage container is about to be emptied). Thanks to the conductivity measurement technique the level sensors can be used in different media.

Ordering information
2.849.0010 849 Level Control

The sensor signal is registered by the Level Control and transmitted as a signal level to a remote connection of an automated system. This means that the Level Control can be used in all Metrohm systems in which it is possible to scan remote lines.

849 Level Control

731 Relay Box

- Two 115/230 V AC outputs
- Two DC outputs
- One standard cable is sufficient for communication with all Metrohm instruments

Additional device for controlling up to four external devices such as pumps or valves with mains connection or direct current consumers via TTL signals, including connection cable for devices with a 25-pin «remote» interface.

Automated systems require the switching of heaters, pumps, valves, thermostats or other external devices. This requires the use of relays to switch mains or low-voltage supplies on and off as necessary. The switching should take place via remote lines from a Titrino, Titrando, sample changer or other Metrohm instrument. The Relay Box meets all these requirements on a very small footprint.

The Relay Box provides four voltage outputs. Two 115/230 V AC outputs are used for switching the mains voltage. The maximum power delivery per output is 1150 W, so that the instrument can also be used for providing power to high-consumption devices such as heating baths or thermostats.

In addition the Relay Box has two DC outputs, whose voltages can be set to 5, 10, 18 or 24V.

Ordering information
2.731.0010 731 Relay Box

Various Metrohm devices can address the Relay Box via their remote lines. Regardless of the type of device, a single standard cable is all that is required for communication. The Relay Box scans the 14 input lines and switches the assigned voltage outputs accordingly.

731 Relay Box

Swing Heads

Additional equipment for the Robotic Sample Processor XL for transferring / pipetting from small sample vessels into larger titration vessels on a rack or into an external titration cell which can be attached to the left of the work station.

If a Swing Head is used then the number of samples and their sizes can be varied within a wide range. This increased flexibility results from the fact that the range of positions on the Sample Processor that can be reached is considerably extended. The Swing Head works with highest accuracy: it moves pipet / transfer tips from one position to the next millimeter by millimeter. Even sample transfer into an external titration cell is carried out fully automatically, thus greatly increasing the flexibility of the Sample Processor. While the transferred sample is being analyzed in the cell, the next sample can already be in preparation; this means an additional gain in time. In addition, the Swing Head can also be equipped with Robotic Arms which can take up and eject tools or even serve as a holder for a homogenizer for crushing tablets.

Ordering information

2.786.0010	786 Swing Head with transfer head left
2.786.0020	786 Swing Head with transfer head right
2.786.0030	786 Swing Head with titration swing arm, left or right swinging
2.786.0040	786 Swing Head
2.786.0140	786 Swing Head right swinging strengthend

Reinforced 786 Swing Head

741 Magnetic Stirrer

Magnetic stirrer for sample changers.

The magnetic stirrer is located beneath the sample rack.

Ordering information
2.741.0010 741 Magnetic Stirrer

741 Magnetic stirrer

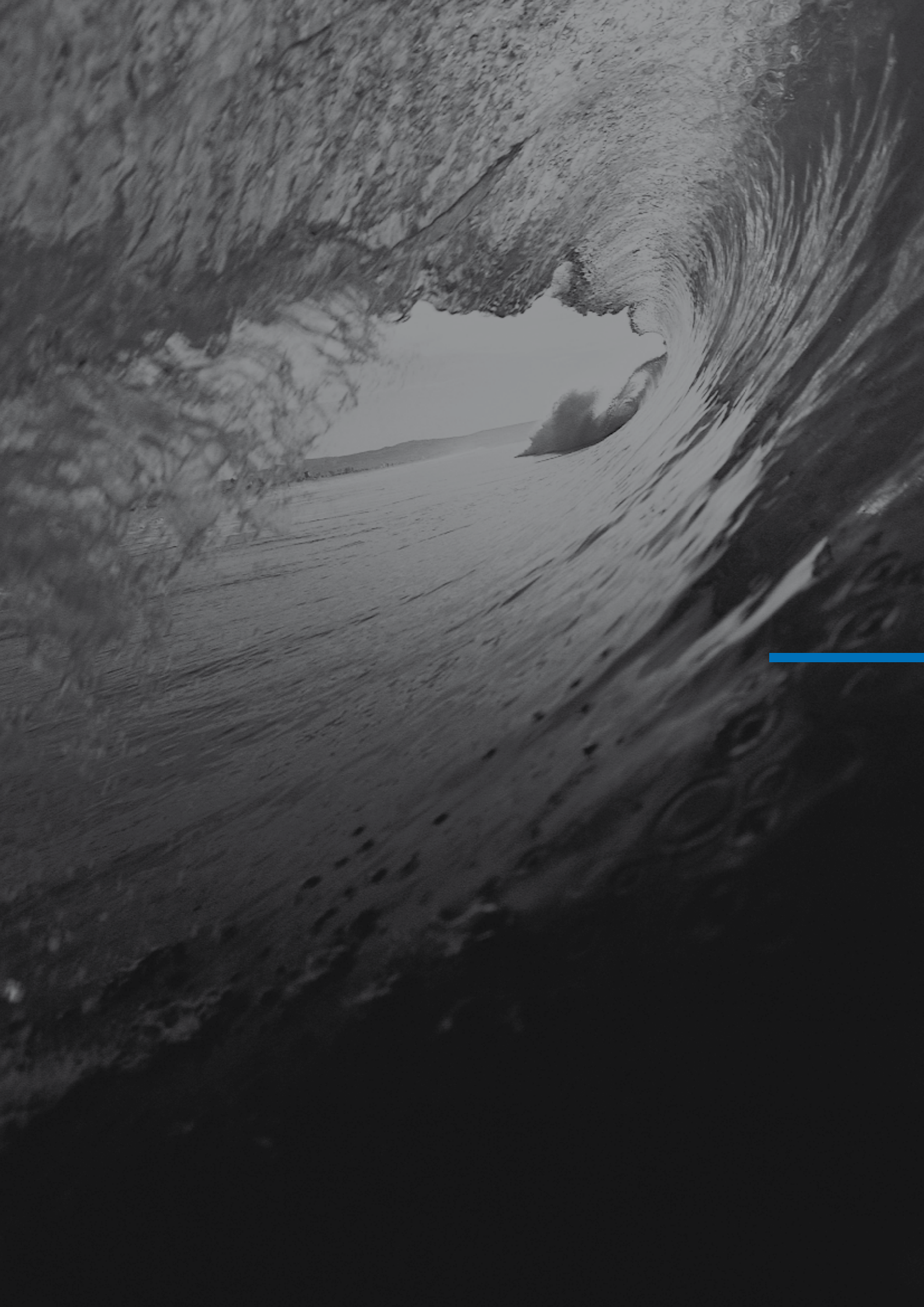
802 Rod Stirrer

Rod stirrer for sample changer and Sample Processor.

With 6.1909.020 Propeller stirrer 104 mm and fixed cable.

Ordering information
2.802.0020 802 Rod Stirrer

802 Rod stirrer



Polarography, voltammetry and CVS

Polarography, voltammetry and CVS

Voltammetry instruments from Metrohm are highly sensitive and very flexible. Applications range from the determination of very low concentrations of toxic heavy metals in water up to the measurement of the concentration of organic additives in electroplating baths using the CVS technique.

Instruments for polarography, voltammetry and CVS

Introduction
Metal traces: total metal and species analysis — quick and easy with voltammetry

The voltammetry instruments from Metrohm have a low price, low running costs and compact dimensions but are great in detecting.

Traces of toxic heavy metals can be analyzed at extremely low concentrations without much trouble. The detection limits are all in the ppt range, so that the necessary sensitivity can always be achieved. For ion speciation in analytes voltammetry is the method of choice.

Trace metal analyses can be carried out with the same or better sensitivity for a fraction of the cost of acquiring an AAS or ICP instrument. The low running costs are an additional bonus point for voltammetry. Apart from small amounts of reagents only small volumes of pure nitrogen are required. No expensive combustible gases, no reconstruction of the laboratory for special gas supplies and fume hoods, no expensive lamps. And no time-consuming calibration of the analytical system.

Convincing applications

Analysis of metal traces

Total concentration can be determined by both voltammetry and spectroscopic methods. With voltammetry, however, it is possible to distinguish between the different oxidation states of metal ions and to specify the biological availability of heavy metals. Free and bound metal ions can be differentiated from each other. This makes voltammetry an essential tool for environmental analysis. Spectroscopy allows comparable statements to be made only after complicated seperation of metal species. Due to the compact size the instrument can also be used in mobile laboratories.

Samples with a high ionic concentration are not a problem for voltammetry. Voltammetry is also predestined for the analysis of:

- water, wastewater and sea water
- foodstuffs
- salts, pure chemicals
- electroplating baths

Specific analysis of organic chemicals

Not only metals but also various organic compounds can be determined by voltammetry. The technique is used in organic chemistry, e.g. for the analysis of contaminants, and in the pharmaceutical industry for the determination of the concentration of the active substance.

Examples of interesting determinations

- 4-carboxybenzaldehyde in terephthalic acid
- free styrene in polystyrene
- vitamins in fruit and vegetable juices, vitamin formulations

Determination of anions

Some special anions can also be determined by voltammetry. The analysis of the following environmentally relevant anions is particularly interesting:

- cyanide
- sulfide
- nitrite
- nitrate

Sb^{III} / Sb^{V}	200 ppt
As^{III} / As^{V}	100 ppt
Bi	500 ppt
Cd	50 ppt
Cr^{III} / Cr^{VI}	25 ppt
Co	50 ppt
Cu	50 ppt
Fe^{II} / Fe^{III}	50 ppt
Pb	50 ppt
Hg	100 ppt
Mo^{IV} / Mo^{VI}	50 ppt
Ni	50 ppt
Pt	0.1 ppt
Rh	0.1 ppt
Se^{IV} / Se^{VI}	300 ppt
Tl	50 ppt
W	200 ppt
U	25 ppt
Zn	50 ppt

1 ppt = part per trillion = 1 ng/kg

Typical detection limits in voltammetric trace analysis

CVS – Cyclic Voltammetric Stripping
Determination of additives in electroplating baths

Cyclic Voltammetric Stripping Analysis (CVS) and *Cyclic Pulse Voltammetric Stripping Analysis* (CPVS) are widespread methods used in the plating industry for the determination of organic additives in electroplating baths. A simply constructed, robust and favorably-priced rotating disk electrode made of platinum is used for these analyses; this electrode is built into the VA stand instead of the otherwise used Multi-Mode Electrode. For many technical coatings, particularly in PCB manufacture in the electronics industry, this method is an essential part of the production control process. The most important fields of application are acid copper baths as well as tin-lead baths. The quantitative determination of the additives is carried out by utilizing their influence on the deposition of the main components of the electroplating bath. As the measurement corresponds to a process which is similar to the production process, the activity of the additives and therefore their effectiveness in the electroplating process is measured directly.

Quantification of the various types of additives requires special calibration techniques; these are all implemented in the new 797 VA Computrace: The so-called brighteners are determined by using the *Linear Approximation Technique* (LAT) or the *Modified Linear Approximation Technique* (MLAT). *Dilution Titration* (DT) is used for the determination of the suppressors.

With CVS or CPVS the concentration of the additives can be determined exactly. The effective concentration of the particular additive in the bath sample is shown directly and printed out in mL additive per liter bath. This means that topping up to achieve the set concentration can be carried out very exactly. This guarantees continuous interference-free operation of the unit. Accuracy of analytical results in particular has helped this method to become widely accepted in the electroplating industry.

Other methods, such as the classical Hull cell method, do not allow the concentration to be determined, but can only be used to assess the quality of the metallic layer which has been deposited.

To carry out the determination one of the pre-installed methods is loaded. After a few parameters have been adapted, the analysis can be started. Ready-to-use methods are included for the most important types of bath from leading manufacturers; these have been worked out in our application laboratory.

Rotating platinum electrode for the determination of additives in plating baths by CVS

Instruments for voltammetry and CVS
797 VA Computrace

Simple operation

The 797 VA Computrace consists of a VA Stand with built-in potentiostat/galvanostat connected to a PC via the USB port. Control, data acquisition and evaluation are carried out by the PC software supplied, which runs under Microsoft Windows™ 2000, Windows™ XP Professional or Windows™ Vista. Due to the well-laid-out program structure the simplicity of operation is unsurpassed. All the methods described in the Metrohm Application Bulletins and Application Notes have already been pre-installed. Method modifications require changing of only a few parameters.

Fields of application

Carrying out classical trace analyses ...

of metal ions or other analytes after calibration by standard addition or calibration curve down to the ultratrace range (ppt) is one of the most important fields of application of the 797 VA Computrace. Evaluation is carried out automatically and can be controlled and reprocessed at the PC. Standard additions can, of course, be carried out automatically by using Dosinos.

... and determining additives in electroplating baths.

These new methods represent the second most important field of application. With the 797 VA Computrace the determination of additives in electroplating baths is possible for the first time. All the necessary techniques for data recording, evaluation and calibration have been implemented in the software; methods for important, often used bath chemicals have already been optimized and pre-installed.

Ordering information

2.797.0010	797 VA Computrace for trace analysis
2.797.0030	797 VA Computrace for CVS

Only with the 797 VA Computrace is it possible to carry out CVS analyses and classical trace metal determination with a single instrument. This means that both investment costs and running costs can be reduced, as can the familiarization time for the operating staff.

The «Exploratory» mode for method development and training

is characterized by an intuitive user interface. This has been reduced to the most important functions that are necessary for carrying out simple electrochemical experiments. After entering a few parameters a voltammogram can be taken; the effects of changing parameter settings on the curve can be seen directly. A direct comparison of the voltammograms is the greatest strength of the «Exploratory» mode. It has been specially developed for training purposes in electrochemistry, but also helps in developing the optimal method for solving an analytical problem.

Proven working electrodes

The time-proven Multi-Mode Electrode (MME) or rotating disk electrodes made from various materials are used as sensors.

797 VA Computrace

MVA accessory kits

MVA-Hg, equipment for mercury determination (6.5327.000)

Complete set of accessories for the determination of mercury as per Application Bulletin 96. Contains rotating gold working electrode, reference electrode, glassy-carbon auxiliary electrode and other accessories.

MVA-As, equipment for arsenic determination (6.5327.010)

Complete set of accessories for the determination of arsenic as per Application Bulletin 226. Contains rotating gold working electrode, reference electrode, glassy-carbon auxiliary electrode and other accessories.

MVA-CVS, equipment for the CVS technique (6.5327.020)

Complete set of accessories for the determination of organic additives in electroplating baths by CVS (cyclic voltammetric stripping). Contains rotating platinum working electrode, reference electrode, platinum auxiliary electrode and other accessories.

Automation in VA

Automation in voltammetry – simple and efficient

Compact sample changer for VA
863 Compact VA Autosampler

The 863 Compact VA Autosampler is the space-saving and favorably priced sample changer for voltammetric trace analysis in combination with the 797 VA Computrace. It permits the determination of small series of similar samples with a high degree of accuracy.

Up to 18 samples can be analyzed automatically in a series. The sample solution is transferred from the sample rack of the 863 Compact VA Autosampler to the measuring vessel of the 797 VA Computrace using the built-in peristaltic pump. All auxiliary solutions necessary for the voltammetric determination are added from Dosinos during the measuring procedure. The two pumps of the connected 843 Pump Station empty and rinse the vessel after each determination. The 863 Compact VA Autosampler is programmed via the built-in keyboard.

The scope of delivery includes a built-in sample rack, extensive accessories and connection cables for setting up a complete workplace.

Ordering information

2.863.0020	863 Compact VA Autosampler

Options

2.843.0040	843 VA Membrane Pump Station
2.843.0140	843 VA Peristaltic Pump Station

863 Compact VA Autosampler

Flexible sample changer for CVS
838 Advanced VA Sample Processor

The 838 Advanced VA Sample Processor together with the 797 VA Computrace permits the fully automatic determination of organic additives in electroplating baths by using «Cyclic Voltammetric Stripping» (CVS). Series of brighteners or suppressors can be analyzed unattended in succession. The sample rack provided accommodates up to 56 samples.

The sample solution is transferred from the sample vessel on the rack of the 838 Advanced VA Sample Processor to the measuring vessel of the 797 VA Computrace either by using the built-in peristaltic pump for determining brighteners or an 800 Dosino for determining suppressors by dilution-titration technique (DT). Further auxiliary solutions necessary for the CVS analysis are automatically added by further 800 Dosinos. The connected 843 Pump Station empties and rinses the vessel after each determination.

