# Catalog

Metrohm

www.metrohm.nt-rt.ru

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pH 4.055
801 Stirrer
Metrohm

# pH/Conductivity measurement

# pH and Ion meters
## pH meter overview





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|---|---|---|---|---|---|
| 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 (Touch Control) / 9 (*tiamo*™) |
| 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 | | graph and data | | graph and data |
| Automatic temperature compensation | x | | x | | x |
| Automatic electrode test | – | | x | | with Touch Control / *tiamo*™ |
| Remote stirrer control | – | | x | | x |
| Handling of intelligent dosing elements | – | | – | | x |
| Automatic standard addition | – | | – | Dosimat | Dosino/Dosimat |
| Touch Control with color display or *tiamo*™ | – | | – | | 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) | – | | – | | Touch Control / *tiamo*™ full |
| 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 | | German, English, Spanish, French, Chinese, Portuguese, Russian, Polish, Italian, Japanese; Touch Control additionally in Korean; *tiamo*™ additionally in Slovak and Traditional Chinese |

# 826 pH mobile

The 826 pH mobile is a handy and very easy-to-operate pH meter with wireless Infrared interface for data transfer to a printer or PC. Numerous functions, e.g., input options for user and/or sample identification, three-point calibration with automatic buffer recognition and various monitoring functions make it possible to work in conformance with GLP anywhere. The measured value memory contains up to 200 measured values, including date, time and sample identification, and can be called up and/or sent to a printer or PC at any time. When the 6.0228.020 Primatrode is used, the 826 pH mobile fulfills protection class IP 67, i.e. even a brief immersion in water will not harm the instrument. Power supply is provided by means of four LR6, UM3 or AA batteries; approx. 750 hours operating time is possible in normal operations.


826 pH mobile

**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 |

# 827 pH lab

The 827 pH lab is a handy and very easy to operate pH meter with wireless Infrared interface for daily routine work in the laboratory. Numerous functions, e.g., input options for user and/or sample identification, three-point calibration with automatic buffer recognition, automatic measured value acceptance and various monitoring functions make working in conformance with GLP child's play. The measured value memory contains up to 200 measured values, including date, time and sample identification, and can be called up and/or sent to a printer or PC at any time.

827 pH lab

| Ordering Information | |
|---|---|
| 2.827.0114 | 827 pH lab; 230 V, EU with Primatrode |
| 2.827.0115 | 827 pH lab; 120 V, US with Primatrode |
| 2.827.0117 | 827 pH lab; 240 V, AUS with Primatrode |
| 2.827.0119 | 827 pH lab; 230 V, UK with Primatrode |
| 2.827.0214 | 827 pH lab; 230 V, EU with Unitrode |
| 2.827.0215 | 827 pH lab; 120 V, US with Unitrode |
| 2.827.0217 | 827 pH lab; 240 V, AUS with Unitrode |
| 2.827.0219 | 827 pH lab; 230 V, UK with Unitrode |

# 780 pH Meter

Precision pH meter

The 780 pH Meter offers a multitude of opportunities for pH measurements that meet the highest standards. In addition to the general functions of pH, voltage and temperature measurement, the 780 pH Meter is equipped with an automatic stirrer control, a multi-point calibration with up to nine buffers, a method memory and various monitoring functions for calibration and servicing. The automatic electrode test in conformance with GLP permits objective assessment of the electrode and leaves nothing more to chance. Reliable and reproducible results are thus guaranteed. The large backlit multi-line display provides an overview and makes the individual settings easy. The bidirectional RS-232 interface enables data transfer to a printer or PC. A sample changer can be connected through the optional 6.2148.010 Remote Box.

780 pH Meter

**Ordering Information**

2.780.0010 780 pH Meter

# 781 pH/Ion Meter

Combined pH/ion meter

The 781 pH/Ion Meter offers a multitude of possibilities for pH and ion measurements that meet the highest standards. In addition to the general functions of pH, ion, voltage and temperature measurement, the 781 pH Meter is equipped with an automatic stirrer control, a multi-point calibration with up to 9 buffers (pH mode), a methods memory and various monitoring functions for calibration and servicing. The automatic electrode test for pH glass electrodes in conformance with GLP permits objective assessment of the electrode and leaves nothing more to chance. Reliable and reproducible results are thus guaranteed. The large backlit multi-line display provides an overview and makes the individual settings easy. The bidirectional RS-232 interface enables data transfer to a printer or PC. A sample changer can be connected through the optional 6.2148.010 Remote Box.

Three different modes are available for ion measurement: direct measurement, standard or sample addition. In the case of fully automated standard addition with an optional Dosimat, only the concentration of the standard and the desired quantity of addition steps need to be entered, the pH/ion meter takes care of the rest. Up to 19 standards can be used for the calibration for direct measurement.

781 pH/Ion Meter

**Ordering Information**

2.781.0010 781 pH/Ion Meter

# 867 pH Module

pH and ion measurement at the highest level is possible with the 867 pH Module. It can be used as stand-alone instrument in conjunction with a 900 Touch Control or as a supplement to a Titrando system.

In addition to measurements of pH, temperature, mV, $I_{pol}$, $U_{pol}$ and concentration, standard additions (manual, dos, autodos) can also be carried out. In addition to conventional sensors, intelligent electrodes – „iTrodes" – can also be used for measurement with the 867 pH Module. A polarized measuring input is available in addition.

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

The instrument is equipped with 2 USB interfaces for connecting USB printers, Autosamplers or barcode readers and 4 MSB interfaces for connecting stirrers or dosing devices of the 800 Dosino type (for the controlled adding of auxiliary solutions or for the automated feed-through of the standard addition).

Both in combination with the Touch Control as stand-alone pH meter and also integrated in ***tiamo***™ full systems (from Version 2.0), it is in compliance with GLP and FDA requirements.

867 pH Module with 840 Touch Control

| **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***™ light |
| **Options** | |
| 2.800.0010 | 800 Dosino |
| 2.801.0010 | 801 Stirrer |
| 2.802.0040 | 802 Stirrer (propeller stirrer) for 804 Ti Stand |
| 2.804.0010 | 804 Ti Stand without stand rod |
| 6.2151.000 | Cable USB A – mini-DIN 8-pin |

# Conductometer
## 856 Conductivity Module

The 856 Conductivity Module can be used as stand-alone instrument in combination with a 900 Touch Control or as a supplement to a Titrando system.

The 856 Conductivity Module can perform measurements with the latest in conductivity measuring technology, the 5-ring conductivity measuring cells. They reach a very high linearity without platinization of the cells. This guarantees highest accuracy, and the cell constant, once determined, remains constant over a wide measuring range. In contrast to the 4-ring cells, the electrode can be immersed completely into the beaker. This means not only that beakers with different fill levels are no problem, but also that rapid mixing within the measuring cell can take place, even in stirred measuring solutions. Last but not least, the 5-ring conductivity measuring cell is very easy to clean, thanks to the removable cap.

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

Thanks to the galvanically separated measuring input, pH value and conductivity can be determined in the same beaker without interference in conjunction with the 867 pH Module.

The instrument is equipped with 2 USB interfaces for connecting USB printers, Autosamplers or barcode readers and 4 MSB interfaces for connecting stirrers or dosing devices of the 800 Dosino type (e.g., for adding auxiliary solutions).

Both in conjunction with the 900 Touch Control as stand-alone conductivity measurement instrument and as an integrated component in ***tiamo***™ full (from Version 2.0), the 856 Conductivity Module is in compliance with GLP and FDA requirements.

856 Conductivity Module with ***tiamo***™

| **Ordering Information** | |
|---|---|
| 2.856.0010 | 856 Conductivity Module |
| 2.856.0110 | 856 Conductivity Module with Touch Control, including 5-ring conductivity measuring cell |
| 2.856.0120 | 856 Conductivity Module with Touch Control, including conductivity measuring cell (stainless steel) |
| 2.856.0210 | 856 Conductivity Module with ***tiamo***™ light, including 5-ring conductivity measuring cell |
| 2.856.0220 | 856 Conductivity Module with ***tiamo***™ light, including conductivity measuring cell (stainless steel) |
| **Options** | |
| 2.801.0010 | 801 Stirrer |
| 6.0915.100 | 5-ring conductivity measuring cell c = 0.7 $cm^{-1}$ with Pt1000 |
| 6.0915.130 | 5-ring conductivity measuring cell c = 1.0 $cm^{-1}$ with Pt1000 |
| 6.0916.040 | Conductivity measuring cell made of stainless steel, c = 0.1 $cm^{-1}$, with Pt1000 (St.N) |
| 6.2103.160 | Adapter 4 x socket B – plug N |
| 6.2151.000 | Cable USB A – mini-DIN 8-pin |

# Potentiometric and thermometric titration

# Potentiometric and thermometric titration

# Potentiometric titrators – Overview

| Potentiometric Titrators | Titrino plus | | | Ti-Touch | | Titrando | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 870 | 877 | 848 | 915 | 916 | 888 | 890 | 901 | 902 | 904 | 905 | 906 | 907 |
| Optional 2nd measuring interface | – | – | – | – | – | – | – | yes | yes | yes | yes | yes | yes |
| Intelligent Sensor «iTrodes» | – | – | – | – | yes | yes | – | yes | yes | yes | yes | yes | yes |
| Volumetric Karl Fischer Titration | yes | – | – | yes | – | – | yes | yes | – | – | – | yes | yes |
| Ion Measurement / Standardaddition | – | – | – | – | – | – | – | – | – | 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 | yes |
| STAT Titration | – | – | – | – | – | – | – | – | yes | – | – | yes | yes |
| Dosino Technology | – | – | – | yes | yes | – | – | yes | yes | – | yes | – | yes |
| Software Control | – | – | – | – | – | yes | yes | yes | yes | yes | yes | yes | yes |
| Touch Control | – | – | – | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| Live Display | yes | 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 | yes |
| PDF report without PC | – | – | – | 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 | yes |

# Potentiometric titrators – Titrando
## Titrando family

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

**Ion meter**
Not only pH, voltage and temperature can be measured with the MEAS pH and MEAS CONC measuring modes. Direct concentration determination and standard addition with ion-selective electrodes are also possible.

**Comprehensive Liquid Handling**
Basic operations of everyday laboratory work such as pipetting, transferring, dosing, dispensing and diluting become child's play, thanks to the Liquid Handling functionality of the Titrando. Maximum accuracy and precision are guaranteed in the range of 10 µL to 100 mL.

**Measuring input**
The measuring interface of the Titrando is comprised of a connector for the intelligent „iTrodes" electrodes, a high-ohm measuring input and a measuring input for polarizable electrodes, in addition to one separate reference input and one temperature input for Pt1000 or NTC temperature sensors. The resolution of the inputs is at 0.1 mV or 0.001 pH. Up to two galvanically isolated measuring interfaces can be installed.

**MSB connector**
Up to 4 Dosinos or Dosimats, 4 magnetic stirrers or rod stirrers and 4 Remote Boxes can be connected for automation with its four installed Metrohm Serial Buses (MSB connectors). This makes the modular Titrando system the most flexible titration system on the market. The „Plug-and-play" functionality makes the manual configuration of peripheral devices superfluous; the Titrando recognizes the connected instrument automatically.

**USB connector**
Two USB ports are available for communication with balances, printers or other USB-capable instruments. Laboratory balances can be connected with the aid of an RS-232 converter.

**The Dosino – space-saving modernity**
With the Titrando, dosing is accomplished with Dosino and intelligent dosing unit, which are screwed directly onto the reagent bottle. All of the data about the reagent and the dosing unit required for the titration is stored in the integrated data chip. Each dosing unit is marked with a serial number and a cylinder number and is shipped with an individual certificate.