The 838 Advanced VA Sample Processor is equipped with a flexible method editor in order to adapt the analytical sequence to meet the user's requirements. The separate keyboard allows access to the method editor and all other instrument settings. During the determination of a sample series the 838 Advanced VA Sample Processor is remote controlled by the 797 VA Computrace.

The scope of delivery includes accessories, sample rack, keyboard and all accessories for setting up a complete workplace.

Ordering information

2.838.0310	838 Advanced VA Sample Processor

Options

2.843.0040	843 VA Membrane Pump Station
2.843.0140	843 VA Peristaltic Pump Station

838 Advanced VA Sample Processor

MVA – Metrohm VA systems

Complete voltammetry systems – customized for each application

The Metrohm MVA systems are complete, ready-to-use packages which are custom-made for a wide range of requirements. Just select the package, connect it to a supply of nitrogen and to a PC and off you go.

From a simple-to-operate voltammetric first-user system up to completely unattended, fully automatic analysis systems for process control, you will find the correct system for your demands in our portfolio. Each MVA system is supplied with all the necessary accessories. Not included in the scope of delivery is the PC, nitrogen and mercury. For special applications the MVA accessory kits (MVA-UV, MVA-Hg, MVA-As and MVA-CVS) can be used together with the basic MVA systems to extend the range of applications.

MVA systems with the 797 VA Computrace for classical trace analysis

797 VA Computrace system for trace analysis (MVA-01)

Analysis system for voltammetric trace analysis and training. For manual operation. The system is suitable for quantitative analysis in routine and research laboratories. Consisting of 797 VA Computrace. Without PC.

797 VA Computrace system for trace analysis with automatic standard addition (MVA-02)

Analysis system for voltammetric trace analysis and training. Consisting of 797 VA Computrace with two 800 Dosinos for automatic addition of auxiliary solutions. Without PC.

Fully automated 797 VA Computrace system for trace analysis (MVA-03)

Fully automatic analytical system for voltammetric trace analysis and education. Consists of 797 VA Computrace with 863 Compact VA Autosampler and two 800 Dosinos for automatic addition of auxiliary solutions. Automatic processing of max. 18 samples. This system is the optimum solution for automatic analysis of small series of samples that have to be analyzed for a single or two parameters in one run. Without PC.

MVA systems with the 797 VA Computrace for the determination of organic additives in electroplating baths by CVS

797 VA Computrace system for electroplating bath analysis (MVA-11)

Analysis system for the determination of organic additives in electroplating baths by the CVS teachnique («Cyclic Voltammetric Stripping»). Consisting of 797 VA Computrace for CVS. All additions of solutions are carried out manually. Without PC.

797 VA Computrace system for electroplating bath analysis with automatic solution addition (MVA-12)

Analysis system for the determination of organic additives in electroplating baths by the CVS technique («Cyclic Voltammetric Stripping»). Consists of 797 VA Computrace for CVS with three 800 Dosinos for automatic addition of auxiliary solutions and sample. Without PC.

797 VA Computrace system for fully automated electroplating bath analysis (MVA-13)

Analysis system for the determination of organic additives in electroplating baths by the CVS technique («Cyclic Voltammetric Stripping»). Consists of 797 VA Computrace for CVS, 838 Advanced VA Sample Processor, three 800 Dosinos and rinsing kit. For sample series up to 56 samples. Without PC.

Sample preparation for trace analysis
705 UV Digester

Digestion is decisive for the reliability of trace and ultra trace analyses in natural sample matrices. The 705 UV Digester is a sample digestion unit proven in practice. It is used for sample preparation in spectroscopy, polarography, voltammetry and ion chromatography to eliminate the organic matrix. ICP-AES, graphite-furnace and flame AAS also profit from the 705 UV Digester.

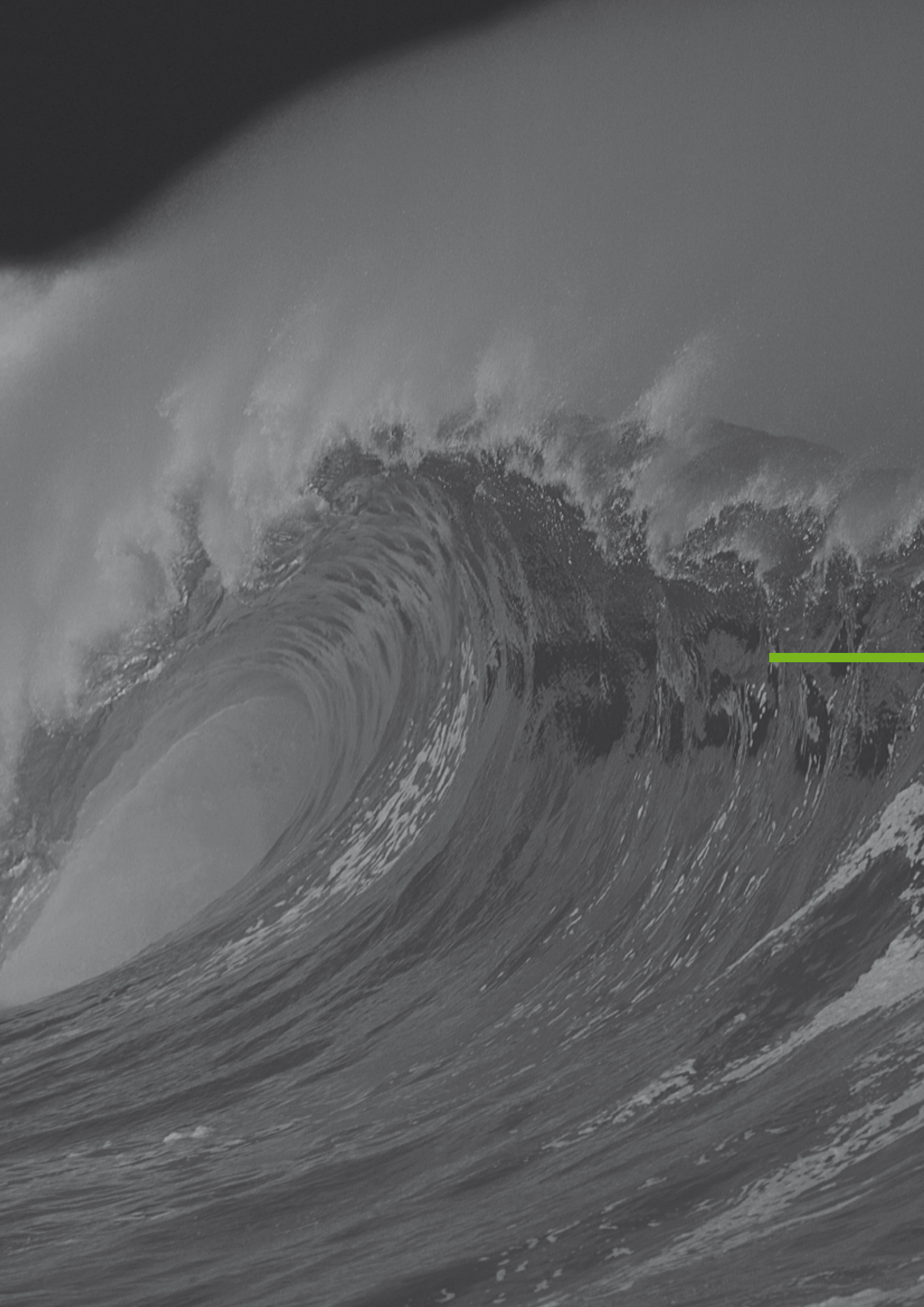
The instrument has been designed for the digestion of water samples free from suspended matter that contain low to moderate concentrations of organic material, for example, natural surface waters. Owing to their low content in heavy metals, these samples are very sensitive to contamination. The advantage of UV photolysis is that only a little hydrogen peroxide has to be added and consequently the blank values can be kept very low. Digestion by UV photolysis is based on the photolytic generation of OH radicals, which in turn react with organic compounds and degrade them. Hydrogen peroxide is used as an initiator of the radical reaction. The radiant energy of the mercury lamp is converted to heat and this accelerates the digestion.

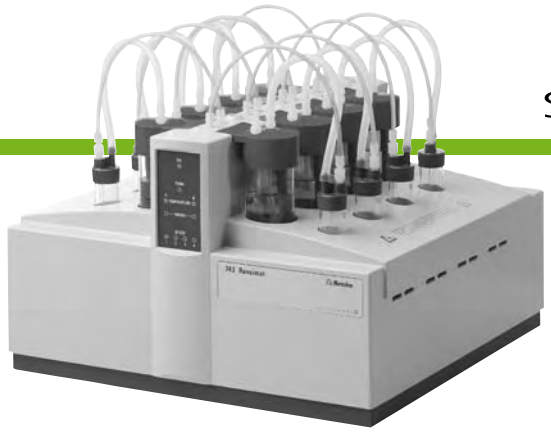
- Simultaneous digestion in 12 or 16 quartz sample tubes, depending on the sample volume
- As only minimal amounts of expensive digestion chemicals are needed (typically 50 µL), the blank value is virtually zero
- The costs and the load on the environment are minimal
- The digested solution can be used directly without the need for aliquot sampling or topping up
- The digestion temperature of approx. 90 °C means most effective digestion and practically no losses of volatile elements

Ordering information

2.705.0016	705 UV Digester (220V / 60 Hz)
2.705.0017	705 UV Digester (220V / 50 Hz)

705 UV Digester





Stability measurement

Stability measurement

The resistance to thermal stress or oxidation is an important parameter for assessing the quality of oils or plastics. Metrohm stability instruments can be used for the following applications, among others:

- Oxidation stability of natural fats and oils
- Oxidation stability of biodiesel
- Thermal stability of PVC

Stability measuring instruments

Oxidation stability of fats and oils
743 Rancimat

A new era in the determination of the oxidation stability of natural fats and oils

The 743 Rancimat as a modern, PC-controlled instrument allows the comfortable determination of oxidation stability. Disposable reaction vials reduce the amount of cleaning of the accessories to the absolute minimum. This saves both time and money. In addition, the accuracy and reproducibility are significantly improved. With the help of the certified temperature sensor in the GLP set it is now possible to adjust the temperature very precisely and reproducibly, which improves the comparability of the results even further. The software of the third Rancimat generation with automatic data recording and evaluation as well as a measurement database allows the comfortable management of large amounts of data.

Oxidation stability of natural fats and oils in the food industry

The determination of the oxidation stability of oils and fats is the classical application for the 743 Rancimat. The so-called induction time thus determined characterizes the resistance of oils and fats to oxidation. Instead of induction time, the term oil stability index (OSI) is frequently used.

The Rancimat method is an automated version of the previously used and extremely complicated AOM method (Active Oxygen Method). The Rancimat method is used as a standard test in the food industry for quality control during the manufacture of fats and oils or for checking incoming goods in processing industries. In addition to vegetable oils and fats, it is also possible to check the oxidation stability of animal fats such as hog fat, tallow or fish oil. Foodstuffs may contain added antioxidants in order to slow down the oxidative decomposition of the oils and fats. By using the 743 Rancimat it is possible to characterize the effectiveness of antioxidants.

Ordering information

2.743.0014	743 Rancimat for oils and fats (230 V)
2.743.0015	743 Rancimat for oils and fats (115 V)

Options

6.5616.000	GLP Test Set for 743 Rancimat and 763 PVC Thermomat

Standards

- AOCS Cd 12b-92 (AOCS – American Oil Chemists' Society): Sampling and analysis of commercial fats and oils: Oil Stability Index
- ISO 6886: Animal and vegetable fats and oils – Determination of oxidative stability (accelerated oxidation test)
- 2.4.28.2-93: Fat stability test on Autoxidation. CDM, Japan

Oxidation stability of foodstuffs and cosmetics

The 743 Rancimat can also be used for the determination of the oxidation stability of foods containing fats.

In addition to foodstuffs, the oxidation stability of cosmetics or cosmetic additives containing fats can be determined with the 743 Rancimat.

743 Rancimat with laptop PC

Oxidation stability of biodiesel
873 Biodiesel Rancimat

A new era in the determination of the oxidation stability of biodiesel (FAME)

The 873 Biodiesel Rancimat is tailor-made for the determination of the oxidation stability of biodiesel, diesel fuel and mixtures of biodiesel with diesel fuel. The accessories optimized for this application comprise elongated reaction vessels and special, chemically resistant connection tubings. To minimize cleaning expenditure some of the accessories are disposables. This has the added advantage of significantly improving the accuracy and reproducibility of the measurements. The software offers automatic data recording and evaluation as well as a measurement database and thus allows the comfortable management of large amounts of data.

Oxidation stability of biodiesel (fatty acid methyl esters, FAME)

In addition to other alternative fuels such as ethanol, methanol or biogas (methane), fatty acid methyl esters are becoming commercially available; these are also known as biodiesel, RME (rapeseed oil methyl esters) or FAME (fatty acid methyl esters). As an alternative, fatty acid ethyl esters (FAEE) are used in some countries. Biodiesel has a relatively short storage life as it is slowly oxidized by atmospheric oxygen. The substances produced by this decomposition can cause motor damage. For this reason oxidation stability is an important quality criterion for biodiesel and is determined regularly during its manufacture. By using the 873 Biodiesel Rancimat this determination can be carried out simply and reliably. The oxidation process can be slowed down by the addition of antioxidants. The 873 Biodiesel Rancimat can also be used for determining the effectiveness of antioxidants.

Ordering information

2.873.0014	873 Biodiesel Rancimat (230 V)
2.873.0015	873 Biodiesel Rancimat (115 V)

Options

6.5616.010	GLP Test Set for 873 Biodiesel Rancimat

Standards

- EN 14112 «Fat and oil derivatives – fatty acid methyl esters (FAME) – Determination of the oxidation stability (accelerated oxidation test)»
- DIN EN 15751 «Automotive fuels – Fatty acid methyl esters (FAME) and mixtures with diesel – Determination of the oxidation stability (accelerated oxidation test)»

873 Biodiesel Rancimat

Thermal stability of PVC
763 PVC Thermomat

Automatic determination of the thermal stability of PVC

With the 763 PVC Thermomat Metrohm offers the first fully PC-controlled instrument for the determination of the thermal stability of PVC plastics. The software for data recording and storing in a database with automatic evaluation of the curves is included in the scope of delivery. Two heating blocks allow the measurement of 8 samples at one or two different temperatures. Up to four 763 PVC Thermomats can be connected to a PC and operated simultaneously by the included software. Highest flexibility is achieved by individual management of each sample and heating block. Disposable sample reaction vessels reduce the cleaning procedure to a minimum.

Thermal stability of PVC

Chlorinated plastics based on polyvinylchloride (PVC) decompose at elevated temperatures releasing gaseous HCl. This product of the thermal decomposition is blown off by a stream of nitrogen into the measuring cell filled with distilled water. The thermal stability of PVC materials is defined as the time that elapses until HCl is released, and is determined by measuring the conductivity in the measuring cell.

Ordering information

2.763.0014	763 PVC Thermomat (230 V)
2.763.0015	763 PVC Thermomat (115 V)

Options

6.5616.000	GLP Test Set for 743 Rancimat and 763 PVC Thermomat

Standards

- DIN 53381 part 1: Determination of the Thermostability of PVC
- DIN VDE 0472 part 614: Examination of insulated cables - Thermostability
- ISO 182 - 3: Plastics - Determination of the tendency of PVC based polymers to evolve HCl at elevated temperatures - part 3: Conductometric method

763 PVC Thermomat

ProcessLab

ProcessLab

ProcessLab is the robust and easy-to-use analysis system from Metrohm for routine analysis in production facilities. Customized to meet your analysis and process requirements, it guarantees reliable results, thus permitting safe and efficient process control.

ProcessLab

ProcessLab - an introduction

ProcessLab is the robust analysis system for routine analysis in production facilities. Wherever various parameters have to be measured at several sampling points, ProcessLab is the superior solution. Custom-made for your analytical requirements, ProcessLab guarantees reliable analytical results and safe process control. Moreover, ProcessLab is easy to use.

ProcessLab – the atline analyzer for routine analysis in the plant

In an atline system the sample is taken manually and fed into the system right beside the process line. In this way various samples from different process stages or units can easily be analyzed.

In contrast, in an online system the sample is fed automatically to the analyzer using a bypass. Several baths or sampling points can only be covered at great expense.

ProcessLab – the innovative solution for process monitoring

Due to the proximity to the process, the results for the relevant process components are available directly after sampling and on-site analysis. Process conditions can then be adjusted immediately to ensure that the process continues within the optimal parameters. No time is lost on waiting for results from the laboratory. ProcessLab is perfect for quick and independent process monitoring in production facilities.