**Intelligent electrodes „iTrodes"**
The integrated memory chip enables the saving of important sensor data such as article and serial numbers, calibration data, calibration history, duration of use and calibration validity. All of the sensor data is uploaded automatically when a connection is made with the Titrando. This means that the possibility of mix-ups or editing errors is eliminated. The user is informed if the electrode type does not match the one defined in the method. Monitoring functions allow the exclusion of electrodes whose calibration data lies outside the limit values or whose calibration period has already expired.

**Operation – The choice is up to you**
The Touch Control is an ergonomic and up-to-date operating element with direct network connection. Thanks to the new „Favorites", you now have direct access to the methods you use most frequently.

The titration software ***tiamo***™ offers, in addition to the standard functions for controlling a Titrando via PC, numerous additional functionalities, e.g., a client/server database or true parallel titration.

**Unlimited automation**
Increasing numbers of samples, complicated sample preparation steps and unattended overnight operation soon justify the use of a sample changer. The Titrando is equipped with the necessary intelligence for controlling sample changers. Whether it be large or small sample capacity, one or two workstations, sample measuring, sample preparation, Liquid Handling, or rinsing and calibrating the electrodes – the USB Sample Processors offer a high degree of automation with low investment costs.

# Titrando

**888 Titrando with Touch Control** (2.888.0110)

High-end titrator with built-in buret drive

- including 900 Touch Control, 801 Stirrer magnetic stirrer, exchange unit (20 mL) and combined „Ecotrode plus“ pH glass electrode
- dynamic (DET), monotonic (MET) and endpoint titration (SET)
- four MSB connectors
- **one galvanically isolated measuring interface** (also for intelligent „iTrodes“ electrodes)
- USB connector

**888 Titrando with *tiamo*™ light** (2.888.0210)

High-end titrator with built-in buret drive

- including titration software ***tiamo***™ light, 801 Stirrer magnetic stirrer, exchange unit (20 mL) and combined „Ecotrode plus“ pH glass electrode
- dynamic (DET), monotonic (MET) and endpoint titration (SET)
- four MSB connectors
- **one galvanically isolated measuring interface** (also for intelligent „iTrodes“ electrodes)
- USB connector

**902 Titrando** (2.902.0010)

High-end titrator for use with intelligent electrodes – iTrodes – with

- up to four dosing systems of the 800 Dosino type
- Endpoint titration (SET)
- enzymatic and pH-STAT titrations (STAT)
- Dosing functions with monitoring (DOS), Liquid Handling
- four MSB connectors
- **one galvanically isolated measuring interface**
- USB connector

**904 Titrando** (2.904.0010)

High-end titrator for use with intelligent electrodes – iTrodes – with

- built-in buret drive
- dynamic (DET), monotonic (MET) and endpoint titration (SET)
- Measurement with ion-selective electrodes (MEAS CONC)
- Dosing functions with monitoring, Liquid Handling
- four MSB connectors
- **one galvanically isolated measuring interface**
- USB connector

**904 Titrando** (2.904.0020)

High-end titrator for use with intelligent electrodes – iTrodes – with

- built-in buret drive
- dynamic (DET), monotonic (MET) and endpoint titration (SET)
- Measurement with ion-selective electrodes
- Dosing functions with monitoring, Liquid Handling
- four MSB connectors
- **two galvanically isolated measuring interfaces**
- USB connector

**905 Titrando** (2.905.0010)

High-end titrator for use with intelligent electrodes – iTrodes – with

- up to four dosing systems of the 800 Dosino type
- dynamic (DET), monotonic (MET) and endpoint titration (SET)
- Measurement with ion-selective electrodes
- Dosing functions (DOS), Liquid Handling
- four MSB connectors
- **one galvanically isolated measuring interface**
- USB connector

**905 Titrando** (2.905.0020)

High-end titrator for use with intelligent electrodes – iTrodes – with

- up to four dosing systems of the 800 Dosino type
- dynamic (DET), monotonic (MET) and endpoint titration (SET)
- Measurement with ion-selective electrodes
- Dosing functions (DOS), Liquid Handling
- four MSB connectors
- **two galvanically isolated measuring interfaces**
- USB connector

**906 Titrando** (2.906.0010)

High-end titrator for use with intelligent electrodes – iTrodes – with

- built-in buret drive
- dynamic (DET), monotonic (MET) and endpoint titration (SET), enzymatic and pH-STAT titrations (STAT), Karl Fischer titration (KFT)
- Measurement with ion-selective electrodes
- Dosing functions with monitoring, Liquid Handling
- four MSB connectors and USB connector
- **one galvanically isolated measuring interface**

**906 Titrando** (2.906.0020)

High-end titrator for use with intelligent electrodes – iTrodes – with

- built-in buret drive
- dynamic (DET), monotonic (MET) and endpoint titration (SET), enzymatic and pH-STAT titrations (STAT), Karl Fischer titration (KFT)
- Measurement with ion-selective electrodes
- Dosing functions with monitoring, Liquid Handling
- four MSB connectors and USB connector
- **two galvanically isolated measuring interfaces**

**907 Titrando** (2.907.0010)

High-end titrator for use with intelligent electrodes – iTrodes – with

- up to four dosing systems of the 800 Dosino type
- dynamic (DET), monotonic (MET) and endpoint titration (SET), enzymatic and pH-STAT titrations (STAT), Karl Fischer titration (KFT)
- Measurement with ion-selective electrodes
- Dosing functions with monitoring, Liquid Handling
- four MSB connectors and USB connector
- **one galvanically isolated measuring interface**

**907 Titrando** (2.907.0020)

High-end titrator for use with intelligent electrodes – iTrodes – with

- up to four dosing systems of the 800 Dosino type
- dynamic (DET), monotonic (MET) and endpoint titration (SET), enzymatic and pH-STAT titrations (STAT), Karl Fischer titration (KFT)
- Measurement with ion-selective electrodes
- Dosing functions with monitoring, Liquid Handling
- four MSB connectors and USB connector
- **two galvanically isolated measuring interfaces**

# Titrando packages

**Surf Titrando Ionic** (2.905.1010)

The Surf Titrando Ionic is based on the 905 Titrando and offers 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** (2.905.1020)

The Surf Titrando Two Phase is based on the 905 Titrando and offers 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** (2.905.2010)

The Surf Titrando NIO is based on the 905 Titrando and offers a complete package for the most common **analyses of non-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** (2.905.2020)

The Plate Titrando is based on the 905 Titrando and offers 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 comprehensive accessories for your titrations.

**Oil Titrando** (2.905.3010)

The Oil Titrando is based on the 905 Titrando and offers 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** (2.905.4010)

The Food Titrando is based on the 905 Titrando and offers a complete package for the most common **analyses of foodstuffs**. Apart from the titration software ***tiamo***™ light and determination methods described in detail, you will also receive comprehensive accessories for your titrations.

**Pharm Titrando** (2.907.1020)

The Pharm Titrando is based on the 907 Titrando and offers 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 instruments and software

**900 Touch Control** (2.900.0010)

Operating unit for the Titrandos, USB Sample Processors, 856 Conductivity Module, 867 pH Module and 846 Dosing Interface. Touch-sensitive, high-resolution color display, simple and intuitive operation, thanks to favorites for direct method access. With integrated Ethernet interface for direct connection to the Internet and USB interface for connecting USB printers or a USB memory stick.

***tiamo*™ 2.4 Light CD: 1 license** (6.6056.241)

Computer program for controlling a titration system.

- Up to two Metrohm instruments can be connected
- Graphical method editor with numerous templates
- Layout manager for individual monitor interface
- Database with reevaluation and report generator
- No parallel titration, no data export
- Languages: German, English, French, Italian, Spanish, Portuguese, Polish, Russian, Slovak, Japanese, Chinese, Traditional Chinese

***tiamo*™ 2.4 Full CD: 1 license** (6.6056.242)

Computer program for controlling titration systems.

- Graphical method editor with numerous templates
- Layout manager for individual monitor interface
- Database with reevaluation and report generator
- Export to LIMS, NuGenesis, Cyberlab, etc.
- In compliance with the directives according to FDA 21 CFR Part 11
- Parallel titration
- Languages: German, English, French, Italian, Spanish, Portuguese, Polish, Russian, Slovak, Japanese, Chinese, Traditional Chinese

***tiamo*™ 2.4 Multi CD: 3 licenses** (6.6056.243)

Computer program for controlling titration systems.

- Client/server version for network operation
- Graphical method editor with numerous templates
- Layout manager for individual monitor interface
- Database with reevaluation and report generator
- Export to LIMS, NuGenesis, Cyberlab, etc.
- In compliance with the directives according to FDA 21 CFR Part 11
- Parallel titration
- Languages: German, English, French, Italian, Spanish, Portuguese, Polish, Russian, Slovak, Japanese, Chinese, Traditional Chinese

# Optional accessories

**800 Dosino** (2.800.0010)

Drive with write/read hardware for intelligent Dosing Units. With fixed cable (length 150 cm).

**800 Dosino** (2.800.0020)

Drive with write/read hardware for intelligent dosing units. With permanently attached cable (length 65 cm).

**801 Stirrer with stand** (2.801.0040)

Magnetic stirrer including base plate, support rod and electrode holder for supplementing the Titrino plus, Dosimat plus, Titrandos, Sample Processors, 805 Dosimat and 780/781 pH meters as well as the 856 and 867 measuring modules. With permanently attached cable for MSB (Metrohm Serial Bus).


**802 Stirrer (propeller stirrer) for 804 Ti 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 Stirrer. The 804 Ti Stand together with the optional 802 Stirrer provides an alternative to the magnetic stirrer. Without stand.

**804 Ti Stand with stand** (2.804.0040)

Titration stand and controller for 802 Rod Stirrer. The 804 Ti Stand together with the optional 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 the Titrando and Sample Processors with read/write hardware for intelligent Exchange Units. With permanently attached cable. Without Exchange Unit.

**846 Dosing Interface** (2.846.0010)

USB-capable control unit for connecting a maximum of four 800 Dosinos or 805 Dosimats for dosing and Liquid Handling tasks. A Touch Control or the connection to a PC with ***tiamo***™, MagIC Net, viva or 797 VA Computrace is required for operation.

**856 Conductivity Module** (2.856.0010)

Conductivity measurement module as supplement to a Titrando or „stand-alone“ in combination with a 900 Touch Control.


**867 pH Module** (2.867.0010)

Module for pH/ion measurement as supplement to a Titrando or „stand-alone“ in combination with a 900 Touch Control.

# Potentiometric titrators – Ti-Touch

**916 Salt Ti-Touch** (2.916.2010)

„Reduce to the max" – this is the 916 Ti-Touch's concept. The new compact Titrator from Metrohm offers the maximum in the class of stand-alone systems for routine analysis.

The „916 Salt Ti-Touch" contains the complete accessories for chloride titration.

**916 Oil Ti-Touch** (2.916.3010)

„Reduce to the max" – this is the 916 Ti-Touch's concept. The new compact Titrator from Metrohm offers the maximum in the class of stand-alone systems for routine analysis.

The „916 Oil Ti-Touch" contains the complete accessories for non-aqueous titration (acid number / base number).

**916 Food Ti-Touch** (2.916.4010)

„Reduce to the max" – this is the 916 Ti-Touch's concept. The new compact Titrator from Metrohm offers the maximum in the class of stand-alone systems for routine analysis.

The „916 Food Ti-Touch" contains the complete accessories for the most important aqueous acid/base titrations – not only in the area of food analysis.

# Potentiometric titrators – Titrino plus

## Titrino plus – Introduction

The Titrino plus, Metrohm's entry class in the area of potentiometric titration, is particularly attractive due to its practically unbelievable price-performance ratio. A large live display with titration curve, „Plug & Play" functionality of exchange unit, stirrer and USB printer, a high-precision measuring input, operation with keyboard – the Titrino plus offers considerably more than you would ever expect in this price segment. Their robustness also makes them the ideal titrators for routine determinations in everyday laboratory operations.