ProcessLab means

- Simple operation
- Robust hardware
- Flexibiliy and modularity
- Networking and process integration
- Efficient ion analysis

ProcessLab: 100% compatible with Metrohm laboratory equipment

Configured 875 ProcessLab

The modular analysis system

ProcessLab is an entirely modular analysis system. Custom-made, it is perfectly adapted to meet your specific analytical and technical process requirements.

Analysis systems with Touch

Each system consists of an analysis module and an operating unit. The analysis module is constructed according to individual requirements and contains exactly those components that are necessary to carry out the desired task. The operating unit with protected keyboard and Touchpad permits easy and convenient operation. For even easier use an operating unit with Touch screen is optionally available.

Both the analysis module and the operating unit are mounted in a robust, splash-water-protected housing and are therefore ideally suited for use under rough conditions in production facilities.

Modular wet-chemistry part

The wet-chemistry part of an analysis module is modular in design, just like the electronics part. Both parts are hermetically separated from one another. Modern interfaces such as Ethernet and USB 2.0 allow the spatially separate installation of the analysis modules or the separation of operating unit and analysis module. This are important features for analyses in clean rooms or in hazardous areas.

System control is achieved by a built-in industrial PC and the powerful ***tiamo***™ software for ProcessLab from Metrohm. ***tiamo***™ laboratory methods can be easily and quickly adapted for ProcessLab.

Established Titrando technology

ProcessLab is also equipped with a Metrohm Dosing & Measuring Controller (MDM). The MDM Controller is a high-end titration system for up to four 800 Dosino dosing systems. Dynamic (DET) and monotonic (MET) titration, endpoint titration (SET), Karl Fischer titration (KFT), measurements with ion-selective electrodes (MEAS CONC) and liquid handling are possible with just one instrument. A maximum of two MDM Controllers can be built into one analysis module, so that up to eight 800 Dosino dosing systems are supported.

Communication with the process surroundings

Digital and analog Input/Output components (I/O) allow the system to be easily integrated in the process surroundings. Thus it can react to different input signals, e.g. automatically measure different parameters depending on the sample, trigger an alarm if limits are infringed or transmit measured values as analog 4...20 mA signals.

With the second Ethernet connection (RJ45) ProcessLab can be easily integrated into a local network or completely operated by remote control. Analysis data can be exported to any LIMS system or made available to a process control system.

Combined modules

The modularity of the system means that several analysis modules can be combined to form a single and complete system. This results in simply structured and easily manageable analysis units. Sample introduction can be performed manually or – far more comfortable – by using a sample processor.

Combined system with sample processor

Analysis techniques and parameters

The strength of the system is its versatility. **ProcessLab offers numerous analytical and sample preparation techniques and can therefore be used very individually.**

- Direct measurement of pH, redox potential and conductivity
- Measurements with ion-selective electrodes (ISE)
- Potentiometric titration
- Karl Fischer titration
- Voltammetry (VA)
- Cyclic voltammetric stripping (CVS)
- Liquid handling for sample preparation

In addition to these techniques, third-party instruments can be connected and their data are stored in the ***tiamo***™ database.

For example, the following parameters can be measured using third-party instruments

- Temperature
- Density
- Pressure
- Refractive index
- Viscosity
- …

Thus, the range of measuring methods and data storage can be extended considerably.

Operating unit with Touch function

Thanks to Metrohm's long-term experience in the field of ion analysis we are able to measure numerous analytical parameters.

The following parameters are particularly important for process analysis

- pH
- Conductivity
- Acid content
- Base content
- Free and total acidity
- Free and total alkalinity
- Water hardness
- Phosphates
- Chloride
- Chlorine
- Ammonia
- Nitrite
- Fe, Cu, Ni, Zn
- Na, Ca, F (with ISE)
- Free and total SO_2
- Sulfate
- H_2S/Mercaptans
- Hydrogen peroxide
- Free fatty acids
- Surfactants
- Water content
- Organic additives (CVS)

Existing *tiamo*™ laboratory methods can be transferred to ProcessLab easily and quickly.

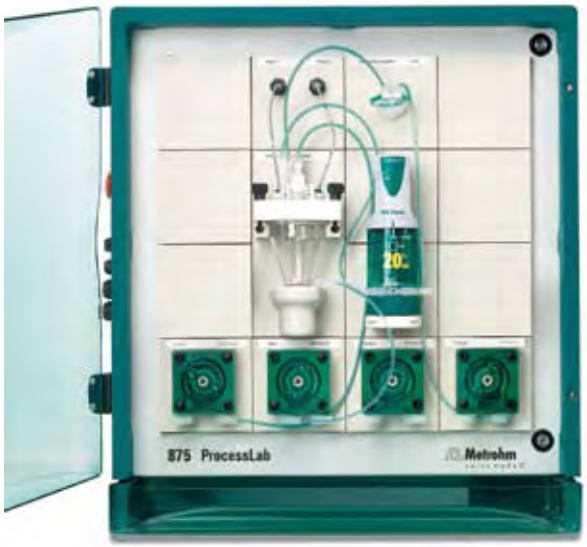
Example of a system for one parameter

On this and the following pages, a selection of typical ProcessLab systems is presented. Depending on the analyses to be carried out, a simple or a more complex analysis system is used.

The system described consists of a simply constructed analysis module. It contains a measuring vessel with magnetic stirrer, a sample loop for automatic measuring of the sample and an 800 Dosino dosing system for the exact addition of a titrant. Also integrated are the necessary peristaltic pumps for automatic rinsing and draining of the measuring vessel. With this setup the simple and fully automatic determination of one analytical parameter is possible. The sample is measured automatically, transferred to the vessel and the concentration of the analyte is determined by titration.

Typical applications

- Acid content in etching and pickling baths in the steel industry
- Metals in plating industry baths
- Analyses in ore extracts and metal production
- Acid mixtures in the semiconductor industry
- Boric acid in surface treatment baths in the semiconductor industry
- Quality control of fine chemicals
- Acids or bases in the production of raw materials
- Active substances in the pharmaceutical industry
- Total acidity in fruit juices and concentrates
- Parameters in production processes in the food industry, e.g. chloride, fluoride and iodide



ProcessLab system for one parameter

Example of a system for several parameters

The ProcessLab shown contains two 800 Dosinos for the exact addition of two titrants. Two or more analytical parameters can be determined. This version also allows variable sample sizes to be measured with a single sample loop and an 800 Dosino dosing system, so that samples of varying sizes can be determined. The peristaltic pumps are used for the automatic addition of reagents and auxiliary components and for rinsing and draining of the measuring vessel. Its modular design facilitates the extension of the system.

Typical applications

- Fe^{2+}/Fe^{3+} as well as free and total acidity in etching and pickling baths
- Cu^{2+} und H_2SO_4 in copper baths
- Ni^{2+} and boric acid in nickel electroplating baths
- Acids and bases in the production of intermediate and finished products
- Quality control of acidic and alkaline products
- Free and bound SO_2 in cooking liquors of the paper industry
- Determination of cyanide and alkalinity in process waters of the steel industry

ProcessLab system for several parameters

Example of a ProcessLab VA/CVS System

This ProcessLab system is equipped with a built-in potentiostat/galvanostat 797 VA Computrace thus covering a further application field. Classical trace analysis can be carried out using voltammetry (VA). In addition, Cyclic Voltammetric Stripping analysis (CVS) can be used for the determination of organic additives in electroplating baths. As a result of the integration of the 797 VA Computrace the analytical system is simple and compact. This version is controlled by a clearly structured ProcessLab software, which provides a simplified user interface. It allows the start of defined analysis sequences by a single button and in this way ensures error-free operation of the system.

Typical VA applications are

- Trace metal ions, e.g. Cu^{2+}, Cd^{2+}, Zn^{2+} and Pb^{2+} in drinking, sea and waste water
- Metals in salts and high-purity chemicals
- Cd^{2+}, Tl^{+} and other metal ions in electrolytes used in zinc production
- Analysis of organics such as 4-carboxybenzaldehyde in polyterephthalic acid (PET production)
- Free styrene in polystyrene

Typical CVS applications are

- Determination of organic additives such as brighteners, suppressors and levelers in plating baths, e.g. in acidic copper baths

ProcessLab VA/CVS System

ProcessLab Base Units and Options

The 875 ProcessLab has a modular design and consists of a base unit, possibly with additional extension modules. This base unit is then equipped with wet-chemistry modules at the front and additional I/O components inside.

875 ProcessLab Base Units with TFT operating unit
ProcessLab Base Unit with built-in industrial PC, operating unit with TFT monitor and ***tiamo***™ for ProcessLab software including basic I/O controller and power supplies.

2.875.0010	Door hinges left
2.875.0020	Door hinges right

875 ProcessLab Base Units with TFT operating unit and Touch function
ProcessLab Base Unit with built-in industrial PC, operating unit with Touch TFT and ***tiamo***™ for ProcessLab software including basic I/O controller and power supplies.

2.875.0510	Door hinges left
2.875.0520	Door hinges right

875 ProcessLab Extension Module
Extension module for extending an 875 ProcessLab Base Unit Titration.

2.875.0110	Door hinges left
2.875.0120	Door hinges right

875 ProcessLab Base Units VA or CVS with TFT operating unit and Touch function
ProcessLab Base Unit with built-in 797 VA Computrace, built-in industrial PC, operating unit with Touch TFT and ProcessLab software including basic I/O controller and power supplies.

2.875.0210	VA, door hinges left
2.875.0220	CVS, door hinges right

ProcessLab Options
A versatile range of wet-chemistry modules and components is available

- ProcessLab measuring amplifier for connecting various sensors
- ProcessLab digital input and output 24 V DC
- ProcessLab analog input and output 4...20 mA
- ProcessLab relay output
- ProcessLab sensor connection
- ProcessLab measuring vessel holder with stirrer and various measuring vessels
- ProcessLab peristaltic pump with 5 mL/min, 40 mL/min, 120 mL/min or 320 mL/min
- ProcessLab sampling system with associated sampling loops
- ProcessLab overflow pipets in various sizes
- ProcessLab solenoid valve module for controlling liquid flows
- Container with liquid level sensor in various sizes
- ProcessLab reagent cabinet with door hinges left or right

Please contact your local agency for a system proposal and possible integration into your process. Thanks to its modular design the system can be perfectly adapted to suit individual requirements.

Opened analysis module

Ion chromatography

Ion chromatography

The ideal method for analyzing anions, cations and polar substances is ion chromatography. It can be used to reliably quantify substances throughout a wide concentration range. A whole variety of ions can be analyzed in a single determination. Complete automation of ion chromatography is easy and helps to save time and reduce costs. Due to its reliability and robustness, ion chromatography is used in many different fields of application.

Professional IC Systems

Professional IC Instruments

Compact IC Instruments

Automation in Ion Chromatography

Alternative Detectors

Liquid Handling in Ion Chromatography

Online IC

IC Software

850 Professional IC
Professional IC 850 — Introduction

Intelligent Ion Chromatography

The 850 Professional IC is the first professional ion chromatography system with intelligent system components that are optimally matched to one another. The way from the sample to a precise result has now become easier, as the system thinks for itself and makes logical decisions on its own.

- Intelligence in the hardware of the 850 Professional IC,
  - **iPump**
  - **iDetector**
  - **intelligent Dosino**
- Intelligence in the **MagIC Net™** software,
- Intelligence in the Metrosep **iColumns**.

These are the intelligent system components that monitor and optimize all functions and, if required, will also document them in an FDA-compatible form. The configuration of the system is as simple as can be, as the components log themselves in automatically and provide the MagIC Net™ software with all the relevant information. The optimal operation of the 850 Professional IC and the results are monitored. If a parameter leaves the predefined range then the user is informed by e-mail or SMS.
The 850 Professional IC is a complex and highly efficient system and yet can be operated simply and intuitively with the MagIC Net™ software. This applies to experienced users and complex applications and complicated calculations as well as to users who value «one-button operation». Any user level is possible.

Innovation, flexibility and extremely simple operation result from the intelligence of the 850 Professional IC, the 858 Professional Sample Processor and the MagIC Net™ software.

Professional IC – ProfIC systems

The «ProfIC» systems are packages of Professional IC instruments and accessories that have been tailored to the needs of a particular group of applications. These systems feature all the necessary components required to carry out the relevant application completely automatically. The main components are

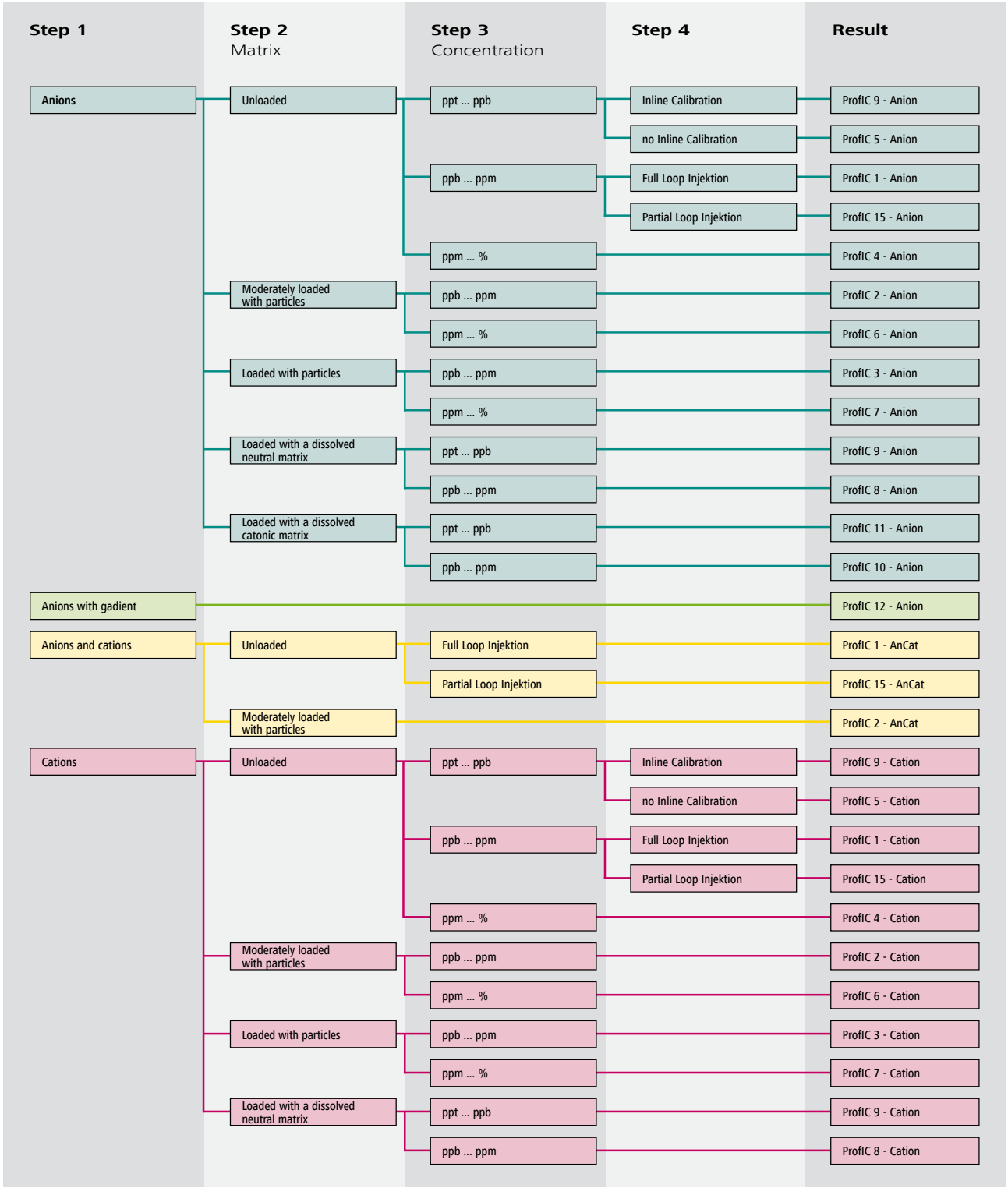
- 850 Professional IC
- 858 Professional Sample Processor
- 872 Extension Module
- 800 Dosino

in the appropriate versions with the corresponding accessories. Not included in the standard equipment are the column, MagIC Net™, sample rack and sample vials. This ensures the greatest possible flexibility of the systems.