**Potentiometric titration**
The 877 Titrino plus supports the titration modes MET (monotonic equivalence point titration) and SET (titration to one or two specified endpoints). The 848 Titrino plus supports in addition the titration mode DET (dynamic equivalence point titration).

**The live curve brings it to light**
Every Titrino plus is equipped with a live curve display. This means that you are always informed of the progress of the titration.

**Maximum precision thanks to the new measuring input**
The Titrino plus is equipped with a high-resolution measuring input that guarantees results with the greatest of precision.

**Maximum ease of installation**
The installation of a Titrino plus is designed to be exceptionally simple. Exchange unit, stirrer and USB compact printer are detected and configured automatically as soon as they are connected.

**Mouse or keys – select your favorite!**
The Titrino plus can be controlled either per mouseclick or keyboard. A USB port is available for communication with balances or printers. The optional 6.2148.030 USB/RS-232 adapter box enables the connection of laboratory balances and operation with a computer.

**Intelligent exchange unit for more convenience**
The chip for the intelligent Metrohm exchange unit automatically provides the titrator with the data (cylinder volume, type of reagent, date of expiration for the titer, etc.) that it requires to accomplish the titrations error-free. This means that you will always titer under optimum conditions and that you will not need, for example, to repeat any measurements because of an expired titer.

# Titrino plus

**848 Titrino plus** (2.848.0010)

Compact titrator for

- dynamic (DET) titrations with automatic equivalence point finding
- monotonic (MET) titrations with automatic equivalence point finding
- endpoint titrations (SET)

**877 Titrino plus** (2.877.0010)

Compact titrator for

- potentiometric endpoint titrations (SET)
- monotonic titrations with automatic equivalence point finding (MET)

# Titrino plus packages

**Food/Beverage Titrino plus** (2.848.1010)

The Food/Beverage Titrino plus offers you the complete package for all conventional analyses in food analysis. In addition to the more than 100 determination methods described in detail, you also receive the accessories for your titrations.

**Food/Beverage Titrino plus with printer** (2.848.1020)

The Food/Beverage Titrino plus offers you the complete package for all conventional analyses in food analysis. In addition to the more than 100 determination methods described in detail, you also receive the accessories for your titrations. Including USB thermal printer Neo's.

**Salt Titrino plus** (2.848.2010)

The Salt Titrino plus offers you the complete package for the analysis of chloride in a wide variety of samples. In addition to the determination methods described in detail, you also receive the complete accessories for your titrations.

**Salt Titrino plus with printer** (2.848.2020)

The Salt Titrino plus offers you the complete package for the analysis of chloride in a wide variety of samples. In addition to the determination methods described in detail, you also receive the complete accessories for your titrations. Including USB thermal printer Neo's.

**Oil Titrino plus** (2.848.3010)

The Oil Titrino plus offers you the complete package for the determination of the acid and base numbers of oil products. In addition to the determination methods described in detail, you also receive the complete accessories for your titrations.

**Oil Titrino plus with printer** (2.848.3020)

The Oil Titrino plus offers you the complete package for the determination of the acid and base numbers of oil products. In addition to the determination methods described in detail, you also receive the complete accessories for your titrations. Including USB thermal printer Neo's.

# Optional accessories

**USB Thermal printer Neo's** (2.141.0100)

Compact printer with USB interface for the Titrino plus and Dosimat plus.
Paper width 60 mm (40 characters). Including 6.2151.120 USB cable.


**801 Stirrer with stand** (2.801.0040)

Magnetic stirrer including base plate, support rod and electrode holder for supplementing the Titrino plus, Dosimat plus, Titrandos, Sample Processors, 805 Dosimat and 780/781 pH meters as well as the 856 and 867 measuring modules. With permanently attached cable for MSB (Metrohm Serial Bus).


**802 Stirrer (propeller stirrer) for 804 Ti 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 Stirrer. The 804 Ti Stand together with the optional 802 Stirrer provides an alternative to the magnetic stirrer. Without stand.

**804 Ti Stand with stand** (2.804.0040)

Titration stand and controller for 802 Rod Stirrer. The 804 Ti Stand together with the optional 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)

The 869 Compact Sample Changer offers automation in a minimum amount of space.

# Thermometric titration
## 859 Titrotherm complete with *tiamo*™

Computer-controlled titrator for thermometric titration. Including complete accessories for the titration (10 mL buret, titration stand with rod stirrer, Thermoprobe, titration vessel and ***tiamo***™ light).

**Benefits of thermometric titration**

- Rapid and robust method for routine operation
- One sensor for all applications – no interacting with the sample or the solvent
- Maintenance-free sensor – no calibration necessary
- Suitable for aggressive media
- No membrane or diaphragm problems

Thermometric titration is a highly versatile determination method. In principle, it is suitable for every reaction that causes a sufficiently large temperature change in the sample solution. It is therefore particularly suitable for applications

- for which no suitable potentiometric sensor or reference electrolyte is available
- for which the sample disrupts the electrode
- for which no solvent suitable for potentiometry is available

859 Titrotherm

**The Titrotherm 859 – state-of-the-art USB technology**

Thanks to state-of-the-art USB technology, the instrument is detected and configured automatically by the tiamo™ titration software at the time of connection to the computer. The same applies to all the dosing units, stirrers and sensors connected to the Titrotherm.

The proven tiamo™ software enables a rapid, goal-oriented method development, in addition to a simple generation of results. The endpoints are determined automatically; reproducibility can be enhanced even more when additional optimization parameters are used. The generation of reports is accomplished using method-specific form sheets that can be designed to suit.

**Thermoprobe – rapid, precise and robust**

The temperature sensor (thermistor) based on semiconductor technology has impressive properties: Its response time is only 0.3 s and its resolution is 10-5 K, thus enabling it to follow every temperature change both rapidly and precisely. The glass shaft lends the sensor an outstanding resistance to many organic solvents and aggressive media.

**The Dosino technology**

The Dosino technology from Metrohm has set a new standard in volumetric titration. The dosing unit is mounted together with the motor drive and the reagent bottle, thus guaranteeing maximum precision with minimum space requirements.

**Catalyzed thermometric titration**

In the event of very low sample concentrations or with low molar reaction enthalpy, the temperature change during the titration is often not sufficient for unambiguous determination of the endpoint, as for example with the determination of very small quantities of organic acids with the titrant c(KOH) = 0.1 mol/L in isopropanol. Here the addition of a small amount of paraformaldehyde facilitates the finding of the endpoint, because immediately after the endpoint is reached (i.e. as soon as excess hydroxide ions are present), the base-catalyzed hydrolysis of the paraformaldehyde starts. This strongly endothermic reaction now provides a sharp endpoint.

**Ordering Information**

| | |
|---|---|
| 2.859.1010 | 859 Titrotherm complete with ***tiamo***™ |

# Karl Fischer titration

# Karl Fischer titration

# Introduction to Karl Fischer titration

Karl Fischer water determination is one of the world's most frequently applied laboratory methods. In contrast to other water determinations, it is specific, rapid and requires very little apparatus.

With an application range of **0.1% to 100% water**, **volumetric Karl Fischer titration** is used in a wide variety of industries. Volumetry has the advantage that not only liquid but also solid and pasty samples can be added directly to the titration vessel. No matter whether you would like to determine water in foods, cosmetics or pharmaceutical products, you can never go wrong with the Metrohm KF titrators.

Coulometry is the optimum method for water determination in liquids, solids and gases for water contents in the trace range (**10 µg to 10 mg absolute water**). In addition, coulometry is an absolute method and thus no titer determination is required.

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

The use of automated systems pays off very quickly with high numbers of samples. Metrohm **KF Automation** offers you sophisticated techniques, not only for volumetric but also for coulometric KF titration.

# Volumetric KF titrators

## Volumetric KF titrators – Overview

| |  |  |  | |
|---|---|---|---|---|
| **Technical specifications** | **870 KF Titrino plus** | **915 Ti-Touch** | **890 Titrando** | **901 Titrando** |
| Titration to preset pH/mV endpoints (SET) | – | – | – | yes |
| pH calibration and pH measurements (CAL, MEAS) | – | – | – | yes |
| Real-time curve display | yes | yes | yes | yes |
| Predefined methods | yes | yes | yes | yes |
| Parallel titration | – | – | – | yes (tiamo™) |
| Dosing drive for titration | Exchange Unit | Dosing Unit (optional Exchange Unit) | Exchange Unit | Dosing Unit (optional Exchange Unit) |
| **Inputs, interfaces** | | | | |
| Second, galvanically separated measuring interface | – | – | – | option |
| Automated reagent exchange with Dosino (option) | – | yes | – | yes |
| MSB-port for connection of further Dosinos (addition of auxiliary solution, …) | – | 2 | 3 | 4 |
| MSB-port for connection of further Dosinos (Titration) | – | 2 | – | 4 |
| Attachment of stirrer | yes | yes | yes | yes |
| Internal stirrer and pump | – | yes | – | – |
| Sample changer connection | – | yes | yes | yes |
| Attachment of printer, balance, ... | USB (1) | USB (1) | USB (2) | USB (2) |
| Optional interfaces | optional RS 232C | Ethernet (RJ-45) | optional RS 232C | optional RS 232C |
| **Software** | | | | |
| ***tiamo***™ | – | – | yes | yes |
| ***tiBase***™ | yes | yes | yes | yes |
| Touch Control | – | integrated Touch Control | yes | yes |

# 890/901 Titrando

**The KF titrators for the modern titration laboratory**

Thanks to their **simple and intuitive operation** the KF Titrandos are the optimum instruments not only for **routine work** but also **for sophisticated applications in the development laboratory**. With the KF Titrando, you have a titration system that can adapt to all imaginable requirements and demands no compromises.

An electrode test and the specially created „safety stop" parameter prevent cell overflows during conditioning, i.e. conditioning is stopped after a given time or after a given volume of KF reagent has been added **(laboratory safety)**. The sophisticated control algorithm of the Titrando is tailored to the characteristics of the Karl Fischer reaction and guarantees maximum-precision results.

The choice is up to you! Both the 901 Titrando and the 890 Titrando can be optionally controlled either as standalone systems with Touch Control or through the PC with ***tiamo***™.

901 Titrando with 900 Touch Control

**901 Titrando**

In addition to the Karl Fischer mode (KFT), the 901 Titrando is also equipped with the SET mode and can thus perform titrations at a predefined endpoint. As a result of the high-resolution, galvanically isolated measuring interface with additional digital measuring input for the intelligent „iTrodes" electrodes, it is additionally possible to perform pH measurements with a maximum of precision. Thanks to the four MSB connectors, up to four 800 Dosino dosing systems can be connected to the 901 Titrando. These can be used not only for titration, but also for the automated addition of sample, standard and auxiliary solutions such as solubility promoters. Furthermore, all Liquid Handling commands are available. Thanks to its „Empty" command, the Dosino may be completely emptied; this makes it possible to dispense with the tasks of opening and cleaning the dosing unit.