Be it the determination of anions in an analytical service laboratory with a very high sample throughput or the detection of cations in the ultratrace range, such as is required in nuclear power plants, the ProfIC systems offer a custom-made solution for any ever-so-demanding measurement in ion chromatography. More than 20 systems can be called up under http://www.professional-ic.com/. Together with the analytical column and the software they will solve any application task.

How to choose the right ProfIC system

Find the right system for your application in a few steps!



«ProfIC 1 – Cation» – Professional IC system for automated ion chromatography

Professional IC system for the fully automatic determination of cations or anions (non-suppressed). «ProfIC 1» safely masters all routine tasks in ion chromatography. It is simple to use and extremely reliable.

Excellent system components guarantee very high sensitivity and reproducible results. Particular attention has been given to long service intervals; these can be monitored by the MagIC Net™ software.

«ProfIC 1» contains intelligent system components such as the iPump and the iDetector and provides space for a total of three iColumns.

The 858 Professional Sample Processor takes care of sample transfer. Numerous sample racks are available for volumes in the range 0.5...500 mL.

The «ProfIC 1» system is your reliable partner, both in routine operation and in research and development.

Ordering information
ProfIC 1 - Cation
«ProfIC 1 – Cation» – Professional IC system for automated ion chromatography

Technical information
Components
1 x 2.850.1010 850 Professional IC
1 x 2.858.0020 858 Professional Sample Processor

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

«ProfIC 2 – Cation» – Professional IC system with inline ultrafiltration

The Professional IC system for the fully automatic determination of cations or anions (non-suppressed) with Metrohm inline ultrafiltration. «ProfIC 2» safely masters all routine tasks in ion chromatography. It is simple to use and extremely reliable.

Excellent system components guarantee very high sensitivity and reproducible results. Particular attention has been given to long service intervals; these can be monitored by the intelligent MagIC Net™ software.

«ProfIC 2» is equipped with Metrohm inline ultrafiltration, which reliably removes particles from the sample and in this way effectively protects the analytical column against particulate contamination. The lifetime of the column is increased significantly. The ultrafiltration cell is equipped with a membrane filter with a pore size of 0.15 µm as standard and is suitable for samples with a light to medium particle load. Inline ultrafiltration works fully automatically and in this way, for example, saves the time-consuming and expensive use of syringe filters.

The ultrafiltration cell is mounted directly on the 858 Professional Sample Processor. The bidirectional dual-channel peristaltic pump provides for sample transfer through the ultrafiltration cell and to the Professional IC system. The sample is continuously delivered at a high flow rate. This delays the formation of a filter cake and increases the working life of the membrane. Cross contamination is kept below 0.1%.

Ordering information
ProfIC 2 - Cation
«ProfIC 2 – Cation» – Professional IC system with inline ultrafiltration

Technical information
Components
1 x 2.850.1010 850 Professional IC
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.5330.010 IC Equipment for ultrafiltration

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

Numerous sample racks for volumes 0.5 ... 500 mL are available for the 858 Professional Sample Processor. Ultrafiltration requires at least 5 mL of the sample.

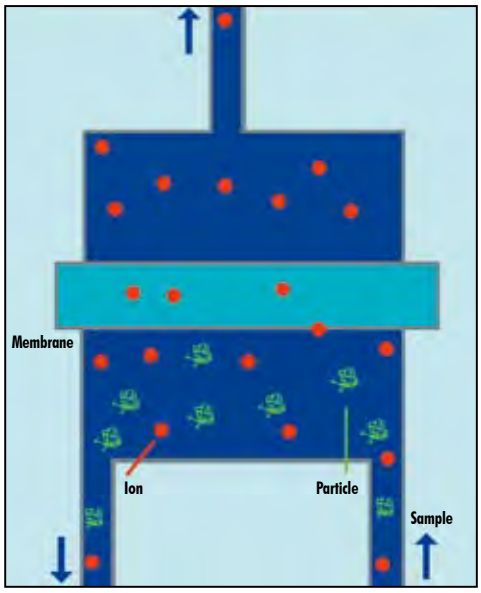
«ProfIC 2» contains intelligent system components such as the iPump and iDetector and offers space for a total of three iColumns.

The «ProfIC 2» system is your reliable partner, both in routine operation and in research and development.

Metrohm Inline Ultrafiltration and Dialysis

Metrohm Inline Ultrafiltration

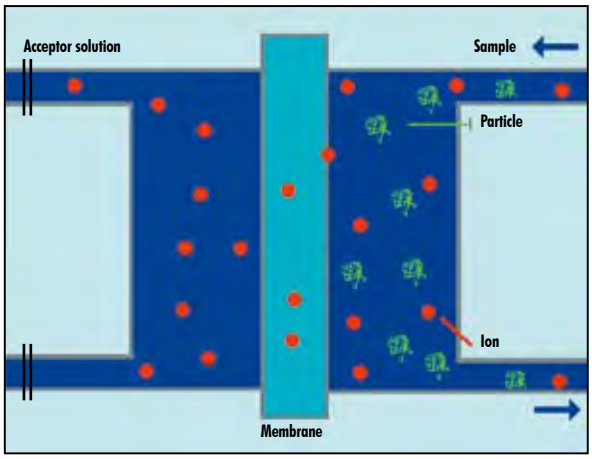
Modern ion chromatography recommends all samples to be filtered prior to injection. Separation columns with particle sizes below 10 µm require absolutely particle-free sample solutions. Unfiltered solutions can increase pressure on the column which in some cases can radically reduce the life span of the column. Manual filtration is usually carried out by means of disposable filter cartridges with a pore size of 0.45 µm or less. These become clogged very quickly, particularly with samples containing very fine particles. Sample changers with filter caps are used as an alternative. Their pore size is often larger than that of disposable filters. However, they are expensive and there is still a risk of clogging.
With Metrohm Inline Ultrafiltration, which belongs to the membrane separation techniques, these problems no longer apply. The samples are placed directly on the sample rack. When the samples are processed the sample flow is channelled into the lower chamber of the ultrafiltration cell and passes along the membrane and into the waste container. In the upper chamber of the cell a peristaltic pump creates a vacuum and draws the sample solution through the ultrafiltration membrane. The filtered sample solution enters the injection loop and is then injected. Less than 20% of the original solution is removed as filtrate, the remainder flows directly into the waste container. This, together with the geometrical arrangement of the cell, virtually eliminates the formation of a filter cake which could block the membrane. Metrohm Inline Ultrafiltration is particularly suitable for samples with a light to medium load, for example drinking water, surface water, wastewater, digestion solutions, extracts.



Ultrafiltration

Metrohm Inline Dialysis

Highly polluted samples require complex and laborious sample preparation steps before they can be analyzed. Metrohm Inline Dialysis provides a considerable rationalization of the whole process. Samples must meet just one condition: they must be liquid or be able to be brought into liquid form and they need to be largely homogeneous. Larger particles can be removed by centrifuging, if necessary. The sample solution is then dialyzed in the dialysis cell according to the method patented by Metrohm (European Patent 0 820 804, US Patent 5,861,097). Due to this special «Inline Stopped-Flow Dialysis» method a virtually complete dialysis is obtained. This means that the acceptor solution has the same ionic concentration as the original sample (equilibrium dialysis). The acceptor solution is then injected directly into the ion chromatograph where it is analyzed. Whereas in ultrafiltration the sample solution is filtered through the membrane as a result of a difference in pressure, the driving force in dialysis is the difference in concentration between the two sides. The ions to be determined diffuse through the membrane, but no sample solution is forced through the membrane. This means that no filter cake is formed that could block the membrane. By means of this technique it is possible to determine anions and cations even in cutting oil emulsions, biodiesel, dairy products or body fluids such as blood and urine.
If the system is programmed so that the next sample is dialyzed during the current run, the total analysis takes about the same time as direct injection.



«Stopped flow» method
An equilibrium is achieved between the acceptor solution and the sample solution

«ProfIC 3 – Cation» – Professional IC system with inline dialysis

Professional IC system for the fully automatic determination of cations or anions (non-suppressed) with Metrohm inline dialysis. «ProfIC 3» safely masters demanding analytical tasks in ion chromatography. It is nevertheless simple to use and extremely reliable.

«ProfIC 3» festures intelligent system components such as the iPump and the iDetector and provides space for a total of three iColumns.

The Professional IC system «ProfIC 3» is equipped with «Inline Stopped Flow Dialysis», which has been patented by Metrohm (European Patent 0 820 804, US-Patent 5,861,097). This fully automatic sample preparation technique effectively removes particles and colloids from the samples to be analyzed. Emulsions, samples containing fats and proteins, body fluids and strongly polluted wastewater can be reliably determined without damaging the analytical column. The driving force behind dialysis is diffusion. This means that only the ions and not the particles can pass through the dialysis membrane. This extends the lifetime of the membrane and, for example, prevents oil droplets from reaching the analytical column through the membrane, as would be the case if filtration was to be used.

The dialysis cell is mounted directly in the 850 Professional IC. The interplay between the two bidirectional peristaltic pumps at the 858 Professional Sample Processor – Pump and 850 Professional IC – Prep 1 allows the dialysis to be controlled by MagIC Net™.

Ordering information

ProfIC 3 - Cation
«ProfIC 3 – Cation» – Professional IC system with inline dialysis

Technical information

Components
1 x 2.850.1030 850 Professional IC
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.5330.000 IC Equipment for dialysis

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

Numerous sample racks for volumes 0.5...500 mL are available for the 858 Professional Sample Processor. Dialysis requires at least 10 mL of the sample.

«ProfIC 4 – Cation» – Professional IC system with inline dilution

Professional IC system for the fully automatic determination of cations or anions (non-suppressed) in concentrated solutions. «ProfIC 4» can be used to analyze samples whose concentration is too high to be determined directly.

Ionic concentrations that are too high overload the column, which results in a poor chromatographic separation and therefore adversely affects the accuracy of the measurement.

«ProfIC 4» allows the automatic inline dilution of each sample. Dilution takes place at an external position of the 858 Professional Sample Processor. In combination with transfer tubing the 800 Dosino carries out the high-precision liquid handling steps.

The MagIC Net™ software controls the dilution steps and carries out all calculations, so that only the dilution factor needs to be entered in the sample table. In addition, the software provides for intelligent dilution, i.e. dilution takes place automatically depending on the predefined concentration limits. The software monitors the results and makes logical decisions.

«ProfIC 4» features intelligent system components such as the iPump, the iDetector and the 800 Dosino and provides space for a total of three iColumns.

The 858 Professional Sample Processor with Pump carries out the sample transfer. Numerous sample racks for volumes 0.5...500 mL are available.

Ordering information
ProfIC 4 - Cation
«ProfIC 4 – Cation» – Professional IC system with inline dilution

Technical information
Components
1 x 2.800.0010 800 Dosino
1 x 2.801.0010 801 Magnetic Stirrer
1 x 2.850.1010 850 Professional IC
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.1562.130 Transfer Tubing / 10 mL
1 x 6.2744.200 Adapter UNF 10/32 / M6
1 x 6.3032.210 Dosing unit complete / 10 mL
1 x 6.5330.020 IC Equipment for dilution

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

«ProfIC 5 – Cation» – Professional IC system with variable sample preconcentration

Professional IC system for trace analysis of cations and anions (non-suppressed). With the «ProfIC 5», concentrations down to the ppb range (µg/L) can be reliably determined. The intelligent 800 Dosino carries out the high-precision sample preconcentration on the preconcentration column, which replaces the sample loop.

This means that it is possible to preconcentrate and analyze more than 50 mL of the sample instead of the 10...20 µL sample used for direct injection via the sample loop. It is also possible to calibrate the system using the 800 Dosino. In this case it will do to work with the single most concentrated standard, from which varying volumes are transferred to the preconcentration column.

«ProfIC 5» features intelligent system components such as the iPump, the iDetector and the 800 Dosino and provides space for a total of three iColumns. The MagIC Net™ software monitors and controls the functions of all components.

The 858 Professional Sample Processor supplies the samples. Transfer takes place with the 800 Dosino. Numerous sample racks are available for volumes 0.5...500 mL. The minimum volume for preconcentration is 0.5 mL.

Ordering information

ProfIC 5 - Cation

«ProfIC 5 – Cation» – Professional IC system with variable sample preconcentration

Technical information

Components

1 x 2.800.0010 800 Dosino
1 x 2.850.1010 850 Professional IC
1 x 2.858.0010 858 Professional Sample Processor
1 x 6.1014.200 Metrosep I Trap 1 Column
1 x 6.1562.130 Transfer Tubing / 10
3 x 6.1805.190 FEP tubing / M6 / 11 cm
1 x 6.1808.000 Connection bushing M6
1 x 6.1808.060 T connector / M6
1 x 6.2744.080 M6 thread/UNF 10/32 coupling
2 x 6.2744.200 Adapter UNF 10/32 / M6
1 x 6.2841.100 Rinsing Station for Sample Processor
1 x 6.3032.210 Dosing unit complete / 10 mL
1 x 6.5330.040 IC Equipment for Liquid Handling

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

«ProfIC 6 – Cation» – Professional IC system with inline dilution and ultrafiltration

Professional IC system for the fully automatic determination of cations or anions (non-suppressed) present in very high concentrations and whose matrix contains particles. «ProfIC 6» works with Metrohm inline dilution and ultrafiltration. With this system it is possible to eliminate bacteria or inorganic particles from the sample and then dilute it so far that it can be analyzed.

Automatic inline dilution of the sample takes place at an external position of the 858 Professional Sample Processor. The 800 Dosino carries out the high-precision liquid handling steps in combination with an transfer tubing.

The MagIC Net™ software controls the dilution steps and carries out all calculations, so that only the dilution factor needs to be entered in the sample table. In addition, the software provides for intelligent dilution, i.e. dilution takes place automatically depending on the predefined concentration limits. The software monitors all intelligent system components from the iColumn to the iDetector.

The Metrohm inline ultrafiltration included in «ProfIC 6» reliably removes particles from the sample and in this way effectively protects the analytical column significantly increasing its lifetime. The ultrafiltration cell is equipped with a membrane filter with a pore size of 0.15 µm as standard and is suitable for samples with a light to medium particle load. Inline ultrafiltration works fully automatically and in this way, for example, saves the time-consuming and expensive use of syringe filters.

Ordering information

ProfIC 6 - Cation

«ProfIC 6 – Cation» – Professional IC system with inline dilution and ultrafiltration

Technical information

Components

1 x 2.800.0010 800 Dosino
1 x 2.801.0010 801 Magnetic Stirrer
1 x 2.850.1010 850 Professional IC
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.1562.130 Transfer Tubing / 10 mL
1 x 6.2744.200 Adapter UNF 10/32 / M6
1 x 6.3032.210 Dosing unit complete / 10 mL
1 x 6.5330.010 IC Equipment for ultrafiltration
1 x 6.5330.020 IC Equipment for dilution

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

The 858 Professional Sample Processor with Pump carries out the sample transfer. Numerous sample racks for volumes 0.5...500 mL are available.

«ProfIC 7 – Cation» – Professional IC system with inline dilution and dialysis

Professional IC system for the fully automatic determination of cations or anions (non-suppressed) present in high concentrations and also in a very critical matrix. Emulsions, samples containing fats and proteins or strongly polluted wastewater are not always compatible with ion chromatography, even after an initial filtration step. This is why «ProfIC 7» is equipped with the inline dialysis system patented by Metrohm (European Patent 0 820 804, US-Patent 5,861,097).

In this way it is possible to determine anions and cations even in cutting oil emulsions, dairy products or body fluids such as blood and urine.

«ProfIC 7» also offers the possibility of automatic inline dilution of the sample. This takes place at an external position of the 858 Professional Sample Processor. In combination with a transfer tubing, the 800 Dosino carries out the high-precision liquid handling steps.

The intelligent MagIC Net™ software controls both the dialysis and the dilution steps. MagIC Net™ carries out all calculations, so that only the dilution factor needs to be entered in the sample table. In addition, the software provides intelligent dilution, i.e. dilution takes place automatically depending on the predefined concentration limits. The software monitors the results and makes logical decisions.

The 858 Professional Sample Processor holds the samples. Numerous sample racks for volumes 0.5...500 mL are available.

Ordering information

ProfIC 7 - Cation
«ProfIC 7 – Cation» – Professional IC system with inline dilution and dialysis

Technical information

Components
1 x 2.800.0010 800 Dosino
1 x 2.801.0010 801 Magnetic Stirrer
1 x 2.850.1030 850 Professional IC
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.1562.130 Transfer Tubing / 10 mL
1 x 6.2744.200 Adapter UNF 10/32 / M6
1 x 6.3032.210 Dosing unit complete / 10 mL
1 x 6.5330.000 IC Equipment for dialysis
1 x 6.5330.020 IC Equipment for dilution

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

«ProfIC 8 – Cation» – Professional IC system with inline sample preconcentration and matrix elimination

Professional IC system for the determination of cations or anions (non-suppressed) in difficult matrices. «ProfIC 8» with Metrohm inline sample preconcentration and matrix elimination allows chromatography unaffected by matrix influences and guarantees that the analytical column has a long lifetime.

A small volume of the sample is transferred fully automatically to the preconcentration column. The anions or cations are retained. The matrix can be removed in a rinsing step. The clean sample is then injected to the IC system.

The 850 Professional IC – Prep 2 is equipped with an additional valve for liquid handling. The peristaltic pump transfers the sample and the rinsing solutions. The intelligent MagIC Net™ software controls and monitors the system.

The 858 Professional Sample Processor is responsible for sample delivery. Numerous sample racks for volumes 0.5...500 mL are available. Only small sample volumes of about 1 mL are normally required for matrix elimination.

Ordering information

ProfIC 8 - Cation
«ProfIC 8 – Cation» – Professional IC system with inline sample preconcentration and matrix elimination

Technical information

Components
1 x 2.850.1050 850 Professional IC
1 x 2.858.0010 858 Professional Sample Processor
1 x 6.1602.150 Bottle neck attachment
1 x 6.1608.070 Eluent bottle / 2 L / GL 45

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

«ProfIC 9 – Cation» – Professional IC system for trace analysis with inline calibration, sample preconcentration and matrix elimination

Professional IC system for ultratrace analysis in the lowest ppt range (ng/L) of cations or anions (non-suppressed) in complex matrices. «ProfIC 9» with Metrohm inline sample preconcentration and matrix elimination allows chromatography unaffected by matrix influences and guarantees that the analytical column has a long lifetime.

Metrohm inline calibration permits very low concentrations – in the lowest ppt range (ng/L) – to be reliably calibrated using a single standard of higher concentration in the ppb range.

The sample is transferred to the preconcentration column fully automatically and with high precision by the intelligent 800 Dosino. The anions or cations are retained. The matrix can be removed in a rinsing step. The clean sample is then injected to the IC system.

The 850 Professional IC – Prep 2 is equipped with an additional valve for liquid handling. The peristaltic pump transfers the standard solution. The intelligent MagIC Net™ software controls and monitors the system.

Calibration and calculation of the results as a function of preconcentration volume is also carried out by the MagIC Net™ software. Even if complex procedures are involved, operating the system is perfectly easy.

The 858 Professional Sample Processor holds the samples. Numerous sample racks for volumes 0.5...500 mL are available. Typical preconcentration volumes are between 0.5...100 mL.

Ordering information

ProfIC 9 - Cation

«ProfIC 9 – Cation» – Professional IC system for trace analysis with inline calibration, sample preconcentration and matrix elimination

Technical information

Components
1 x 2.800.0010 800 Dosino
1 x 2.850.1050 850 Professional IC
1 x 2.858.0010 858 Professional Sample Processor
1 x 6.1014.200 Metrosep I Trap 1 Column
1 x 6.1562.130 Transfer Tubing / 10 mL
3 x 6.1805.190 FEP tubing / M6 / 11 cm
1 x 6.1808.000 Connection bushing M6
1 x 6.1808.060 T connector / M6
1 x 6.2744.080 M6 thread/UNF 10/32 coupling
2 x 6.2744.200 Adapter UNF 10/32 / M6
1 x 6.2841.100 Rinsing Station for Sample Processor
1 x 6.3032.210 Dosing unit complete / 10 mL
1 x 6.5330.040 IC Equipment for Liquid Handling

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

«ProfIC 15 – Cation» – Professional IC system for partial loop injection

Professional IC system for the fully automatic determination of cations and anions (non-suppressed) and «Partial Loop Injection». «Partial Loop Injection» enables concentrated samples to be injected without previous dilution as well as multipoint calibrations using just one standard solution. «ProfIC 15» safely masters all routine tasks in ion chromatography. It is simple to use and extremely reliable.

Excellent system components guarantee very high sensitivity and reproducible results. Particular attention has been given to long service intervals; these can be monitored by the MagIC Net™ software.

«ProfIC 15» features intelligent system components such as the iPump and the iDetector and provides space for a total of three iColumns.

The 800 Dosino takes care of the sample transfer. With its high precision liquid handling, partial loop injections are performed easily and with high reproducibility. This ensures very accurate results, for example with calibration using just one standard.

For the 858 Professional Sample Processor numerous sample racks are available for volumes in the range 0.5...500 mL.

The «ProfIC 15» system is your reliable partner, both in routine operation and in research and development.

Ordering information
ProfIC 15 - Cation
«ProfIC 15 – Cation» – Professional IC system for partial loop injection

Technical information
Components
1 x 2.800.0010 800 Dosino
1 x 2.850.1010 850 Professional IC
1 x 2.858.0010 858 Professional Sample Processor
1 x 6.1825.220 PEEK sample loop 100 µL
1 x 6.2841.100 Rinsing Station for Sample Processor
1 x 6.3032.120 Dosing unit complete, 2 mL
1 x 6.5330.040 IC Equipment for Liquid Handling

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

«ProfIC 1 – Anion» – Professional IC system for automated ion chromatography

Professional IC system for the fully automatic determination of anions with sequential suppression. «ProfIC 1» safely masters all routine tasks in ion chromatography. It is simple to use and extremely reliable.

Excellent system components guarantee very high sensitivity and reproducible results. Particular attention has been given to long service intervals; these can be monitored by the MagIC Net™ software.

«ProfIC 1» features intelligent system components such as the iPump and the iDetector and provides space for a total of three iColumns.

The anion system is equipped with sequential suppression. This unique combination of chemical and downstream CO_2 suppression results in very low detection limits. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent.

The 858 Professional Sample Processor provides for sample transfer. Numerous sample racks are available for volumes in the range 0.5...500 mL.

The «ProfIC 1» system is your reliable partner, both in routine operation and in research and development.

Ordering information

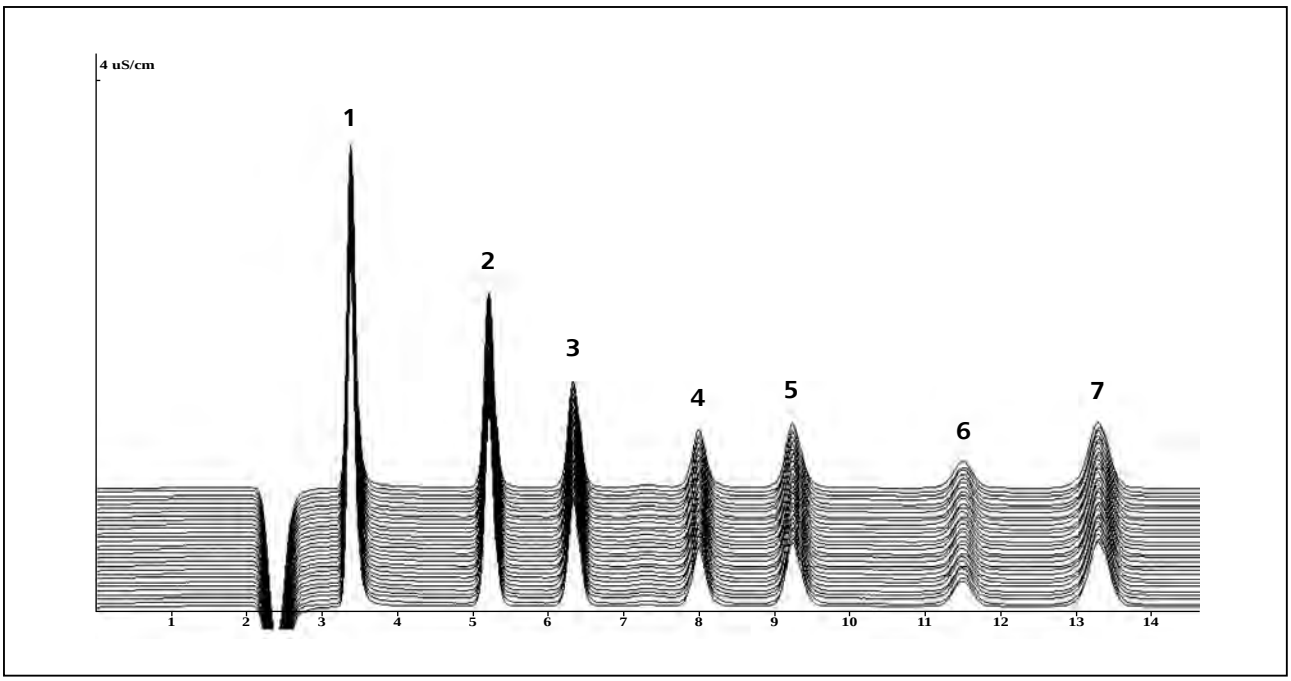
ProfIC 1 - Anion
«ProfIC 1 – Anion» – Professional IC system for automated ion chromatography

Technical information

Components
1 x 2.850.2030 850 Professional IC
1 x 2.858.0020 858 Professional Sample Processor

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

Suppressor reproducibility



For each measurement with the Metrohm Suppressor Module «MSM II», a fresh suppressor cartridge is used. Thus, you can always be sure that you are working with a cation exchanger that delivers its full performance: today, tomorrow, and even after years of uninterrupted use. The suppressor is characterized by its pressure stability; it is 100% solvent-resistant and impresses with its long working life. As no sensitive membranes are used, the suppressor reaches its equilibrium after a very short time and is then ready for use. That is exactly the reason why we can give a 10years warranty on the «MSM II». The Metrohm Suppressor Module is favorably-priced and robust. Reproducibility of measurements made with the «MSM II» is excellent as is shown by the chromatograms:

30 injections, separation of standard anions on the Metrosep A Supp 5 – 150, eluent 1.0 mmol/L $NaHCO_3$, 3.2 mmol/L Na_2CO_3, flow 0.7 mL/min, loop 20 µL, suppression with the Metrohm Suppressor Module «MSM II», regeneration with 50 mmol/L H_2SO_4, rinsing with deionized water.

1 Fluoride
2 Chloride
3 Nitrite
4 Bromide
5 Nitrate
6 Phosphate
7 Sulfate

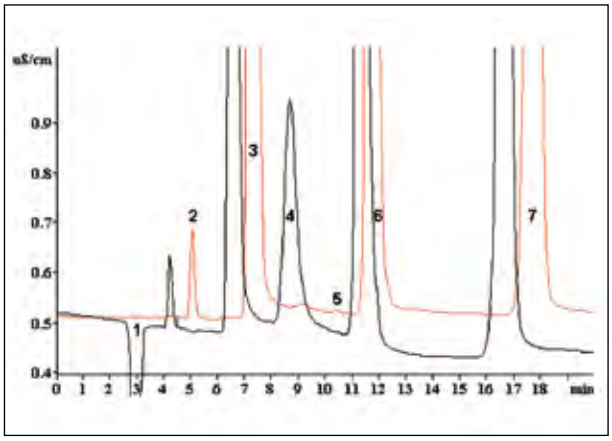
10 year
suppressor warranty

Ion	F^-	Cl^-	NO_2^-	Br^-	NO_3^-	HPO_4^{2-}	SO_4^{2-}
Concentration (mg/L)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Rel. standard deviation in % (n=30)	0.46	0.33	0.37	0.37	0.32	0.41	0.37

Sequential Suppression

Sequential suppression is the combination of chemical suppression using the «MSM II» with Metrohm CO_2 Suppression «MCS». In this way anions can be detected with carbonate/ bicarbonate eluents at the low background conductivity of hydroxide eluents.

The removal of the CO_2 prevents the carbonate equilibrium from negatively affecting the peak areas. The benefit for the user: Peak areas thus obtained are up to 50% larger – at the same concentration and for the same sample volume; this means lower detection limits.
No carbonate peak also means no annoying interference with the quantification of certain analyte anions. For example, chloride and carbonate coelute on many polystyrene-divinylbenzene columns. By using the CO_2 suppressor such problems are a thing of the past. The virtual elimination of the injection peak improves the determination of rapidly eluting anions, for example fluoride. Although the separation of the injection peak and fluoride peak is already very good on polyalcohol columns, the detection limits can be improved even further by using the CO_2 suppressor. As the injection peak is practically no longer visible, considerably larger sample volumes can also be injected.



Drinking water from Herisau (Switzerland): comparison of suppression with «MSM II» alone (black) and with «MSM II» plus «MCS» (red).

Column: Metrosep A SUPP 5 – 100 (6.1006.510)
Eluent: 3.2 mmol/L Na_2CO_3; 1.0 mmol/L $NaHCO_3$
Flow rate: 0.7 mL/min

Nr.	Ion	Conc. (mg/L)
1	Injection peak	–
2	Fluoride	0.04
3	Chloride	7.79
4	Carbonate	–
5	Bromide	0.004
6	Nitrate	7.82
7	Sulfate	5.20

«ProfIC 2 – Anion» – Professional IC system with inline ultrafiltration

The Professional IC system for the fully automatic determination of anions with Metrohm inline ultrafiltration. «ProfIC 2» safely masters all routine tasks in ion chromatography. It is simple to use and extremely reliable.

Excellent system components guarantee very high sensitivity and reproducible results. Particular attention has been given to long service intervals; these can be monitored by the intelligent MagIC Net™ software.

«ProfIC 2» is equipped with Metrohm inline ultrafiltration, which reliably removes particles from the sample and in this way effectively protects the analytical column against particulate contamination. The lifetime of the column is increased significantly. The ultrafiltration cell is equipped with a membrane filter with a pore size of 0.15 µm as standard and is suitable for samples with a light to medium particle load. Inline ultrafiltration works fully automatically and in this way, for example, saves the time-consuming and expensive use of syringe filters.

The ultrafiltration cell is mounted directly on the 858 Professional Sample Processor. The bidirectional dual-channel peristaltic pump provides for sample transfer through the ultrafiltration cell and to the Professional IC system. The sample is continuously delivered at a high flow rate. This delays the formation of a filter cake and increases the working life of the membrane. Cross contamination is kept below 0.1%.

Ordering information
ProfIC 2 - Anion
«ProfIC 2 – Anion» – Professional IC system with inline ultrafiltration

Technical information
Components
1 x 2.850.2030 850 Professional IC
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.5330.010 IC Equipment for ultrafiltration

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

Numerous sample racks for volumes 0.5...500 mL are available for the 858 Professional Sample Processor. Ultrafiltration requires at least 5 mL of the sample.

«ProfIC 2» features intelligent system components such as the iPump and the iDetector and provides space for a total of three iColumns.

The anion system is additionally equipped with sequential suppression. This unique combination of chemical and downstream CO_2 suppression results in very low detection limits. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent.

The «ProfIC 2» system is your reliable partner, both in routine operation and in research and development.

«ProfIC 3 – Anion» – Professional IC system with inline dialysis

Professional IC system for the fully automatic determination of anions with Metrohm inline dialysis. «ProfIC 3» safely masters demanding analytical tasks in ion chromatography. It is nevertheless simple to use and extremely reliable.

«ProfIC 3» features intelligent system components such as the iPump and the iDetector and provides space for a total of three iColumns.

The Professional IC system «ProfIC 3» is equipped with «Inline Stopped Flow Dialysis», which has been patented by Metrohm (European Patent 0 820 804, US-Patent 5,861,097). This fully automatic sample preparation technique effectively removes particles and colloids from the samples to be analyzed. Emulsions, samples containing fats and proteins, body fluids and strongly polluted wastewater can be reliably determined without damaging the analytical column. The driving force behind dialysis is diffusion. This means that only the ions and not the particles can pass through the dialysis membrane. This extends the life of the membrane and, for example, prevents oil droplets from reaching the analytical column through the membrane, as would be the case if filtration was to be used.

The dialysis cell is mounted directly in the 850 Professional IC. The interplay between the two bidirectional peristaltic pumps at the 858 Professional Sample Processor – Pump and 850 Professional IC – Prep 1 allows the dialysis to be controlled by MagIC Net™.

Ordering information
ProfIC 3 - Anion
«ProfIC 3 – Anion» – Professional IC system with inline dialysis

Technical information
Components
1 x 2.850.2110 850 Professional IC
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.5330.000 IC Equipment for dialysis

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

The anion system is equipped with sequential suppression. Very high sensitivity is guaranteed by this unique combination of chemical and downstream CO_2 suppression. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent.