**890 Titrando**

The 890 Titrando offers the same high-end features as the 901 Titrando (except for the digital measuring input), but is restricted to the KF mode and titrates exclusively with the proven exchange unit. In addition, up to three 800 Dosino dosing systems can be connected and used for the automatic addition of sample, standard and auxiliary solutions.

| **Ordering Information** | |
|---|---|
| 2.890.0110 | 890 Titrando with Touch Control |
| 2.890.0210 | 890 Titrando with ***tiamo***™ light |
| 2.901.0010 | 901 Titrando |
| **Options** | |
| 2.800.0010 | 800 Dosino |
| 2.803.0010 | 803 TI Stand with stirrer and pump |
| 2.900.0010 | 900 Touch Control |
| 6.2061.010 | Bottle holder for Dosinos |
| 6.3026.150 | Exchange Unit 5 mL |
| 6.3026.210 | Exchange Unit 10 mL |
| 6.3026.220 | Exchange Unit 20 mL |
| 6.3032.120 | Dosing Unit 2 mL |
| 6.3032.150 | Dosing Unit 5 mL |
| 6.3032.210 | Dosing Unit 10 mL |
| 6.3032.220 | Dosing Unit 20 mL |
| 6.6056.241 | ***tiamo***™ 2.4 Light CD: 1 license |
| 6.6056.242 | ***tiamo***™ 2.4 Full CD: 1 license |
| 6.6056.243 | ***tiamo***™ 2.4 Multi CD: 3 licenses |

# 915 KF Ti-Touch

- Buret, stirrer, dosing unit, membrane pump and Touch Control in a single compact unit
- Contact-free reagent replacement
- Intranet and LIMS access – without PC
- Generating PDF reports – without a PC
- USB port for USB flash drive, printer, barcode reader, etc.
- One-touch titration

„Reduce to the max" – that is the concept behind the 915 KF Ti-Touch. The new compact titrator for Karl Fischer titration from Metrohm offers the maximum in the class of stand-alone systems for routine analysis.

The sophisticated control algorithm of the 915 KF Ti-Touch is tailored to the characteristics of the Karl Fischer reaction and guarantees maximum-precision results. In addition, you can select a polarized alternating current (Ipol) or a defined voltage (Upol) to be applied to the electrode. Both working methods ensure fast, true results.

915 KF Ti-Touch

Different reagents require different parameters. The 915 KF Ti-Touch allows for the pertinent method to be selected for the different reagents.

Due to its simple and intuitive operation, it is the optimal instrument for routine work.

For example, the KF icons show you at a glance whether the instrument still needs to be conditioned or whether you can start the water determination. The electrode test and the „safety stop" parameter prevent cell run-over during conditioning. If, for example, the electrode is not connected correctly or the titration cell is very humid, conditioning is stopped automatically after a given time or after a given volume of KF reagent has been added. This function increases work safety in your laboratory.

**Automatic, contact-free reagent replacement**

Replacing the used KF reagent in the titration cell may be carried out manually using the integrated membrane pump. Automated replacement is even more convenient. You determine the moment and the instrument performs the replacement automatically together with a Dosino. In both cases, contact with harmful reagents is avoided.

**The Dosino – the optimum KF dosing system**

Thanks to its „Empty" command, the Dosino may be completely emptied; this makes it possible to eliminate the task of opening and cleaning the dosing unit, which is particularly annoying with KF reagents. Once the reagent is used up, the remaining content in the cylinder may be directly returned to the bottle or the titration vessel. Then the empty reagent bottle is replaced, the „preparing" routine may be carried out via 915 KF Ti-Touch and the titer determination of the new reagent is ready to be started. In contrast to the exchange unit, repeated rinsing prior to titer determination is not necessary; this means you save on both time and reagents.

**Ordering Information**

2.915.0110 915 KF Ti-Touch

# 870 KF Titrino plus

- Maximum ease of installation
- Uncomplicated operation thanks to predefined methods and formulas
- Maximum precision thanks to high-resolution measuring input
- Live curve for detecting side reactions
- Overflow protection for enhanced work safety
- USB interface for compact printer

The inexpensive 870 Titrino plus is a KF titrator for volumetric water content determination. With it, water contents from a few ppm to 100% can be determined reliably and precisely in solid, liquid and gaseous samples. With its new user interface, which is tailored to routine users, the 870 Titrino plus is so simple to operate that only brief orientation periods are required. It is the ideal titrator for routine determinations, also because of its robustness. Titration vessel and electrode are included in the scope of delivery.

870 KF Titrino plus with 803 Ti Stand

**Maximum ease of installation**
The installation of the 870 Titrino plus is designed to be exceptionally simple. Exchange unit, stirrer and USB compact printer are detected and configured automatically as soon as they are connected.

**Ready-to-use methods make work easier**
You need only decide whether you wish to carry out a titer, blank value or water content determination and then start the titration with the single press of a key. Parameters need to be adjusted only in exceptional cases.

**Mouse or keys – select your favorite!**
The 870 Titrino plus is the first titrator that can be controlled either per mouseclick or keyboard.

**Maximum precision**
Just as is the case with the high-end Titrando titrator, the 870 KF Titrino plus is equipped with a high-resolution measuring input that guarantees results with the greatest of precision.

**The live curve brings side reactions to light**
Metrohm KF titrators are standard-equipped with a live curve display. Side reactions can thus be recognized and suppressed in time.

Great importance is placed on work safety in the handling of the harmful KF reagents. The overflow of iodine solution from the titration vessel is prevented by the „Conditioning options“ safety parameter.

**Optional:**
**The 803 KF Titration Stand**
The 803 KF Titration Stand is used for stirring and for the replacement of the exhausted working medium. With the integrated pump it is possible to aspirate the titrated solution and to add new solvent without opening the cell.

| Ordering Information | |
|---|---|
| 2.870.0010 | 870 KF Titrino plus |
| 2.870.1010 | 870 KF Titrino plus complete |
| 2.870.1020 | 870 KF Titrino plus with printer |
| 2.870.2010 | 870 KF Titrino plus and 860 KF Thermoprep |

# KF Coulometer

## Coulometric KF titrators – Overview

| |  |  |  |  |  |
|---|---|---|---|---|---|
| **Technical specifications** | **756 KF Coulometer** | **831 KF Coulometer** | **851 Titrando** | **852 Titrando** | **899 Coulometer** |
| Coulometric Karl Fischer titration (KFC) | **yes** | **yes** | **yes** | **yes** | **yes** |
| Volumetric Karl Fischer titration (KFT) | **–** | **–** | **–** | **yes** | **–** |
| Bromine index (BRC) | **–** | **–** | **yes** | **yes** | **–** |
| Titration to preset mV endpoints (MET $I_{pol}$, SET $U_{pol}$) | **–** | **–** | **–** | **yes** | **–** |
| Monotonic equivalence point titration (MET $I_{pol}$, MET $U_{pol}$) | **–** | **–** | **–** | **yes** | **–** |
| Water/time real-time curve display | **yes** | **yes** | **yes** | **yes** | **yes** |
| Predefined methods | **yes** | **yes** | **–** | **–** | **yes** |
| Parallel titration | **–** | **–** | **yes (with *tiamo*™)** | **yes (with *tiamo*™)** | **–** |
| Automatic reagent exchange with Dosino (option) | **yes** | **yes** | **yes** | **yes** | **–** |
| Automatic titration start for coulometry | **–** | **–** | **yes** | **yes** | **yes** |
| **Inputs, interfaces** | | | | | |
| MSB-port for connection of further Dosinos (titration) | **–** | **–** | **–** | **3** | **–** |
| MSB-port for connection of further Dosinos (dosing) | **–** | **–** | **yes** | **yes** | **–** |
| Attachment of stirrer | **yes** | **yes** | **yes** | **yes** | **yes** |
| Sample changer connection | **yes** | **yes** | **yes** | **yes** | **yes** |
| Attachment of printer and balance | **RS 232C** | **RS 232C** | **USB** | **USB** | **USB** |
| Optional interfaces | **RS 232C** | **RS 232C** | **RS 232C** | **RS 232C** | **RS 232C** |
| **Software** | | | | | |
| ***tiamo***™ | **yes** | **yes** | **yes (2.1 or higher)** | **yes (2.1 or higher)** | **–** |
| ***tiBase***™ | **–** | **–** | **yes** | **yes** | **yes** |
| Touch Control | **–** | **–** | **yes** | **yes** | **–** |

# 851/852 Titrando

Coulometry is the ideal method for water determination in liquids, solids and gases when it comes to water determination in the trace range (10 µg to 10 mg absolute water). In addition, coulometry is an absolute method and thus no titer determination is necessary.

Coulometric titrations are carried out easily and quickly with the **851 Titrando**. The **852 Titrando** controls not only coulometric, but also volumetric Karl Fischer titration.

**Bromine index**
It is now possible to determine bromine indexes with the **851 Titrando** and the **852 Titrando**. No additional accessory parts are required for the measurements. The conventional coulometric titration cell and the generator electrode with diaphragm can also be used for bromine index determination. Only the anolyte and catholyte need to be adapted.

**Automatic titration start**
It can readily happen that the sample is injected into the titration vessel without the titration having been started beforehand. If this is the case, then the water in the sample will be conditioned away and the measurement will need to be repeated. This will no longer be a problem for you with the **851 Titrando** or the **852 Titrando**. The instrument starts the titration automatically, as soon as the sample is added. This way, you save on reagents, sample and above all on precious time.

**Coulometric and volumetric titrations**
Should the water content of the samples be too high for coulometric determination, this will not be a problem for the **852 Titrando**. This instrument can determine samples with water contents ranging from a few micrograms to contents of 100% without difficulty.

852 Titrando with 900 Touch Control

| Ordering Information | |
|---|---|
| 2.851.0010 | 851 Titrando with generator electrode with diaphragm |
| 2.851.0020 | 851 Titrando with Touch Control and generator electrode with diaphragm |
| 2.851.0110 | 851 Titrando with generator electrode without diaphragm |
| 2.851.0120 | 851 Titrando with Touch Control and generator electrode without diaphragm |
| 2.852.0050 | 852 Titrando with generator electrode with diaphragm |
| 2.852.0060 | 852 Titrando with Touch Control and generator electrode with diaphragm |
| 2.852.0150 | 852 Titrando with generator electrode without diaphragm |
| 2.852.0160 | 852 Titrando with Touch Control and generator electrode without diaphragm |
| **Options** | |
| 2.800.0010 | 800 Dosino |
| 2.801.0010 | 801 Stirrer |
| 2.803.0010 | 803 TI Stand with stirrer and pump |
| 2.900.0010 | 900 Touch Control |
| 6.3032.120 | Dosing Unit 2 mL |
| 6.3032.150 | Dosing Unit 5 mL |
| 6.3032.210 | Dosing Unit 10 mL |
| 6.3032.220 | Dosing Unit 20 mL |
| 6.3032.250 | Dosing Unit 50 mL |
| 6.6056.241 | ***tiamo***™ 2.4 Light CD: 1 license |
| 6.6056.242 | ***tiamo***™ 2.4 Full CD: 1 license |
| 6.6056.243 | ***tiamo***™ 2.4 Multi CD: 3 licenses |

# 756/831 KF Coulometer

The Metrohm KF coulometers are suitable for precise water determination in the trace range (1 ppm to 10%). They come supplied with a selection of two different types of generator electrodes. The generator electrode without diaphragm requires only one reagent and is practically maintenance-free. The utilization of the generator electrode with diaphragm is preferred for the following applications: extremely low water content (<100 µg absolute water), utilization of ketone reagents or of a high proportion of solubility promoter (>10%).

With or without a printer – The choice is up to you! The 756 KF Coulometer comes equipped with a built-in thermal printer. You can, however, also connect an external printer or connect the instrument with a PC, just as you would with the 831 KF Coulometer.

You receive a complete titration cell and extensive accessories with all KF coulometers. The 728 Stirrer (magnetic stirrer) is included in the accessories of the KF coulometers with generator electrodes with diaphragm.