Numerous sample racks for volumes 0.5...500 mL are available for the 858 Professional Sample Processor. Dialysis requires at least 10 mL of the sample.

«ProfIC 4 – Anion» – Professional IC system with inline dilution

Professional IC system for the fully automatic determination of anions in concentrated solutions. «ProfIC 4» can be used to analyze samples the concentration of which is too high to be determined directly.

Ionic concentrations that are too high overload the column, which results in a poor chromatographic separation and therefore adversely affects the accuracy of the measurement.

«ProfIC 4» allows the automatic inline dilution of each sample. Dilution takes place at an external position of the 858 Professional Sample Processor. In combination with transfer tubing the 800 Dosino carries out the high-precision liquid handling steps.

The MagIC Net™ software controls the dilution steps and carries out all calculations, so that only the dilution factor needs to be entered in the sample table. In addition, the software provides for intelligent dilution, i.e. dilution takes place automatically depending on the predefined concentration limits. The software monitors the results and makes logical decisions.

«ProfIC 4» features intelligent system components such as the iPump, the iDetector and the 800 Dosino and provides space for a total of three iColumns.

The anion system is equipped with sequential suppression. This unique combination of chemical and downstream CO_2 suppression results in very low detection limits. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent.

The 858 Professional Sample Processor with Pump provides for the sample transfer. Numerous sample racks for volumes 0.5...500 mL are available.

Ordering information
ProfIC 4 - Anion
«ProfIC 4 – Anion» – Professional IC system with inline dilution

Technical information
Components
1 x 2.800.0010 800 Dosino
1 x 2.801.0010 801 Magnetic Stirrer
1 x 2.850.2030 850 Professional IC
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.1562.130 Transfer Tubing / 10 mL
1 x 6.2744.200 Adapter UNF 10/32 / M6
1 x 6.3032.210 Dosing unit complete / 10 mL
1 x 6.5330.020 IC Equipment for dilution

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

«ProfIC 5 – Anion» – Professional IC system with variable sample preconcentration

Professional IC system for trace analysis of anions. With the «ProfIC 5», concentrations down to the ppb range (µg/L) can be reliably determined. The intelligent 800 Dosino carries out the high-precision sample preconcentration on the preconcentration column, which replaces the sample loop.

This means that it is possible to preconcentrate and analyze more than 50 mL of the sample instead of the 10...20 µL sample used for direct injection via the sample loop. It is also possible to calibrate the system using the 800 Dosino. In this case it will do to work with the single most concentrated standard, from which varying volumes are transferred to the preconcentration column. This opens the single digit ppb range even for routine analysis.

«ProfIC 5» features intelligent system components such as the iPump, the iDetector and the 800 Dosino and provides space for a total of three iColumns. The MagIC Net™ software monitors and controls the functions of all components.

The anion system is equipped with sequential suppression. This unique combination of chemical and downstream CO_2 suppression allows the achievement of very low detection limits. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent. With the preconcentration technique carbonate interference is practically eliminated.

Ordering information

ProfIC 5 - Anion

«ProfIC 5 – Anion» – Professional IC system with variable sample preconcentration

Technical information

Components

1 x 2.800.0010 800 Dosino
1 x 2.850.2030 850 Professional IC
1 x 2.858.0010 858 Professional Sample Processor
1 x 6.1014.200 Metrosep I Trap 1 Column
1 x 6.1562.130 Transfer Tubing / 10 mL
3 x 6.1805.190 FEP tubing / M6 / 11 cm
1 x 6.1808.000 Connection bushing M6
1 x 6.1808.060 T connector / M6
1 x 6.2744.080 M6 thread/UNF 10/32 coupling
2 x 6.2744.200 Adapter UNF 10/32 / M6
1 x 6.2841.100 Rinsing Station for Sample Processor
1 x 6.3032.210 Dosing unit complete / 10 mL
1 x 6.5330.040 IC Equipment for Liquid Handling

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

The 858 Professional Sample Processor supplies the samples. Transfer is carried out by the 800 Dosino. Numerous sample racks are available for volumes 0.5...500 mL. The minimum volume for preconcentration is 0.5 mL.

«ProfIC 6 – Anion» – Professional IC system with inline dilution and ultrafiltration

Professional IC system for the fully automatic determination of anions in very high concentrations in matrices containing particles. «ProfIC 6» works with Metrohm inline dilution and ultrafiltration. This system enables users to dilute the sample and eliminate bacteria or inorganic particles prior to the analysis.

Automatic inline dilution of the sample takes place at an external position of the 858 Professional Sample Processor. The 800 Dosino carries out the high-precision liquid handling steps by means of a tranfer tubing.

The MagIC Net™ software controls the dilution steps and provides for all calculations; only the dilution factor needs to be entered in the sample table. In addition, the software provides for intelligent dilution, i.e. dilution takes place automatically depending on the predefined concentration limits. The software monitors all intelligent system components from the iColumn to the iDetector.

The Metrohm inline ultrafiltration included in «ProfIC 6» reliably removes particles from the sample and in this way effectively protects the analytical column increasing its lifetime significantly. The ultrafiltration cell is equipped with a membrane filter with a pore size of 0.15 µm as standard and is suitable for samples with a light to medium particle load. Inline ultrafiltration works fully automatically and in this way, for example, saves the time-consuming and expensive use of syringe filters.

Ordering information

ProfIC 6 - Anion
«ProfIC 6 – Anion» – Professional IC system with inline dilution and ultrafiltration

Technical information

Components
1 x 2.800.0010 800 Dosino
1 x 2.801.0010 801 Magnetic Stirrer
1 x 2.850.2030 850 Professional IC Anion
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.1562.130 Transfer Tubing / 10 mL
1 x 6.2744.200 Adapter UNF 10/32 / M6
1 x 6.3032.210 Dosing unit complete / 10 mL
1 x 6.5330.010 IC Equipment for ultrafiltration
1 x 6.5330.020 IC Equipment for dilution

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

The anion system is equipped with sequential suppression. Very high sensitivity is achieved by this unique combination of chemical and downstream CO_2 suppression. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent.

The 858 Professional Sample Processor with Pump carries out the sample transfer. Numerous sample racks for volumes 0.5...500 mL are available.

«ProfIC 7 – Anion» – Professional IC system with inline dilution and dialysis

Professional IC system for the fully automatic determination of anions in high concentrations and in critical matrices. Emulsions, samples containing fats and proteins or strongly polluted wastewater are not always compatible with ion chromatography, even after preceeding filtration. This is why «ProfIC 7» is equipped with the inline dialysis system patented by Metrohm (European Patent 0 820 804).

In this way it is possible to determine anions and cations even in cutting oil emulsions, dairy products or body fluids such as blood and urine.

«ProfIC 7» also offers the possibility of automatic inline dilution of the sample. This takes place at an external position of the 858 Professional Sample Processor. In combination with a transfer tubing, the 800 Dosino carries out the high-precision liquid handling steps.

The intelligent MagIC Net™ software controls both the dialysis and the dilution steps. MagIC Net™ provides for all calculations; only the dilution factor needs to be entered in the sample table. In addition, the software provides for intelligent dilution, i.e. dilution takes place automatically depending on the predefined concentration limits. The software monitors the results and makes logical decisions.

The anion system is equipped with sequential suppression. Very high sensitivity is achieved by this unique combination of chemical and downstream CO_2 suppression. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent.

The 858 Professional Sample Processor with Pump carries out the sample transfer. Numerous sample racks for volumes 0.5...500 mL are available.

Ordering information

ProfIC 7 - Anion
«ProfIC 7 – Anion» – Professional IC system with inline dilution and dialysis

Technical information

Components
1 x 2.800.0010 800 Dosino
1 x 2.801.0010 801 Magnetic Stirrer
1 x 2.850.2110 850 Professional IC
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.1562.130 Transfer Tubing / 10 mL
1 x 6.2744.200 Adapter UNF 10/32 / M6
1 x 6.3032.210 Dosing unit complete / 10 mL
1 x 6.5330.000 IC Equipment for dialysis
1 x 6.5330.020 IC Equipment for dilution

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

«ProfIC 8 – Anion» – Professional IC system with inline sample preconcentration and matrix elimination

Professional IC system for the determination of anions in difficult matrices. «ProfIC 8» with Metrohm inline sample preconcentration and matrix elimination allows chromatography unaffected by matrix influences and guarantees that the analytical column has a long lifetime.

A small volume of the sample is transferred fully automatically to the preconcentration column. The anions are retained. The matrix can be removed in a rinsing step. The clean sample is then injected to the IC system.

The 850 Professional IC – Prep 2 is equipped with an additional valve for liquid handling. The peristaltic pump transfers the sample and the rinsing solutions. The intelligent MagIC Net™ software controls and monitors the system.

The anion system is equipped with sequential suppression. This unique combination of chemical and downstream CO_2 suppression results in very low detection limits. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent. With the preconcentration technique carbonate interference is practically eliminated.

The 858 Professional Sample Processor provides for sample delivery. Numerous sample racks for volumes 0.5...500 mL are available. Only small sample volumes of about 1 mL are normally required for matrix elimination.

Ordering information

ProfIC 8 - Anion
«ProfIC 8 – Anion» – Professional IC system with inline sample preconcentration and matrix elimination

Technical information

Components
1 x 2.850.2150 850 Professional IC Anion
1 x 2.858.0010 858 Professional Sample Processor
1 x 6.1602.150 Bottle neck attachment
1 x 6.1608.070 Eluent bottle / 2 L / GL 45

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

«ProfIC 9 – Anion» – Professional IC system for trace analysis with inline calibration, sample preconcentration and matrix elimination

Professional IC system for ultratrace analysis in the lowest ppt range (ng/L) of anions in complex matrices. «ProfIC 9» with Metrohm inline sample preconcentration and matrix elimination allows chromatography unaffected by matrix influences and guarantees that the analytical column has a long working life.

Metrohm inline calibration permits very low concentrations – in the lowest ppt range – to be reliably calibrated using a single standard of higher concentration – in the ppb range.

The sample is transferred to the preconcentration column fully automatically and with high precision by the intelligent 800 Dosino. The anions are retained. The matrix can be removed in a rinsing step. The clean sample is then injected to the IC system.

The 850 Professional IC – Prep 2 is equipped with an additional valve for liquid handling. The peristaltic pump transfers the standard solutions. The intelligent MagIC Net™ software controls and monitors the system.

Calibration and calculation of the results as a function of preconcentration volume are also provided by the MagIC Net™ software. Even if complex procedures are involved, operating the system is perfectly easy.

The anion system is equipped with sequential suppression. Very high sensitivity is achieved by this unique combination of chemical and downstream CO_2 suppression. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent. With the preconcentration technique carbonate interference is practically eliminated.

The 858 Professional Sample Processor holds the samples. Numerous sample racks for volumes 0.5...500 mL are available. Typical preconcentration volumes are between 0.5...100 mL.

Ordering information

ProfIC 9 - Anion

«ProfIC 9 – Anion» – Professional IC system for trace analysis with inline calibration, sample preconcentration and matrix elimination

Technical information

Components
1 x 2.800.0010 800 Dosino
1 x 2.850.2150 850 Professional IC
1 x 2.858.0010 858 Professional Sample Processor
1 x 6.1014.200 Metrosep I Trap 1 Column
1 x 6.1562.130 Transfer Tubing / 10 mL
3 x 6.1805.190 FEP tubing / M6 / 11 cm
1 x 6.1808.000 Connection bushing M6
1 x 6.1808.060 T connector / M6
1 x 6.2744.080 M6 thread/UNF 10/32 coupling
2 x 6.2744.200 Adapter UNF 10/32 / M6
1 x 6.2841.100 Rinsing Station for Sample Processor
1 x 6.3032.210 Dosing unit complete / 10 mL
1 x 6.5330.040 IC Equipment for Liquid Handling

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

«ProfIC 10 – Anion» – Professional IC system with inline sample preconcentration, matrix elimination and matrix neutralization

Professional IC system for the determination of anions in difficult matrices. «ProfIC 10» with Metrohm inline sample preconcentration, matrix neutralization and matrix elimination allows chromatography unaffected by matrix influences and guarantees that the analytical column has a long lifetime.

A small volume of the sample is transferred fully automatically to the preconcentration column. On its way it passes through the sample preparation module, where complete cation exchange takes place. This means that it is possible to neutralize both acids and bases. The matrix is then removed from the preconcentration column in a rinsing step and the clean and pH-neutral sample injected to the IC system.

For liquid handling the 858 Professional Sample Processor – Pump – Injector is equipped with an additional valve. An additional peristaltic pump transfers the sample and rinsing solutions. The intelligent MagIC Net™ software controls and monitors the system.

«ProfIC 10» is equipped with sequential suppression. Very high sensitivity is achieved by this unique combination of chemical and downstream CO_2 suppression. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent. With the preconcentration technique, carbonate interference is practically eliminated.

«ProfIC 10» features intelligent system components such as the iPump and the iDetector and provides space for a total of three iColumns.

Ordering information

ProfIC 10 - Anion
«ProfIC 10 – Anion» – Professional IC system with inline sample preconcentration, matrix elimination and matrix neutralization

Technical information

Components
1 x 2.850.2190 850 Professional IC Anion
1 x 2.858.0030 858 Professional Sample Processor
1 x 6.1602.150 Bottle neck attachment
1 x 6.1608.070 Eluent bottle / 2 L / GL 45
1 x 6.1825.230 PEEK sample loop 10 µL

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

The 858 Professional Sample Processor – Pump – Injector is responsible for sample delivery. Numerous sample racks for volumes 0.5...500 mL are available. Only small sample volumes of about 1 mL are normally required for matrix elimination and neutralization.

«ProfIC 11 – Anion» – Professional IC system for trace analysis with inline calibration, sample preconcentration, matrix elimination and matrix neutralization

Professional IC system for ultratrace analysis of anions in complex matrices. «ProfIC 11» with Metrohm inline neutralization, sample preconcentration and matrix elimination allows chromatography unaffected by matrix influences and guarantees that the analytical column has a long lifetime.

Metrohm inline calibration permits very low concentrations – in the ppt range (ng/L) – to be reliably calibrated using a single standard of higher concentration – in the ppb range.

The sample is transferred to the preconcentration column fully automatically and with high precision by the intelligent 800 Dosino. On its way it passes through the sample preparation module, where complete cation exchange takes place. This means that it is possible to neutralize both acids and alkalis. The matrix is then removed from the preconcentration column in a rinsing step. The clean and pH-neutral sample is then injected to the IC system.

The 850 Professional IC – Prep 3 is equipped with a sample preparation module. Sample and rinsing solution are delivered by the 800 Dosino. A valve on the 858 Professional Sample Processor switches sampling and sample transfer. The 872 Extension Module is used for inline calibration. The intelligent MagIC Net™ software controls and monitors the system.

Calibration and calculation of the results as a function of preconcentration volume are provided by the MagIC Net™ software. Different sample volumes can be conveniently entered in the sample table. Even if complex procedures are involved, operating the system is perfectly easy.

«ProfIC 11» features intelligent system components such as the iPump and the iDetector and provides space for a total of three iColumns. The system is equipped with sequential suppression.

The 858 Professional Sample Processor – Pump – Injector provides for sample delivery. Numerous sample racks for volumes 0.5...500 mL are available.

Ordering information

ProfIC 11 - Anion
«ProfIC 11 – Anion» – Professional IC system for trace analysis with inline calibration, sample preconcentration, matrix elimination and matrix neutralization

Technical information

Components
1 x 2.800.0010 800 Dosino
1 x 2.850.2190 850 Professional IC
1 x 2.858.0030 858 Professional Sample Processor
1 x 2.872.0050 872 Extension Module Sample Prep
1 x 6.1014.200 Metrosep I Trap 1 Column
1 x 6.1562.130 Transfer Tubing / 10 mL
3 x 6.1805.190 FEP tubing / M6 / 11 cm
1 x 6.1808.000 Connection bushing M6
1 x 6.1808.060 T connector / M6
1 x 6.2744.080 M6 thread/UNF 10/32 coupling
2 x 6.2744.200 Adapter UNF 10/32 / M6
1 x 6.2841.100 Rinsing Station for Sample Processor
1 x 6.3032.150 Dosing unit complete / 5 mL
1 x 6.5330.040 IC Equipment for Liquid Handling

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

«ProfIC 15 – Anion» – Professional IC system for partial loop injection

Professional IC system for the fully automatic determination of anions with sequential suppression and partial loop injection capability. «Partial Loop Injection» enables concentrated samples to be injected without previous dilution as well as multipoint calibrations using just one standard solution. «ProfIC 15» safely masters all routine tasks in ion chromatography. It is simple to use and extremely reliable.

Excellent system components guarantee very high sensitivity and reproducible results. Particular attention has been given to long service intervals; these can be monitored by the MagIC Net™ software.

«ProfIC 15» features intelligent system components such as the iPump and the iDetector and provides space for a total of three iColumns.

The anion system is equipped with sequential suppression. This unique combination of chemical and downstream CO_2 suppression results in very low detection limits. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent.

The 800 Dosino provides for the sample transfer. Due to its high precision liquid handling, partial loop injections are performed easily and with high reproducibility. This ensures very accurate results, for example with calibration using one single solution.

For the 858 Professional Sample Processor numerous sample racks are available for volumes in the range 0.5...500 mL.

Ordering information
ProfIC 15 - Anion
«ProfIC 15 – Anion» – Professional IC system for partial loop injection

Technical information
Components
1 x 2.800.0010 800 Dosino
1 x 2.850.2030 850 Professional IC
1 x 2.858.0010 858 Professional Sample Processor
1 x 6.1825.220 PEEK sample loop 100 µL
1 x 6.2841.100 Rinsing Station for Sample Processor
1 x 6.3032.120 Dosing unit complete, 2 mL
1 x 6.5330.040 IC Equipment for Liquid Handling

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

The «ProfIC 15» system is your reliable partner, both in routine operation and in research and development.

«ProfIC 12 – Anion» – Professional IC gradient system

Professional IC system for the determination of anions with a binary high-pressure gradient. In addition to step gradients, this system can be used to run any linear, convex or concave gradients to work in a time-optimized way.

«ProfIC 12» is equipped with two high-pressure pumps and a very effective passive mixing device. The 872 Extension Module IC Pump can be used to upgrade the system to a quaternary gradient.

«ProfIC 12» works with sequential suppression. This unique combination of chemical and downstream CO_2 suppression results in very low detection limits. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent. The removal of carbon dioxide additionally reduces baseline drift during the gradient run.

The MagIC Net™ software is used for controlling the system and programming the gradient. All system functions, from monitoring the service interval to calibration, can be monitored by MagIC Net™.

«ProfIC 12» features intelligent system components such as two iPumps and the iDetector and provides space for a total of three iColumns.

The 858 Professional Sample Processor – Pump is responsible for sample delivery. Numerous sample racks for volumes 0.5...500 mL are available.

Ordering information

ProfIC 12 - Anion
«ProfIC 12 – Anion» – Professional IC gradient system

Technical information

Components
1 x 2.850.2220 850 Professional IC Anion
1 x 2.858.0020 858 Professional Sample Processor

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

«ProfIC 1 – AnCat» – Professional IC system for automated ion chromatography

Very compact and professional IC system for the fully automatic determination of anions and cations. With «ProfIC 1 – AnCat» anions and cations can be determined both in parallel as well as independently in order to save time. Both systems use the same 858 Professional Sample Processor with Pump, which is controlled intelligently by the MagIC Net™ software.

With «ProfIC 1 – AnCat» all routine tasks in ion chromatography can be safely mastered. It is simple to operate and extremely reliable. Excellent system components guarantee very low detection limits and reproducible results. Particular attention has been given to long service intervals; these can be monitored with the MagIC Net™ software.

The anion system is equipped with sequential suppression. This unique combination of chemical and downstream CO_2 suppression results very low detection limits. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent.

«ProfIC 1 – AnCat» features two iPumps as well as two iDetectors and provides space for a total of three iColumns in two different temperature ranges.

The 858 Professional Sample Processor – Pump provides for the sample transfer. Numerous sample racks for volumes 0.5...500 mL are available.

Ordering information

ProfIC 1 - AnCat
«ProfIC 1 – AnCat» – Professional IC system for automated ion chromatography

Technical information

Components
1 x 2.850.3030 850 Professional IC
1 x 2.858.0020 858 Professional Sample Processor

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

The «ProfIC 1 – AnCat» system is your reliable partner, both in routine operation and in research and development.

«ProfIC 2 – AnCat» – Professional IC system with inline ultrafiltration

Very compact and professional IC system for the fully automatic determination of anions and cations with Metrohm inline ultrafiltration. With «ProfIC 2 – AnCat» anions and cations can be determined both in parallel as well as independently in order to save time. Both systems use the same 858 Professional Sample Processor – Pump, which is controlled intelligently by the MagIC Net™ software.

With «ProfIC 2 – AnCat» all routine tasks in ion chromatography can be safely mastered. It is simple to operate and extremely reliable. Excellent system components guarantee very low detection limits and reproducible results. Particular attention has been given to long service intervals; these can be monitored with the MagIC Net™ software.

«ProfIC 2 – AnCat» is equipped with Metrohm inline ultrafiltration, which reliably removes particles from the sample and in this way effectively protects the analytical column against particulate contamination. The lifetime of the column is increased significantly. The ultrafiltration cell is equipped with a membrane filter with a pore size of 0.15 µm as standard and is suitable for samples with a light to medium particle load. Inline ultrafiltration works fully automatically and in this way, for example, saves the time-consuming and expensive use of syringe filters.

The ultrafiltration cell is mounted directly on the 858 Professional Sample Processor. The bidirectional dual-channel peristaltic pump carries out sample transfer through the ultrafiltration cell and to the Professional IC system.

Ordering information

ProfIC 2 – AnCat
«ProfIC 2 – AnCat» – Professional IC system with inline ultrafiltration

Technical information

Components
1 x 2.850.3030 850 Professional IC
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.5330.010 IC Equipment for ultrafiltration

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

The anion system is additionally equipped with sequential suppression. This unique combination of chemical and downstream CO_2 suppression results in very low detection limits. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent.

«ProfIC 2 – AnCat» features two iPumps as well as two iDetectors and provides space for a total of three iColumns in two different temperature ranges.

The 858 Professional Sample Processor – Pump provides for the sample transfer. Numerous sample racks for volumes 0.5...500 mL are available. Ultrafiltration requires a sample volume of at least 5 mL.

The «ProfIC 2 – AnCat» system is your reliable partner, both in routine operation and in research and development.

«ProfIC 15 – AnCat» – Professional IC system for partial loop injection

Professional IC system for the fully automatic determination of anions with sequential suppression and cations with partial loop injection capability. «Partial Loop Injection» allows concentrated samples to be injected without previous dilution as well as multipoint calibrations using just one standard solution. «ProfIC 15» safely masters all routine tasks in ion chromatography. It is simple to use and extremely reliable.

Excellent system components guarantee very high sensitivity and reproducible results. Particular attention has been given to long service intervals; these can be monitored by the MagIC Net™ software.

«ProfIC 15 – AnCat» features two iPumps as well as two iDetectors and provides space for a total of three iColumns in two different temperature ranges.

The anion system is equipped with sequential suppression. This unique combination of chemical and downstream CO_2 suppression results in very low detection limits. The flexibility of the carbonate eluent is complemented by the low background conductivity of a hydroxide eluent.

The 800 Dosino provides for the sample transfer. Due to its high precision liquid handling, partial loop injections are performed easily and with high reproducibility. This ensures very accurate results, for example when calibrating using one single standard solution.

Ordering information

ProfIC 15 – AnCat
«ProfIC 15 – AnCat» – Professional IC system for partial loop injection

Technical information

Components
1 x 2.800.0010 800 Dosino
1 x 2.850.3030 850 Professional IC
1 x 2.858.0010 858 Professional Sample Processor
1 x 6.1825.220 PEEK sample loop 100 µL
1 x 6.2841.100 Rinsing Station for Sample Processor
1 x 6.3032.120 Dosing unit complete, 2 mL
1 x 6.5330.040 IC Equipment for Liquid Handling

IC column, sample rack, sample vials as well as MagIC Net™ have to be ordered separately according to the particular application.

For the 858 Professional Sample Processor numerous sample racks are available for volumes in the range 0.5...500 mL.

The «ProfIC 15» system is your reliable partner, both in routine operation and in research and development.

Professional IC
Professional IC instruments

850 Professional IC – a system of innovative and intelligent components perfectly matched to one another!

Configuration: configuration of the system could not be easier, as the components log themselves in automatically and all the relevant information is available to the MagIC Net™ software.

Monitoring: the system monitors and optimizes all functions and, if required, documents them in an FDA-compatible form. Optimal operation of the 850 Professional IC and its results are monitored. If a parameter is outside the predefined range then the user is informed by e-mail or SMS.

Inline sample preparation: the way from sample preparation to precise result has become shorter, as now even complex sample preparation steps can be carried out inline and automatically. The system automatically optimizes sample preconcentration or dilution as required.

- ***Intelligent pump: iPump***
- ***Intelligent detector: iDetector***
- ***Intelligent column: iColumn***
- ***Intelligent liquid handling with Dosinos***
- ***Extension Module***

850 Professional IC – instruments for cation determination

850 Professional IC Cation (2.850.1010)

The 850 Professional IC Cation is the professional ion chromatography system for the determination of anions or cations without suppression.

850 Professional IC Cation – Prep 1 (2.850.1030)

The 850 Professional IC Cation – Prep 1 is the professional ion chromatography system for the determination of anions or cations without suppression in combination with sample preparation techniques such as ultrafiltration and dialysis.

850 Professional IC Cation – Prep 2 (2.850.1050)

The 850 Professional IC Cation – Prep 2 is the professional ion chromatography system for the determination of anions or cations without suppression after sample preparation. The system is suitable for the integration of Metrohm inline sample preconcentration, matrix elimination or inline calibration.

850 Professional IC — instruments for anion determination

850 Professional IC Anion (2.850.2010)

The 850 Professional IC Anion is the professional ion chromatography system for the determination of anions with chemical suppression.

850 Professional IC Anion – MCS (2.850.2030)

The 850 Professional IC Anion – MCS is the professional ion chromatography system for the determination of anions with sequential suppression.

850 Professional IC Anion – MCS – Prep 1 (2.850.2110)

The 850 Professional IC Anion – MCS – Prep 1 is the professional ion chromatography system for the determination of anions with sequential suppression in combination with inline sample preparation techniques such as ultrafiltration or dialysis.

850 Professional IC Anion – MCS – Prep 2 (2.850.2150)

The 850 Professional IC Anion – MCS – Prep 2 is the professional ion chromatography system for the determination of anions with sequential suppression. At the same time it allows fully automatic sample preparation if inline sample preconcentration, inline matrix elimination or inline calibration is necessary.

850 Professional IC Anion – MCS – Prep 3 (2.850.2190)

The 850 Professional IC Anion – MCS – Prep 3 is the professional ion chromatography system for the determination of anions with sequential suppression with simultaneous Metrohm Inline Neutralization or Metrohm Inline Cation Removal.

850 Professional IC – instruments with gradient

850 Professional IC Anion – MCS – LP Gradient (2.850.2210)

The 850 Professional IC Anion – MCS – LP Gradient is the intelligent ion chromatography system for the determination of anions using sequential suppression and low-pressure gradient.

850 Professional IC Anion – MCS – Gradient (2.850.2220)

The 850 Professional IC Anion – MCS – Gradient is the professional ion chromatography system for the determination of anions with sequential suppression and binary high-pressure gradient.

850 Professional IC – instruments for anion and cation determination

850 Professional IC AnCat – non-suppressed (2.850.3000)

The 850 Professional IC AnCat – non-suppressed is the intelligent ion chromatography system for the determination of anions and cations without suppression.

850 Professional IC AnCat (2.850.3010)

The 850 Professional IC AnCat is the professional ion chromatography system for the determination of cations without suppression and anions either with or without chemical suppression, as required.

850 Professional IC AnCat – MCS (2.850.3030)

The 850 Professional IC AnCat – MCS is the professional ion chromatography system for the determination of cations without suppression and anions either with or without sequential suppression, as required.

872 Professional IC Extension Modules

872 Extension Module IC Pump (2.872.0010)

The 872 Extension Module IC Pump is an extension tool for upgrading all 850 Professional IC instruments. It allows an additional IC high-pressure pump «iPump» to be installed in any 850 Professional IC system.

872 Extension Module Sample Prep (2.872.0050)

The 872 Extension Module Sample Prep is an extension tool for upgrading all 850 Professional IC instruments. It enables an additional peristaltic pump and injection valve to be installed in any 850 Professional IC system.

Compact IC instruments
Compact IC — Instruments — Introduction

Compact intelligence for ion chromatography

881 Compact IC pro – 882 Compact IC plus

Metrohm's high-end ion chromatograph is the 850 Professional IC, whose intelligent system components define the standards regarding precision of results and ease of operation. This technology is now available for the Compact IC instruments. The 881 Compact IC pro and the 882 Compact IC plus are the ideal choice for users from all fields of application with clearly defined analytical requirements. These instruments ensure the rapid and safe determination of anions, cations and polar substances in the µg/L to the g/L range.

All intelligent functions of the Professional IC instrument series have been integrated into the 881 and 882 Compact instruments: iPump, iDetector, iColumn technology. They guarantee precise results and help prevent operator errors. The MagIC Net™ chromatography software controls all system components and monitors all parameters that are relevant to the chromatographic analysis.

The 881 Compact IC pro instruments are equipped with column heater and eluent degasser; the version with sequential suppression comes with an additional sample degasser. The 882 Compact IC plus instruments do not comprise these modules.

Professional Compact IC pro instruments

881 Compact IC pro – Cation (2.881.0010)

The 881 Compact IC pro – Cation is an intelligent ion chromatograph in compact design for the determination of anions, cations or polar substances without suppression.

881 Compact IC pro – Anion (2.881.0020)

The 881 Compact IC pro – Anion is an intelligent ion chromatograph in compact design for the determination of anions or polar substances with chemical suppression.

881 Compact IC pro – Anion – MCS (2.881.0030)

The 881 Compact IC pro – Anion – MCS is an intelligent ion chromatograph in compact design for the determination of anions or polar substances with sequential suppression.

Professional Compact IC plus instruments

882 Compact IC plus – Cation (2.882.0010)

The 882 Compact IC plus – Cation is an intelligent ion chromatograph in compact design for the determination of anions, cations or polar substances without chemical suppression.

882 Compact IC plus – Anion (2.882.0020)

The 882 Compact IC plus – Anion is an intelligent ion chromatograph in compact design for the determination of anions or polar substances with chemical suppression.

882 Compact IC plus – Anion – MCS (2.882.0030)

The 882 Compact IC plus – Anion – MCS is an intelligent ion chromatograph in compact design for the determination of anions or polar substances with sequential suppression.

Other Compact IC instruments

861 Advanced Compact IC (2.861.0010)

Advanced Compact IC is suited for applications without suppression such as cation and non-suppressed anion determinations as well as for methods combining conductivity with other types of detection.

861 Advanced Compact IC with MSM II (2.861.0020)

Advanced Compact IC is suited for applications with or without suppression such as anion determinations as well as for methods combining conductivity with other types of detection.

861 Advanced Compact IC with sequential suppression (2.861.0040)

Advanced Compact IC is suited for applications with or without chemical suppression as well as sequential suppression for highest sensitivity.

Column heater for 861 Advanced Compact IC (2.861.0500)

This column heater optionally upgrades all 861 Compact IC models.

792 Basic IC (2.792.0020)

Compact IC system for training and routine analysis. Determination of cations and anions with and without chemical suppression, built-in double piston pump, electrically operated injection valve, high-performance detector and data recording. With text book.

IC Automation
IC Automation — Introduction

Sample changer

The 858 Professional Sample Processor is more than just a sample changer. Equipped with pumps, high-pressure valve and Dosinos it makes an integral contribution to inline sample preparation and liquid handling. More than 30 sample racks are recognized automatically. This means that individual sample vials with very different shapes and sizes can be used. The standard version accommodates 148 samples.

Metrohm inline sample preparation (MISP)

Samples such as milk, chocolate, soda lye, biodiesel or strongly polluted wastewater require a sample preparation step before they can by analyzed by IC . The 850 Professional IC together with the 858 Professional Sample Processor offers numerous possibilities for completely automating inline sample preparation, e.g. ultrafiltration, dialysis, preconcentration, matrix elimination, matrix neutralization and inline calibration.

IC equipment for liquid handling

MISP made easy. The IC equipments sets contain all the necessary parts for the relevant sample preparation method. This means that you can be certain that the method will work properly.

IC Automation instruments

858 Professional Sample Processor (2.858.0010)

The 858 Professional Sample Processor processes samples with volumes ranging from 500 µL to 500 mL. Sample transfer is carried out either by using the peristaltic pump of the 850 Professional IC system or by an 800 Dosino.