**Arguments that convince:**

- Live curve for early detection of possible side reactions
- Simple operation thanks to dialog in German, English, French, Spanish, Italian, Portuguese and Swedish.
- Selection of Expert or Routine mode
- Internal memory for up to 100 methods
- With two RS-232C (DB9) data interfaces for connecting balance, printer and PC
- Optional connection for PC keyboard and barcode reader
- Optional: Automatic reagent replacement via dosing unit and Dosino

756 KF Coulometer with 728 Stirrer

| Ordering Information | |
|---|---|
| 2.756.0010 | 756 KF Coulometer with generator electrode with diaphragm |
| 2.756.0110 | 756 KF Coulometer with generator electrode without diaphragm |
| 2.831.0010 | 831 KF Coulometer with generator electrode with diaphragm |
| 2.831.0110 | 831 KF Coulometer with generator electrode without diaphragm |
| 2.831.2110 | 831 KF Coulometer and 860 KF Thermoprep |
| **Options** | |
| 2.140.0200 | Impact printer CUSTOM DP40-S4N |
| 2.700.0020 | 700 Dosino |
| 2.703.0010 | 703 Ti Stand with stirrer and pump |
| 2.728.0010 | 728 Stirrer without stand |
| 6.5617.000 | Equipment for reagent replacement |

# 899 Coulometer

**Small and compact**
The 899 Coulometer is the smallest Metrohm coulometer. The magnetic stirrer is already built-in and a support rod can be dispensed with, thanks to the titration cell holder. The titration cell stands securely attached on the 899 Coulometer.

**Automatic titration start**
It can readily happen that the sample is added to the titration vessel without the titration having been started beforehand. In such cases, the conditioning continues to run until the reagent is once again titrated until it is dry. Recalculations are not possible and the determination must be repeated. This costs sample and valuable time.

The 899 Coulometer offers an automatic titration start. The titration starts automatically, as soon as sample is added to the titration vessel.

**Flexible, thanks to accumulator**
A Power Box can be obtained as an optional accessory for the 899 Coulometer. This ensures impressive flexibility. Determine the water content of your samples wherever you like.

899 Coulometer

| Ordering Information | |
|---|---|
| 2.899.0010 | 899 Coulometer with generator electrode with diaphragm |
| 2.899.0110 | 899 Coulometer with generator electrode without diaphragm |
| 2.899.1010 | 899 Coulometer with generator electrode with diaphragm and Neo's USB thermal printer |
| 2.899.1110 | 899 Coulometer with generator electrode without diaphragm and Neo's USB thermal printer |
| 2.899.2110 | 899 Coulometer with generator electrode without diaphragm and 860 KF Thermoprep |
| 2.899.3110 | 899 Coulometer with generator electrode without diaphragm and 885 Compact Oven SC |
| **Options** | |
| 2.141.0100 | USB Thermal printer Neo's |
| 6.2164.500 | Power Box for 899 |
| 6.5406.000 | Coulometric KF equipment, including generator electrode with diaphragm |
| 6.5406.010 | Coulometric KF equipment, including generator electrode without diaphragm |

# Manual KF Sample Preparation

**Polytron PT 1300 D** (2.136.0100)

Polytron PT 1300 D - Metrohm version
Homogenizer that can be controlled directly by ***tiamo***™ or Touch Control.

**KF Evaporator** (2.136.0200)

The KF Evaporator is used for sample preparation in Karl Fischer titration by means of azeotropic distillation.
As with the oven method, the water is separated from the sample matrix. Because the sample itself remains in the evaporation chamber, the titration vessel and the electrodes are not contaminated. Furthermore, unwanted side reactions and matrix effects are avoided.

**860 KF Thermoprep** (2.860.0010)

The 860 KF Thermoprep is designed for thermal sample preparation in Karl Fischer titration.
Numerous substances cannot be analysed by direct Karl Fischer titration as they are not soluble, react with the Karl Fischer reagent or release their water only very slowly or not until heated to high temperatures. Using tightly sealed sample vials, the sample is inserted in the oven. The samples can be subsequently analysed by any volumetric or coulometric KF titrator.

# Automated KF Sample Preparation
## 874 USB Oven Sample Processor

The 874 Oven Sample Processor opens up new possibilities for water content determinations in samples that either are insoluble, cause side reactions or cannot be introduced directly into the titration vessel for other reasons. These problems are avoided with the use of the oven method, because the water is separated from the difficult sample matrix.

**Mode of operation of the oven technique**

Each of the samples is introduced into the oven in tightly sealed sample vials. The water is released by the heating up of the sample and transferred into the KF cell with a flow of carrier gas. It is there that the Karl Fischer titration then takes place.

**Sample preparation**

Sample preparation for the oven technique is as simple as possible and consists solely of weighing the sample into the vial and then sealing it. In addition, the hermetic sealing of the vessels with septa reliably prevents the absorption of humidity from the ambient air.

**Area of application**

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

**The advantages of the oven method at a glance**

- Reproducible analysis conditions for all samples, reflected in a markedly improved precision in the results
- Reduction of manual sample preparation to a minimum
- Considerable time savings
- No contamination of the oven or of the KF cell by the sample, thus precluding any carry-over or memory effects
- Improved release of water from the sample, because the carrier gas is not channeled over the sample, but rather directly through it
- Lower reagent consumption, as the titration solution needs to be replaced only rarely

**874 USB Oven Sample Processor**

- USB device – the 874 USB Oven Sample Processor is simply connected to a PC via USB port and recognized automatically.
- Optimum heating-up temperature – with the help of the temperature ramp, the optimum oven temperature can be determined for each sample.
- Reagent replacement – a 800 Dosino can be connected directly to an MSB connector of the changer and used together with a dosing unit for automatic replacement of the reagent.

Including ***tiamo***™ full and extensive accessories, comprising 100 sample vessels, 100 septum caps, 1 pair of sealing pliers.

874 USB Oven Sample Processor with 851 Titrando

| Ordering Information | |
|---|---|
| 2.874.0010 | 874 USB Oven Sample Processor with ***tiamo***™ full |
| 2.874.0020 | 874 USB Oven Sample Processor customized with ***tiamo***™ full |
| **Options** | |
| 6.1448.050 | Aluminum septum caps |
| 6.2419.000 | Sample glass, 6 mL, 1,000 pcs. |

# 885 Compact Oven Sample Changer

- Small space requirements – The instrument offers automation in the smallest possible space.
- Flexibility – The 885 Compact Oven Sample Changer can be operated with a coulometric or volumetric titrator.
- Simple operation – Only the oven temperature, the gas flow and the number of samples must be defined.
- Reusable sample vessels – After the analysis, sample vessels can be opened, cleaned and reused.

The 885 Compact Oven Sample Changer is used for thermal sample preparation in Karl Fischer titration. The samples are heated in the oven to a temperature of up to 250 °C. This causes the water to vaporize and be transported with a dry carrier gas into a titration cell in which the analysis takes place.

**Area of application and principle of the oven method**

The oven method is recommended for samples that release their water only at higher temperatures, for poorly soluble substances and those that react with the KF reagent.

885 Compact Oven Sample Changer

The substance to be analyzed is placed in a tightly sealed sample vessel on the sample rack and heated up in the oven. A double needle pierces the septum and a dry flow of carrier gas transports the released water into the titration cell.

The advantage of the oven method lies in the fact that the sample itself does not enter the titration cell. This avoids the contamination of both the oven and titration cell, thus excluding both carry-over and memory effects that could falsify the results of the analysis.

**Small space requirements**

The name of the 885 Compact Oven Sample Changer explains its purpose: The instrument offers automation in a minimum amount of space.

**Great flexibility**

Depending on the sample, Karl Fischer titration can be either coulometric or volumetric. No matter which method is used – the 885 Compact Oven Sample Changer can be operated with all stand-alone KF titrators with sample table.

**Simple operation**

The instrument is controlled using the integrated keypad. Only the oven temperature and the gas flow must be defined and the number of the samples to be determined must be established.

**Reusable sample vessels**

Screw-cap vials are used with the 885 Compact Oven Sample Changer. After the measurement, these sample vessels can be opened, cleaned and subsequently reused without difficulty. Only the septum must be replaced after it has been pierced.

| **Ordering Information** | |
|---|---|
| 2.885.0010 | 885 Compact Oven Sample Changer |
| **Options** | |
| 6.1448.077 | Septum |
| 6.2141.340 | Remote cable 885 - Remote Box MSB |
| 6.2148.010 | Remote Box MSB |

# KF Automation

**Automated coulometric KF titrations** (MATi 04)

MATi 4 is a fully automated system for coulometric Karl Fischer titrations with high sample throughput. Up to 160 samples in 6 mL vials can be placed on the sample rack of the Sample Processor. The sample is pipetted into an external coulometric cell and then titrated there. The system is controlled by means of the ***tiamo***™ titration software.

**Automated volumetric KF titrations** (MATi 10)

Fully automated system for volumetric Karl Fischer water content determination in up to 24 samples. The system is controlled with ***tiamo***™ and consists of an 814 USB Sample Processor, a 901 Titrando and extensive accessories. The samples are weighed out into the beakers, sealed to protect against humidity and placed on the rack. Before the actual titration, they are dissolved in a KF working medium, after which the water content is titrated.

**Automated volumetric KF titration including sample preparation** (MATi 11)

Fully automated system for volumetric Karl Fischer water content determination in up to 53 samples. This system is controlled with ***tiamo***™ and consists of an 815 Robotic USB Sample Processor XL, a 901 Titrando and extensive accessories. The samples are pulverized in a short time with the Polytron and the water they contain is released. Even samples of poor solubility, e.g., tablets, can be analyzed without difficulty with this method. The use of solubility promoters can be avoided in this way.

# KF Gas Analyzer
## 875 KF Gas Analyzer

- Complete system with durable components for high flexibility and for pressures up to 40 bar
- Separation of the gas-carrying system from the electronics and the power supply
- Input filter for avoiding the introduction of particles by the sample
- Integrated vaporizer for liquefied gases
- Oil filter for removing oil residue
- Precise gas measurement with mass flow measurement instrument
- Automated analysis process
- Predefined analysis methods
- All components are integrated in a single housing

The KF Gas Analyzer is a robustly constructed analysis system for routine water content determination in liquefied and permanent gases.

The system is controlled with ***tiamo***™ and is comprised of one operating unit (TFT monitor) and an analysis module. The analysis module is fitted with the gas path, a titration vessel and a coulometer. This makes it possible to perform all analysis steps fully automatically.

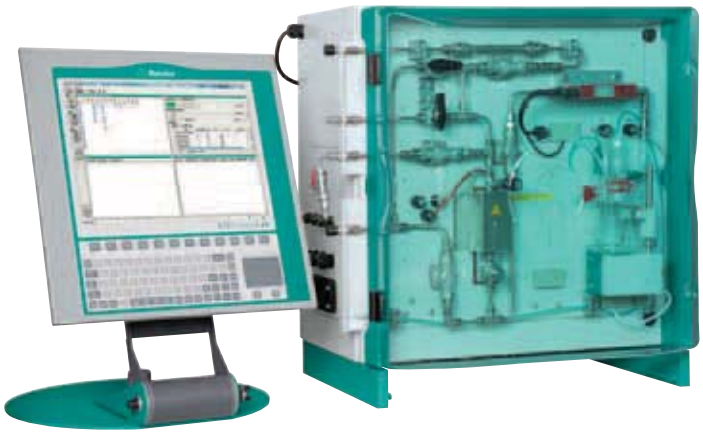
The system was designed for water content determination in gases in accordance with Karl Fischer and is also suitable for very low water content determinations.

**Application examples**

Water content determination in various liquefied gases

- Propane, propene, LPG, butane, butene, butadiene
- Dimethyl ether
- Methyl chloride, ethyl chloride, vinyl chloride
- CFC, HFC, CHC, fresh and used refrigerants with chiller oil contents

Water content determination in permanent gases such as natural gas



875 KF Gas Analyzer

| Ordering Information | |
|---|---|
| 2.875.9020 | KF Gas Analyzer with TFT monitor |
| 2.875.9050 | KF Gas Analyzer without TFT monitor |
| **Options** | |
| 6.7209.000 | KF Gas Analyzer equipment for reagent replacement and adding methanol |
| 6.7209.010 | KF Gas Analyzer equipment for rinsing with solvent |

# Dosing devices


c(NaOH) = 0.1 mol/L

# Dosing devices

# Dosing, pipetting and manual titration
## The Dosimats at a glance

| | 876 Dosimat plus | 876 Manual Titrator plus | 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 | **optional** | **yes** | **optional** |
| Remote Control via PC | **yes** | **yes** | **yes** |

# 865 Dosimat plus

Universal dispensing unit for titration and dosing tasks in the laboratory. Including push-button cable for manual dispensing control and 6.3026.220 exchange unit (20 mL).

A multitude of instruments can be connected at the USB interface of the Dosimat plus, even a number of them simultaneously when a USB hub is used (keyboard, mouse, USB compact printer or USB DIN A4 printer, USB Memory Stick for methods and data backup). The optional 6.2148.030 USB/RS-232 adapter box enables the connection of laboratory balances and operation with a computer.

With its four dosing modes, the Dosimat plus offers a multitude of applications:

**DOS (Dosing)**
Dosing at the press of a button, particularly suitable for performing manual titrations with indicator. A result can be calculated automatically from the dosed volume and a result report can be printed out. Different calculation variables can be defined in advance as parameters.

865 Dosimat plus with 801 Magnetic Stirrer (optional)

**XDOS (Extended Dosing)**
Fixed volume dosing: The volume and the dosing rate are specified.

Time-controlled dosing: The volume and the time are specified.

Dosing according to dosing rate: The dosing rate and the time are specified.

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

**CNT D (Content dosing)**
This mode is suitable for the preparation of standard and other solutions. The 865 Dosimat plus automatically determines the volume of the solvent to be dosed on the basis of the sample size of the starting substance (solid or stock solution) and the specified target concentration. A report containing all of the relevant data concerning the solution that was prepared can be printed out after the dosing.

**LQT (Liquid transfer)**
This mode is suitable for the pipetting and diluting of liquids.

**Ordering Information**

| | |
|---|---|
| 2.865.0010 | 865 Dosimat plus |

# 876 Dosimat plus – 876 Manual Titrator

Metrohm Dosimats make routine Liquid Handling easier. They are used to accomplish a wide variety of dosing and Liquid Handling tasks in laboratories around the world. The new Dosimats can be used as autonomous, manually operated instruments or they are used as automatic dosing devices for Titrino/Titrino plus titrators.

The 876 Dosimat plus is suitable for hand titrations and dosings. A push-button cable for manual dispensing control and a 20 mL exchange unit are supplied with the Dosimat plus.

The 876 Manual Titrator with flat stopcock switching and refilling is used for result calculations for titration with color indicator. The instrument is also supplied with a push-button cable for manual dispensing control, a 20 mL exchange unit and a magnetic stirrer.

A multitude of instruments can be connected at the USB interface of the Dosimat plus and Manual Titrator, even a number of them simultaneously when a USB hub is used (keyboard, mouse, USB compact printer or commercially available USB DIN A4 printer, USB Memory Stick for methods and data backup). The optional 6.2148.030 USB/RS-232 adapter box enables the connection of laboratory balances and remote control with a PC. With its two dosing modes, the Dosimat plus and the Manual Titrator are outstandingly suitable for classic laboratory dosing tasks.

**DOS (Dosing)**
Dosing at the press of a button, particularly suitable for performing manual titrations with indicator. A result can be calculated automatically from the dosed volume and a result report can be printed out. Different calculation variables can be defined in advance as parameters.

**XDOS (Extended Dosing)**
Fixed volume dosing: The volume and the dosing rate are specified.

Time-controlled dosing: The volume and the time are specified.

Dosing according to dosing rate: The dosing rate and the time are specified.

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

876 Manual Titrator

| Ordering Information | |
|---|---|
| 2.876.0010 | 876 Dosimat plus |
| 2.876.0110 | 876 Manual Titrator plus |
| **Options** | |
| 2.801.0040 | 801 Stirrer with stand |
| 2.802.0040 | 802 Stirrer (propeller stirrer) for 804 Ti Stand |
| 2.804.0010 | 804 Ti Stand without stand rod |
| 2.804.0040 | 804 Ti Stand with stand |
| 2.805.0010 | 805 Dosimat |
| 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 |

# Intelligent Liquid Handling
## 846 Dosing Interface

The 846 Dosing Interface can be seamlessly incorporated as a system component and control instrument into a Metrohm Titrando system. The interface is operated with a Touch Control or from a PC with ***tiamo***™.

**Comprehensive Liquid Handling**

Basic operations of everyday laboratory work such as pipetting, transferring, dosing, dispensing and diluting become child's play thanks to the innovative Liquid Handling functionality of the Dosing Interface in connection with the 800 Dosino. The system guarantees maximum accuracy and precision in the range of 10 µL to 100 mL, i.e. across no fewer than four orders of magnitude.

The control device has four MSB connectors (MSB = Metrohm Serial Bus) at which auxiliary and peripheral devices can be operated. Numbered among these are one dosing drive each (800 Dosino or 805 Dosimat), one stirrer or titration stand, one Remote Box, etc. Two USB connectors continue to be available through which such instruments as printer, balances, keyboard, barcode reader, a USB Sample Processor or other control devices can be connected.

846 Dosing Interface with 900 Touch Control

| **Ordering Information** | |
|---|---|
| 2.846.0010 | 846 Dosing Interface |
| 2.800.0010 | 800 Dosino |
| **Options** | |
| 2.801.0040 | 801 Stirrer with stand |
| 6.2061.010 | Bottle holder for Dosinos |
| 6.2065.000 | Stacking frame for 846 Dosing Interface, 856 Conductivity Module, 867 pH Module |
| 6.3032.120 | Dosing Unit 2 mL |
| 6.3032.150 | Dosing Unit 5 mL |
| 6.3032.210 | Dosing Unit 10 mL |
| 6.3032.220 | Dosing Unit 20 mL |
| 6.3032.250 | Dosing Unit 50 mL |

# Automation in titration


20
815 Robotic Titrosampler

# Automation in titration

# Introduction to automation
## Automation in titration

The automation of potentiometric measurement methods has gained enormously in importance as it becomes ever less frequently the case that simple determinations are sufficient. In contrast to purely manual determination, the fully automatic alternative is very precise, safe and time-saving.

With large **numbers of samples,** the thought of automation of the analysis that is always the same quickly presents itself, particularly since qualified personnel can be utilized more efficiently when the routine is taken over by a completely automated system. Even in the case of smaller series or with many different analyses, automation can help achieve more rapid and more reproducible results.

A uniform **sample preparation** that can be guaranteed only with a completely automated system ensures that the results will continue to be identical – independent of the user – even over long periods of time. Typical preparatory steps from everyday lab work such as Liquid Handling (pipetting, transferring), dilution, addition, tempering, degassing, pulverization, filtration, filling and much more can proceed just as automatically as the subsequent analytical determination.

One aspect not to be neglected is that of safety in the laboratory. The frequent handling of typical laboratory equipment (pipettes, burets, etc.) and the exposure to aggressive chemicals requires the complete concentration of the laboratory employee. When automated systems are used with sample preparation, the contact with hazardous substances and solvents is minimized, thus massively enhancing occupational safety.

Metrohm offers a large selection of instruments for the automation of your analysis, including sample preparation. On the following pages, you will learn more about the various sample changers and the completely preconfigured analysis systems.

# Overview of sample changers

| |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| | **862 Compact Titrosampler** | **869 Compact Sample Changer** | **814 USB Sample Processor** | **815 Robotic USB Sample Processor XL** | **855 Robotic Titrosampler** | **864 Robotic Balance Sample Processor** |
| Integrated measuring input | **yes** | **–** | **–** | **–** | **yes** | **–** |
| Integrated balance | **–** | **–** | **–** | **–** | **–** | **yes** |
| Work stations | **1** | **1** | **1 / 2** | **1 / 2** | **1** | **2** |
| Automatic rack recognition | **yes** | **yes** | **yes** | **yes** | **yes** | **yes** |
| Exchangeable racks | **–** | **–** | **yes** | **yes** | **yes** | **yes** |
| Titration / measurement directly on the rack | **yes** | **yes** | **yes** | **yes** | **yes** | **yes** |
| Standard racks | **11 x 120 mL** | **11 x 120 mL** | **12 x 250 mL<br>14 x 200 mL<br>16 x 150 mL<br>22 x 120 mL<br>24 x 75 mL** | **28 x 250 mL<br>28 x 200 mL<br>34 x 150 mL<br>59 x 120 mL<br>100 x 75 mL<br>160 x 6 mL<br>228 x 11 mL** | **28 x 250 mL<br>28 x 200 mL<br>34 x 150 mL<br>59 x 120 mL<br>100 x 75 mL<br>160 x 11 mL<br>228 x 11 mL** | **20 x 120 mL** |
| Thermostated racks | **–** | **–** | **–** | **yes** | **yes** | **–** |
| Beaker sensor | **–** | **–** | **yes** | **yes** | **yes** | **yes** |
| Splash protection | **yes** | **yes** | **yes** | **yes** | **yes** | **yes** |
| Drip pan | **–** | **–** | **yes** | **yes** | **yes** | **yes** |
| Max. number internal pumps | **–** | **–** | **2 / 4** | **2 / 4** | **2** | **–** |
| Max. number external pumps | **2** | **2** | **2 / 4** | **2 / 4** | **1** | **4** |
| Connector Swing Head | **–** | **–** | **1 / 2** | **1 / 2** | **1** | **2** |
| External positions | **–** | **–** | **4 / 8** | **4 / 8** | **4** | **8** |
| Pipetting / Sample transfer | **–** | **–** | **yes** | **yes** | **yes** | **yes** |
| Stirrer connector | **1** | **1** | **1 / 2** | **1 / 2** | **1** | **2** |
| Connector MSB | **–** | **–** | **3** | **3** | **3** | **3** |
| Connector Remote | **yes** | **yes** | **optional** | **optional** | **optional** | **optional** |
| Connector USB | **–** | **–** | **2** | **2** | **2** | **2** |
| Connector Mini-USB | **yes** | **yes** | **–** | **–** | **–** | **–** |
| Stand-alone | **yes** | **yes** | **optional** | **optional** | **optional** | **–** |
| ***tiamo***™ | **–** | **–** | **yes** | **yes** | **yes** | **yes** |

# Sample Changer
## 869 Compact Sample Changer

- Inexpensive automation
- Space-saving
- Various method templates
- Simple operation
- A total of 12 positions
- Live display

The 869 Compact Sample Changer offers automation in a minimum amount of space.

The 869 Compact Sample Changer offers the rapid and simple automation of Titrino and Titrino plus applications. For multiple determinations and **small sample series**, this sample changer is just the right choice. A wide variety of titrations can be performed fully automatically in a total of 12 positions and the electrode can be cleaned and/or conditioned between the determinations. In order to keep the consumption of titrant and solvents as low as possible, slender sample beakers are used as standard equipment that enable low-waste and rapid titration with even small volumes.

869 Compact Sample Changer

Thanks to the large and clearly organized **live display**, the current status of the sample series can be recognized directly and important samples can be given preferential analysis at any time. In light of the fact that laboratory space is expensive and rare, the compact sample changer requires no more support surface than that of a commercially available laboratory balance.

Various **method templates** can be used as the basis for creating and storing application-specific methods. Only four parameters need to be set on the 869 Compact Sample Changer for this purpose. In addition, the methods can also be printed out or saved electronically via USB (OTG) connector. Communication between Compact Sample Changer and Titrino / Titrino plus takes place via remote signals with an additional control box or PC being required.