858 Professional Sample Processor – Pump (2.858.0020)

The 858 Professional Sample Processor – Pump processes samples with volumes ranging from 500 µL to 500 mL. Sample transfer is carried out either by using the built-in bidirectional dual-channel peristaltic pump or by an 800 Dosino.

858 Professional Sample Processor – Pump – Injector (2.858.0030)

The 858 Professional Sample Processor – Pump – Injector processes samples with volumes ranging from 500 µL to 500 mL. Sample transfer is carried out either by using the built-in bidirectional dual-channel peristaltic pump or by an 800 Dosino. Additionally a six-port injection valve is available for sample preparation purposes.

863 Compact IC Autosampler (2.863.0010)

The 863 Compact IC Autosampler is the ideal aid for routine analysis. Using the 863 Compact IC Autosampler all Metrohm ion chromatographs can be automated.

IC Equipment for Liquid Handling

IC Equipment for dialysis (6.5330.000)

Accessories kit for inline dialysis with the ProfIC systems.

IC Equipment for ultrafiltration (6.5330.010)

Accessories kit for inline ultrafiltration with the ProfIC systems.

IC Equipment for dilution (6.5330.020)

Accessories kit for inline sample dilution with the ProfIC systems.

IC Equipment for Rinsing Station to mount on Sample Processor (6.5330.030)

Accessories kit to connect a Rinsing Station to the Professional Sample Processor. The rinsing water may be fed using either a peristaltic pump or a Dosino.

IC Equipment for liquid handling with Dosino (6.5330.040)

Accessories kit for the connection of a Dosino to the Professional Sample Processor for liquid handling

Alternative Detectors
Alternative Detectors — Introduction

Ion chromatography has established itself in laboratories as a powerful and flexible analytical method. Conductivity is used as the classical IC detection method solving most application problems. Combining it with alternative detection methods the range of analytes as well as the sensitivity and selectivity can be increased even further. Such detectors, for example UV/VIS or electrochemical, may be used either as stand-allone solutions or in combination with a condcutivity detector. Moreover, Inline Sample Preparation as well as post column reaction systems can be applied.

IC-MS as well as IC-ICP-MS are especially useful for speciation of anions and cations. In this field of so called hyphenated techniques Metrohm cooperates with Agilent. Please check with your local Metrohm distributor.

UV/VIS Compact IC instruments

844 UV/VIS Compact IC (2.844.0010)

The Compact

- First Compact UV/VIS IC System «All In One»
- Low purchase cost
- Low cost of ownership
- Three wavelengths plus parallel reference channel
- Easy to run with IC Net or IC Cap software
- Extremely small bench space requirements
- Totally metal-free flow path
- High precision
- High accuracy
- Low detection limits
- «Made in Switzerland» – proven high quality

Compact ion chromatograph for the photometric determination of polar substances, anions and cations in the UV/VIS range. Very compact construction. System with integrated dual-piston high-pressure pump, electrically operated injection valve and highly sensitive diode array detector.

844 UV/VIS Compact IC with post column reactor (2.844.0020)

Compact ion chromatograph for the photometric determination of anions and cations in the UV/VIS range. Very compact construction. System with integrated dual-piston high-pressure pump, electrically operated injection valve and highly sensitive diode array detector. Totally metal-free flow path with additional PCR (Post-Column Reactor) and two-channel peristaltic pump.

844 UV/VIS Compact IC – SST (2.844.0030)

The 844 UV/VIS Compact IC – SST is a compact ion chromatograph for the photometric determination of polar substances, anions and cations in the UV/VIS range. The complete flow path is made of stainless steel. The 844 UV/VIS Compact IC – SST is equipped with a diode array detector.

844 UV/VIS Compact IC with column heater (2.844.0110)

Compact ion chromatograph for the photometric determination of polar substances, anions and cations in the UV/VIS range. Very compact construction. System with integrated dual-piston high-pressure pump, electrically operated injection valve and highly sensitive diode array detector. With totally metal-free flow path and additional column heating for two separation columns.

844 UV/VIS Compact IC with post column reactor and column heater (2.844.0120)

Compact ion chromatograph for the photometric determination of anions and cations in the UV/VIS range. Very compact construction. System with integrated dual-piston high-pressure pump, electrically operated injection valve and highly sensitive diode array detector. With totally metal-free flow path and additional column heating for two separation columns, PCR (Post-Column Reactor) and two-channel peristaltic pump.

844 UV/VIS Compact IC with column heater – SST (2.844.0130)

The 844 UV/VIS Compact IC with column heater – SST is a compact ion chromatograph for the photometric determination of polar substances, anions and cations in the UV/VIS range. The complete flow path is made of stainless steel and a column heater is installed. The 844 UV/VIS Compact IC with column heater – SST is equipped with a diode array detector.

844 UV/VIS Compact IC with post column reactor – IC Pump (2.844.1020)

Compact ion chromatograph for the photometric determination of anions and cations in the UV/VIS range. Very compact construction. System with integrated dual-piston high-pressure pump, electrically operated injection valve and highly sensitive diode array detector. With totally metal-free flow path, additional PCR (Post-Column Reactor) and additional IC Pump for hassle-free reagent delivery for routine and development work.

Electrochemical Detectors

791 IC VA Detector (2.791.0020)

Amperometric Detector for Ion Chromatography.

Electrochemical (amperometric) detection with the 791 IC VA Detector is an extremely sensitive detection method that is used successfully in both HPLC and ion chromatography. This method is also characterized by its very high selectivity: Only easily oxidizable or reducible substances are detected – chloride or sulfate are not detected and do not interfere with the electrochemical determination, even in high concentrations.

The detector can be used in series or in parallel with other detectors that are normally used in IC or HPLC (e.g. conductivity or UV/VIS detectors).

Numerous electrodes suitable for each amperometric application are available.

871 Advanced Bioscan (2.871.0010)

Pulsed amperometric detector for the highly sensitive determination of sugars, sugar alcohols and sugar acids, polysaccharides and other oxidizable substances. Measuring cell not included.

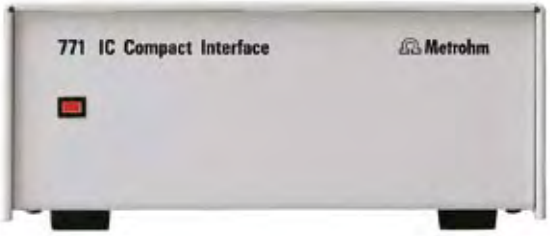
The 871 Advanced Bioscan extends the modular IC program from Metrohm by including carbohydrate analysis in the range of IC applications. The heart of the 871 Advanced Bioscan is the pulsed amperometric detector with built-in injector and column heater. Control is via the Metrodata IC Net software.

Besides carbohydrates the 871 Advanced Bioscan is used to determine oxidizable inorganic anions. There are different measuring cells with either gold, silver, platinum or glassy carbon as electrode material available.

IC Interfaces

771 IC Compact Interface (2.771.0010)

Universal analog-digital converter with two channels and 24-bit resolution. Data is transferred to the PC via an RS 232C interface for processing by IC Net or MagIC Net™.



771 IC Compact Interface; MagIC Net™ Professional (2.771.0110)

IC Compact Interface with MagIC Net™ Professional software. The 771 Compact Interface connects the analog signals of the existing IC instruments (Compact, Modular and Advanced) with the improved capabilities of the client/server and database-based technology of the MagIC Net™ software.

771 IC Compact Interface; MagIC Net™ Compact (2.771.0210)

IC Compact Interface with MagIC Net™ Compact Software. The 771 Compact Interface connects the analog signals of the existing IC instruments (Compact, Modular and Advanced) to the improved capabilities of the client/server and database based of the MagIC Net™ software.

Liquid handling
Liquid handling in IC

Sample injection – inline sample preparation

In the beginning there was the ***syringe*** – and manual sample injection is still being used. However, in most cases the samples are injected automatically into the ion chromatograph. This starts with a simple ***peristaltic pump***, which pumps the samples solution to the injector. Additional components such as valves, filtration and dialysis cells, neutralization modules etc. then clear the way for inline sample preparation. The use of the ***800 Dosino*** as a module for sample transfer and in particular as a means for exactly measuring out several solutions and differing volumes, extends these possibilities even further. Logical and flexible dilution – i.e. free choice of the dilution factor as well as further dilution should the result be outside the calibration range – is only one of the many applications that have been made feasible with the 800 Dosino.

Eluent preparation

The 845 Eluent Synthesizer eliminates the time-consuming manual preparation of the eluent and standards used in ion chromatography. It makes work easier in the research lab, the analytical lab and in quality assurance. Compared to the traditional, i.e. manual preparation of eluents, the fully automated system guarantees precise mixtures and excellent «batch-to-batch» reproducibility. The 845 Eluent Synthesizer helps to avoid errors, as it carries out all calculations automatically, no matter whether in milliliters, mols or milligrams.

811 Online IC instruments

Metrohm know-how as a solid basis

For many, many years Metrohm instruments have been used for monitoring production processes. The 811 Online IC and the 821 Compact Online IC profit from this experience and open up new prospects in online analysis.

Flexibility is everything

The Metrohm Online ICs can be adapted to any IC application. The 1-channel version permits the determination of anions or cation, whereas the 2-channel version of the 811 Online IC can determine anions and cations simultaneously. A 10-way sampling valve is available for each channel. This can be freely programmed; samples from ten different continuously flowing production streams can be brought to each channel. The Online ICs are controlled by a built-in industrial PC. After programming, the instruments are operated by mouse-click. Various calibration routines or sample sequences can be called up. Numerous ions can be determined in each sample stream and the results recorded. The Online ICs are network compatible; this means that they can export data and receive remote control commands. Distance does not matter as diagnoses and parameter settings can be carried out virtually from everywhere via the built-in modem. The user carries out the calibration and system settings; these are password-protected with several access levels being available. The 811 Online IC has been designed with a clear focus on simplicity, which means that it can be operated by non-chemists.

811 Online IC instruments

811 Online IC Process Analyzer (1 channel, 230 V) (2.811.0014)

1-Channel online ion chromatograph with inline calibration and sample preconcentration for the analysis of cations and anions with and without suppression down to the ultra-trace range. 10 independent sample flows. 230 V.

811 Online IC Process Analyzer (1 channel, 115 V) (2.811.0015)

1-Channel online ion chromatograph with inline calibration and sample preconcentration for the analysis of cations and anions with and without suppression down to the ultra-trace range. 10 independent sample flows. 115 V.

811 Online IC Process Analyzer (2 channel, 230 V) (2.811.0024)

2-Channel online ion chromatograph with inline calibration and sample preconcentration for simultaneous analysis of cations and anions with and without suppression down to the ultra-trace range. 10 independent sample flows. 230 V.

811 Online IC Process Analyzer (2 channel, 115 V) (2.811.0025)

2-Channel online ion chromatograph with inline calibration and sample preconcentration for simultaneous analysis of cations and anions with and without suppression down to the ultra-trace range. 10 independent sample flows. 115 V.

821 Compact Online IC instruments

The 821 Compact Online IC is the little brother of the 811 Online IC. It is based on the proven components of the Advanced Compact IC. In comparison to laboratory instruments the term «Compact» is, of course, relative. The size and weight of the Online IC systems are still considerable, which makes sense considering their use in the production sector.

The 821 Compact Online IC extends the range of industry-conform Metrohm online ion chromatography systems. A maximum of 10 different sample streams can be freely selected and analyzed. The 821 Compact Online IC allows anions to be reliably determined with or without chemical suppression down to the lower ppb range as well as cations. Simple operation, high degree of data security, almost complete insensitivity to power cuts and precise results even under rough conditions, e.g. in production facilities, are guaranteed.

821 Online IC instruments

821 Compact Online IC Process Analyzer (230 V) (2.821.0014)

Compact Online IC system for the sequential determination of anions or cations from up to 10 sample flows. Equipped with Metrohm Suppressor Module, industrial PC, UPS, modem, control cards. For 230 V.

821 Compact Online IC Process Analyzer (115 V) (2.821.0015)

Compact Online IC system for the sequential determination of anions or cations from up to 10 sample flows. Equipped with Metrohm Suppressor Module «MSM», industrial PC, UPS, modem, control cards. For 115 V.

Professional IC – Software

MagIC Net™ software for intuitive and simple operation

It's MagIC!
Clear symbols, well-laid-out presentation, intuitive operation, «one-button IC»: That is MagIC Net™.

Complete system monitoring, control cards for calibrations and measurements, comfortable database functions: that is MagIC Net™ too, the intelligent software – Swiss Made – for controlling and monitoring Metrohm ion chromatography systems.

The MagIC Net™ chromatography software controls the chromatographs of the Professional and Compact IC families of instruments and records all the data obtained. MagIC Net™ is currently offered in three different versions:

- **MagIC Net™ Professional** supports the complete range of intelligent ion chromatographs and sample changers. It can be used to control all the peripheral devices for inline sample preparation and liquid handling as well as any other Metrohm or third-party instruments.
- **MagIC Net™ Compact** features the complete functions of the MagIC Net™ Professional version, however, the compact version can be used with a Compact IC instrument and a sample changer for automation only.
- **MagIC Net™ Multi** provides the functions of MagIC Net™ Professional as a client-server installation.

All three versions are characterized by their well-laid-out user interface, clear symbols and intuitive operation. The control and monitoring functions of the MagIC Net™ software are unique: system parameters, service intervals and expiry dates as well as the results of samples and standards can be checked. If a limit is exceeded previously defined actions, e.g. sending a message by e-mail or mobile phone or switching off the system can be triggered. Thanks to the modern data management of MagIC Net™ the user always keeps control, as necessary information is available immediately.

All intelligent components are automatically recognized, monitored and controlled:

- 850 Professional IC
- 872 Extension Module
- 881 Compact IC pro
- 882 Compact IC plus
- 858 Professional Sample Processor
- 863 Compact IC Autosampler
- 800 Dosinos
- iColumns
- 771 Compact Interface

With flexible programming of sequences in the time programs, combined with logical decisions and almost unlimited calculation options MagIC Net™ opens up the whole world of ion chromatography. From simple routine applications up to highly complex combinations of various sample preparation techiques.

MagIC Net™ versions

MagIC Net™ 1.1 Compact CD: 1 license (6.6059.111)

Professional PC program for controlling one intelligent Compact IC system and one Professional Sample Processor or one 771 Compact Interface. The software permits control, data acquisition, evaluation and monitoring as well as report generation for ion chromatographic analyses.

MagIC Net™ comprises the following features: graphic user interface for routine operations, extensive database programs, method development, configuration and manual system control, highly flexible user administration, efficient database operations, extensive data export functions, individually configurable report generator, control and monitoring of all system components and the chromatographic results. MagIC Net™ complies with FDA regulation 21 CFR part 11 as well as GLP.

Dialog languages: German, English, French, Chinese, Korean, Japanese and more.

1 license.

MagIC Net™ 1.1 Professional CD: 1 license (6.6059.112)

Professional PC program for controlling intelligent Professional IC systems, Compact IC instruments and their peripherals such as Professional Sample Processors, 800 Dosino, 771 Compact Interface, etc. The software permits control, data acquisition, evaluation and monitoring as well as report generation for ion chromatographic analyses.

MagIC Net™ comprises the following features: graphic user interface for routine operations, extensive database programs, method development, configuration and manual system control, highly flexible user administration, efficient database operations, extensive data export functions, individually configurable report generator, control and monitoring of all system components and the chromatographic results. MagIC Net™ complies with FDA regulation 21 CFR part 11 as well as GLP.

Dialog languages: German, English, French, Chinese, Korean, Japanese and more.

1 license.

MagIC Net™ 1.1 Multi CD: 3 licenses (6.6059.113)

Professional PC program for controlling intelligent Professional IC systems, Compact IC instruments and their peripherals such as Professional Sample Processors, 800 Dosino, 771 Compact Interface, etc. The software permits control, data acquisition, evaluation and monitoring as well as report generation for ion chromatographic analyses.

MagIC Net™ comprises the following features: graphic user interface for routine operations, extensive database programs, method development, configuration and manual system control; highly flexible user administration, efficient database operations, extensive data export functions, individually configurable report generator, control and monitoring of all system components and the chromatographic results. MagIC Net™ complies with FDA regulation 21 CFR part 11 as well as GLP.

Dialog languages: German, English, French, Chinese, Korean, Japanese and more.

Client-Server version with 3 licenses.

General Catalog

The Whole World of Ion Analysis

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