The titration head of the sample changer offers space for an 802 Stirrer propeller stirrer and two additional electrodes. The propeller stirrer can be connected directly to the instrument and is also monitored by it. Titrant and auxiliary reagent can be added with the buret tips that have already been inserted. The 869 Compact Sample Changer can be equipped with rinsing and aspiration pumps upon request. Despite its inexpensive price, no corners were cut with respect to **safety** with the 869 Compact Sample Changer. The safety shield protects the user against inadvertent contact with chemicals.

**Ordering Information**

2.869.0010 869 Compact Sample Changer

# 898 XYZ Sample Changer

- Simple automation for high numbers of samples
- Time savings thanks to high speed
- Measuring and titration directly in the sample beaker
- Precise and reproducible results

XYZ Sample Changer with one workstation, one membrane pump and rinsing station for the automatic processing of routine samples in large numbers. The control takes place via computer operation using the ***tiamo***™ titration software.

**Time savings and improved operating sequences**
The advantages of a sample changer lie not only in the time savings for the laboratory personnel: Automatic systems control operating sequences, prevent errors and thus improve reproducibility and accuracy. Independent of the time of day, the system works through the prepared samples (automatic sample preparation, Liquid Handling or sample processing) and guarantees thereby the complete traceability of the individual steps.

The 898 XYZ Sample Changer convinces with its speed and the number of samples that can be processed without supervision. Two sample racks with 41 x 120 mL beakers or 24 x 250 mL beakers each can be fitted on the 898 XYZ SC and processed continuously there. As soon as the processing of the first sample rack has been completed, it can be replaced while operations are running.

Whereas beakers, sample racks, titration head and tubing are already included in the package, stirrers, propeller stirrers and Ti Stand (if needed) must be ordered separately in accordance with the titrator.

898 XYZ Sample Changer

| Ordering Information | |
|---|---|
| 2.898.0110 | 898 XYZ Sample Changer 82 x 120 mL |
| 2.898.0210 | 898 XYZ Sample Changer 48 x 250 mL |

# USB Sample Processors
## 814 USB Sample Processor

In today's world, single determinations are simply no longer enough!

In modern-day laboratories single determinations no longer meet the requirements. Each and every result has to be confirmed by multiple determinations in order to meet the **tough quality standards**. An „automatic" titrator without sample changer is therefore basically just a semiautomatic titrator because it is not able to carry out a double or threefold determination by itself: 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: automated 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 - the 814 USB Sample Processor masters everything that used to be the exclusive domain of laboratory robots.

Thanks to its compact design, even complex tasks can be carried out reliably on the smallest possible footprint. Depending on the sample matrix, the titrated sample solution is aspirated and the titration equipment is rinsed using **membrane or peristaltic pumps**. These are either mounted already inside the instrument or available as peripheral devices.

Depending on the user's preference, the 814 USB Sample Processor can be controlled by **Touch Control**, the ***tiamo***™ titration or the **MagIC Net** chromatography software. The method examples provided make creating your own methods perfectly easy.

814 USB Sample Processor with sample rack for 12 x 250 mL

| 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) |
| 2.814.0110 | 814 USB Sample Processor (2T/2P) |
| 2.814.0120 | 814 USB Sample Processor (2T/4P) |
| 2.814.0130 | 814 USB Sample Processor (2T/0P) |

# 815 Robotic USB Sample Processor XL

Minimum effort with maximum sample throughput!

In view of the **large number of samples** and ever more elaborate preparation steps, the use of robots is becoming ever more important, even in analytical laboratories. The larger the number of steps per sample that must be completed, the more their professional automation pays off. It has been a long time since this merely involved switching from one beaker to the next in order to analyze the sample – more and more it is the simplification of the entire sample processing, from the preparation to the multiple determination, that is demanded.

Reproducibility and accuracy are the alpha and omega in analysis and are thus numbered among the main requirements of automation. Robotic Sample Processors make child's play of the basic operations of modern automation, e.g.,**pipetting, transferring, aliquoting, dosing and dispensing**.

The use of the 786 Swing Head ensures that a **maximum number of sample vessels** can always be positioned on the rack, so that series as large as possible can be processed. Depending on the application and the vessel size used, this maximum is between 28 and 228 positions (standard racks).

Thanks to the compact design, even more complex tasks can be managed reliably. **Parallel processing** of the samples is accomplished easily and conveniently with the Robotic Sample Processor XL. While the pipetted sample volume is titrated at an external workstation (optional), the pH of the prepared samples can also be determined, for example, or the next sample can already undergo preparation. This means the time per analysis is reduced to a minimum.

Depending on the requirements, the 815 Robotic USB Sample Processor XL can be operated using **Touch Control,** the ***tiamo***™ titration software or the **MagIC Net** chromatography software. Method development is child's play with the example methods supplied.

815 Robotic USB Sample Processor XL

| 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) |

# 864 Robotic Balance Sample Processor TAN/TBN

- Fully automatic weighing of the sample
- High-end analyzer with a minimum footprint
- Robotic USB Sample Processor - proven technology
- Sample preparation and analysis in one system
- Saves time by taking over routine tasks
- Intelligent liquid handling - transferring, diluting and more
- Reliable, robust and safe
- Attractive price
- Control software that leaves nothing to be desired

System for the fully automatic preparation and analysis of petrochemical products that need to be weighed in, diluted and titrated.

System includes the following instruments:

1 x 864 Robotic Balance Sample Processor XL
1 x 905 Titrando
3 x 800 Dosino
1 x 786 Swing Head
1 x 786 Swing Head strengthened
1 x 802 Stirrer
1 x 843 Pump Station (Peristaltic)

864 Robotic Balance Sample Processor TAN/TBN

The 864 Robotic Balance Sample Processor TAN/TBN offers fast and convenient sample preparation combined with **the analysis of petrochemical products** in one system.

The sample is placed in a beaker on the sample rack and an aliquote of it is pipetted and weighed into the titration beaker fully automatically. After **sample transfer and weighing**, the sample is diluted with solvent. The TAN or TBN value is then determined by titration. After the analysis the titration beaker is emptied and the titration equipment is cleaned directly inside the beaker.

The sample rack can accommodate 20 sample and titration beakers (6.1459.300) each as well as 20 pipetting tips (6.1562.240) for sample transfer. These 10 mL tips are picked up, filled and stripped off after weighing so that **cross-contamination-free sample transfer** is absolutely guaranteed. Time and amount of work per sample is minimized. The only thing that needs to be ensured is that enough sample is in the beaker.

The combined automation of sample preparation and analysis in a single system increases **reproducibility** and **accuracy** of results as the sample is weighed in where it will be analysed. If necessary, the equipment can be cleaned more intensely by using an additional external rinsing station combined with a second 843 Pump Station.

The complete preparation and analysis system is controlled by the approved titration software ***tiamo***™. Each preparation step (including the sample amount weighed in) is documented in a database as are the titration results for each single sample.

**Ordering Information**

| | |
|---|---|
| 2.864.1130 | 864 Robotic Balance Sample Processor TAN/TBN |

# Titrosampler
## 862 Compact Titrosampler

The 862 Compact Titrosampler – **titrator and sample changer** in one – is a completely automated titration station with the support surface of a commercially available analytical balance.

A wide variety of analyses can be performed fully automatically in a total of 12 positions and the electrodes can be cleaned and/or conditioned between the determinations. The titration curve is directly in view thanks to the large, clearly organized **Live Display** and the current status of the sample series is recognizable at once. Pressing samples can be given priority analysis at any time. „Plug & Play" functionality of intelligent dosing unit, stirrer and USB printer, a high-precision measuring input, operation per mouse click and a variety of dialog options – this combination device leaves nothing to be wished for.

**Highest degree of precision** thanks to the new measuring input: Just as is the case with the high-end Titrando titrator, the new Compact Titrosampler is also equipped with a high-resolution measuring input which guarantees results with the greatest of precision. A multitude of instruments can be connected to the USB interface of the Compact Titrosampler, even a number of them at once when a USB hub is used:

- Numerical keypad
- USB compact printer
- Commercially available USB DIN A4 printer
- USB Memory Stick for methods and data backup

862 Compact Titrosampler with printer

| Ordering Information | |
|---|---|
| 2.862.0010 | 862 Compact Titrosampler |
| 2.862.0110 | 862 Compact Titrosampler with printer |

# 855 Robotic Titrosampler

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

The 855 Robotic Titrosampler opens up a new dimension in automation. The successful **combination** of high-performance titrator and perfect laboratory automation at the robot level covers an extensive spectrum of applications. Thanks to this combination of automation and titration, up to 40% of the space usually required can be dispensed with – and this with identical functionality and unchanging flexibility.

The more demanding the application, the more work steps there are that are required prior to the actual determination. The time-consuming **sample preparation** can be left to the Robotic Titrosampler. Whether it be pipetting, transferring or simply diluting with solvent – there is practically no limit to what is possible. With up to three buret connections integrated in the instrument, the Robotic Titrosampler offers sufficient latitude for Liquid Handling tasks.

A high-performance titrator based on the **proven Titrando technology** is already integrated in the Robotic Titrosampler. With the **accuracy and precision** of the Titrando, the Robotic Titrosampler is also equipped with 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), measurement with ion-selective electrodes (MEAS CONC) and Liquid Handling (LQH, DOS) are child's play with the Robotic Titrosampler.

With the multitude of combination options and in view of the many different applications that are processed nowadays in laboratories, it is imperative that the retraceability of each individual sample be guaranteed. With its connectors for intelligent dosing units, the 855 Robotic Titrosampler offers **complete documentation** of your analysis.

The control can be accomplished either using the handy **Touch Control** or with the state-of-the-art ***tiamo***™ titration software.

855 Robotic Titrosampler „Basic"

| Ordering Information | |
|---|---|
| 2.855.0010 | 855 Robotic Titrosampler „Basic" (1T/1P) |
| 2.855.0020 | 855 Robotic Titrosampler „Basic" (1T/2P) |

# Titration systems
## Introduction – Automated systems

**Profit from more than 60 years of experience!**
Metrohm offers much more than only a wide variety of different individual instruments out of which you can select according to your requirements. Complete systems have been assembled on the basis of the application experiences of the last 60 years that are targeted to fulfil various requirements. Select your automated Metrohm laboratory instruments quickly and easily – with the assurance that we have already thought of everything.

**848 Titropackage plus**
The compact and inexpensive system for the automation of potentiometric analyses in the smallest possible space! The combination of routine titrator and very compact sample changer requires exceptionally little space and can be put into operation in a very small amount of time.

**MATi systems**
These systems (MATi = Metrohm Automated Titration) are tailored to various standard applications and offer a maximum of convenience and flexibility. More than ten different, fully automated systems offer the perfect basis for the determination of your samples.

**Compact Titrosampler packages**
The Compact Titrosampler packages each covers one standard application – and that with minimum space requirements. The „Food/Beverage“ and „Salt“ packages are furnished with the accessories required for the application, so that you can begin working immediately. Just install and go.

**Robotic Analyzers**
The Robotic Analyzer family is comprised of various packages, each of which covers a standard application. Each of these packages offers you the perfect framework for the solution of your application. The centerpiece is always the unique 855 Robotic Titrosampler, the space-saving combination of a titrator installed in the sample changer. Depending on the application, this titrating analyzer is equipped with the accessories tailored to your application. You receive exactly what you need, no more and no less.

Because of the great flexibility of Metrohm automation, the systems can be adapted and expanded according to customer specifications upon request.

# 848 Titropackage plus

Compact and inexpensive system for the automation of potentiometric determinations in the smallest possible space. Comprised of:

- 1 x 848 Titrino plus
- 1 x 802 Stirrer
- 1 x 869 Compact Sample Changer

The 848 Titropackage plus contains everything required to enable rapid installation and direct entry into working with the system. A large number of pre-defined titration methods, combined with very simple operation, permits immediate use.

**Titrino plus**

The Titrino plus, Metrohm's new entry class in the area of potentiometric titration, is particularly attractive due to its practically unbelievable price-performance ratio. A large live display with titration curve, „Plug & Play" functionality of exchange unit, stirrer and USB printer, a high-precision measuring input, operation per mouseclick – the Titrino plus offers considerably more than you would ever expect in this price segment. With its operating dialog, which is tailored to routine users, the Titrino plus instruments are so simple to operate that only brief orientation periods are required. Their robustness also makes them the ideal titrators for routine determinations in everyday laboratory operations.

**Compact Sample Changer**

For multiple determinations and small sample series, this sample changer is just the right choice. A wide variety of titrations can be performed fully automatically in a total of 12 positions and the electrode can be cleaned and/or conditioned between the determinations. In order to keep the consumption of titrant and solvents as low as possible, slender sample beakers are used as standard equipment that enable low-waste and rapid titration with even small volumes. Thanks to the large and clearly organized live display, the current status of the sample series can be recognized directly and important samples can be given preferential analysis at any time. In light of the fact that laboratory space is expensive and rare, the compact sample changer requires no more support surface than that of a commercially available laboratory balance.

848 Titropackage plus

**Ordering Information**

| | |
|---|---|
| 2.848.0110 | 848 Titropackage plus |
| 2.848.0120 | Titropackage plus with printer |

# MATi systems

**Fully automatic water analysis** (MATi 01)

PC-controlled, fully automatic water analysis system with a rapid measurement system for the precise sample transfer of 100 mL samples. After the conductivity measurement, pH value, alkalinity and Ca/Mg content are determined in an external cell. Up to 59 samples can be placed on the rack. The control of this system is handled by the proven ***tiamo***™ titration software.

**Automated TAN/TBN analysis** (MATi 02)

PC-controlled, fully automatic analysis system for the direct determination of TAN or TBN values in mineral oil products in series of up to 59 samples. The analysis is carried out in accordance with ASTM standards D664 and D2896. The system is noteworthy for its special resistance to the solvents used in these applications. The data acquisition and the complete control of the system takes place via the proven ***tiamo***™ titration software.

**Nonaqueous titrations** (MATi 03)

Direct nonaqueous titration of pharmaceutical active ingredients and other substances in series of up to 59 samples. The system is noteworthy for its special resistance to organic solvents. The control of this system is handled by the proven ***tiamo***™ titration software, that can also be provided in an FDA-compliant version upon request.

**Automatic titration of acids and bases for up to 12 samples** (MATi 06)

Fully automatic system for potentiometric titration of acids and bases in series of up to 12 samples. The titration is carried out directly in the beaker on the rack. Afterwards, the electrode is cleaned automatically using the membrane pumps built into the sample changer and the titration beaker is emptied. The control of this system is handled by the user-friendly ***tiamo***™ titration software.

**Automated titration system for up to 28 samples** (MATi 07)

Fully automated system for the performance of potentiometric titrations such as acid/base, Redox and classic halogenide titration in series of up to 28 samples. The system is controlled with the ***tiamo***™ titration software. At the end of the determination, the electrode and buret tips are cleaned automatically using the Pump Station and the beaker is emptied.

**Automated pipetting and titration system for up to 100 samples** (MATi 08)

Automated system for the performance of potentiometric titrations on acids and bases in up to 100 samples. The sample is pipetted out of the beaker into the external titration vessel, after which a completely automatic determination is carried out. After the titration, the external vessel is cleaned thoroughly using the membrane pumps built into the Sample Processor. The control of this completely automatic analysis system takes place using the proven ***tiamo***™ titration software.

**Automated COD determination** (MATi 12)

Automatic system for potentiometric titration of COD samples in series up to 21 samples. The titration is carried out directly in the reaction vessel on the rack. Afterwards, the electrode is cleaned automatically by means of the membrane pump built into the sample changer and the reaction vessel is emptied. The control of this system is handled by the user-friendly ***tiamo*™** titration software.

**Fully automated determination of the permanganate index, according to DIN EN ISO 8467** (MATi 13)

Automated system for the determination of the permanganate index in accordance with DIN EN ISO 8467. Up to 24 samples can be placed on the rack and processed within one series. The sample is pipetted from the sample beaker into the external titration cell and analyzed completely automatically in accordance with the requirements of the DIN standard. The system is controlled by the ***tiamo***™ titration software.

# 862 Compact Titrosampler

- Compact and inexpensive automated titration instrument
- Simple installation and operation
- Intelligent dosing unit and monitoring of the titrant
- Ready for immediate use
- Maximum precision thanks to high-resolution measuring input
- Live curve
- USB compact printer as option

The 862 Compact Titrosampler is an instrument for the determination of dynamic (DET) and monotonic (MET) titrations with automatic equivalence point finding and endpoint titrations (SET) in a very small space. The combination of titrator and sample changer in a single instrument requires no more support surface than that of a commercially available analytical balance. Thanks to the USB printer, the results can be documented directly and clearly.

A wide variety of analyses can be performed fully automatically in a total of 12 positions and the electrodes can be cleaned and/or conditioned between the determinations. The titration curve is directly in view thanks to the large, clearly organized Live Display and the current status of the sample series is recognizable at once. Pressing samples can be given priority analysis at any time. „Plug & Play" functionality of intelligent dosing unit, stirrer and USB printer, a high-precision measuring input, operation per mouse click and a variety of dialog options – this combination device leaves nothing to be wished for.

862 Food/Beverage Compact Titrosampler with accessories and printer

**Maximum precision thanks to the new measuring input**

Just as is the case with the high-end titrator Titrando, the Compact Titrosampler is also equipped with a high-resolution measuring input which guarantees results with the greatest of precision.

**USB interface**

A multitude of instruments can be connected to the USB interface of the Compact Titrosampler, even a number of them at once when a USB hub is used:

- Keyboard or mouse
- USB compact printer or commercially available USB DIN A4 printer
- USB Memory Stick for methods and data backup

**862 Food/Beverage Compact Titrosampler**

The 862 Food/Beverage Compact Titrosampler is a compact and inexpensive instrument for the automatic performance of most potentiometric analyses required in the food industry. Equipped with extensive accessories, the 862 Food/Beverage Compact Titrosampler is ready for immediate use.

**862 Salt Compact Titrosampler**

The 862 Salt Compact Titrosampler is comprised of a complete package for the analysis of chloride in a very wide variety of samples. The accessories included are tailored precisely to this application, thus enabling not only simple and rapid installation but also clearly organized documentation of the results with the USB printer that is included.

| Ordering Information | |
|---|---|
| 2.862.1010 | 862 Food/Beverage Compact Titrosampler |
| 2.862.1110 | 862 Food/Beverage Compact Titrosampler with printer |
| 2.862.2010 | 862 Salt Compact Titrosampler |
| 2.862.2110 | 862 Salt Compact Titrosampler with printer |

# Robotic Analyzer packages

**Robotic Chloride Analyzer** (2.855.1010)

The complete package for the determination of chloride contains all the components for a fully automatic chloride titration in the smallest possible space in a minimum of time. Instruments, accessories, software and application know-how – simply everything is included.

**Robotic Acid-Base Analyzer** (2.855.1020)

The complete package for the determination of acids and/or bases contains all the components for a fully automatic acid-base titration in the smallest possible space in a minimum of time. Instruments, accessories, software and application know-how – simply everything is included.

**Robotic TAN/TBN Analyzer** (2.855.2010)

The complete package for the determination of TAN and/or TBN contains all the components for a fully automatic TAN/TBN titration in the smallest possible space in a minimum of time. Instruments, accessories, software and application know-how – simply everything is included.

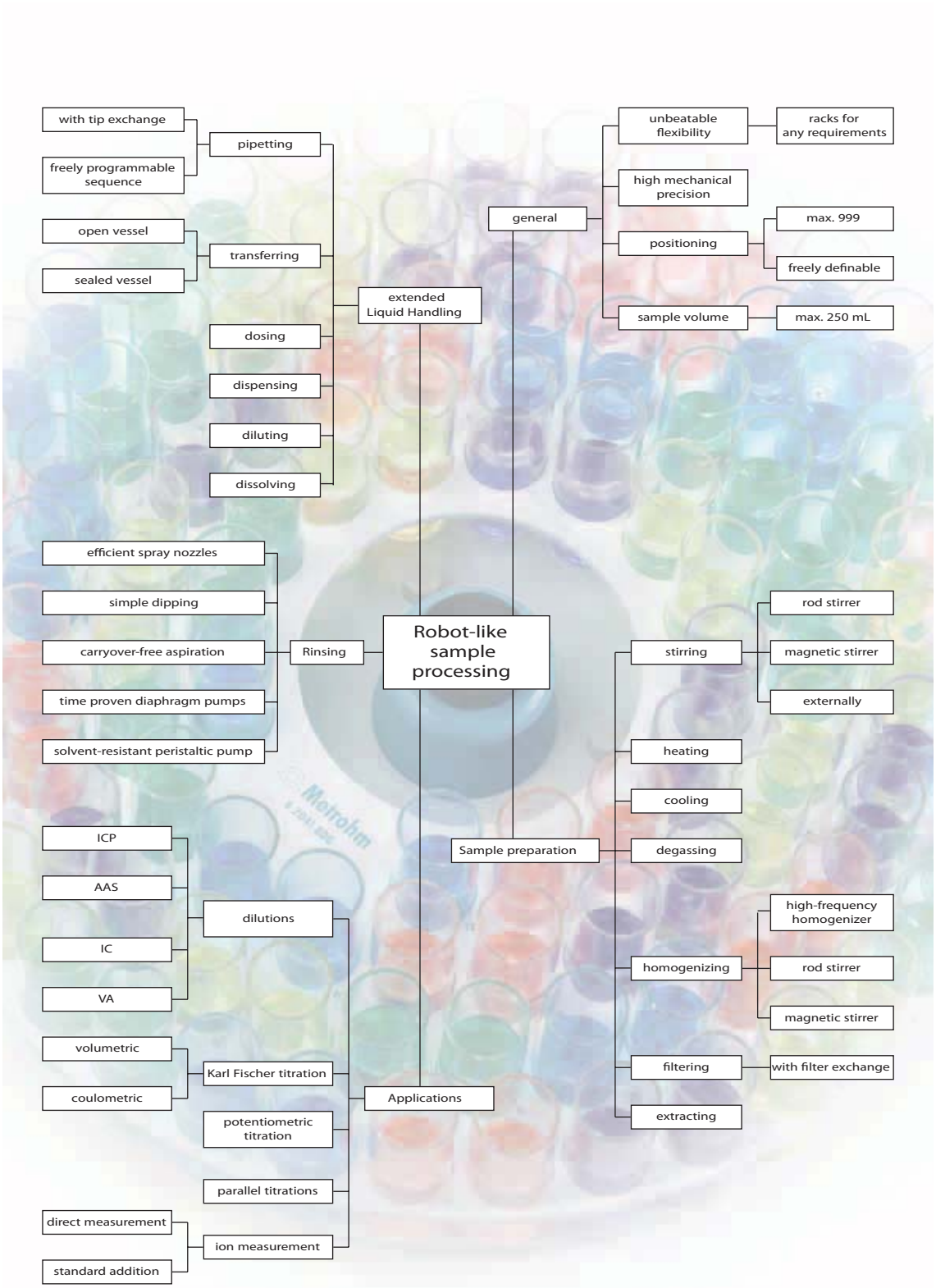
**Robotic Fluoride Analyzer** (2.855.2020)

The complete package for the determination of fluoride contains all the components for a fully automatic fluoride titration in the smallest possible space in a minimum of time. Instruments, accessories, software and application know-how – simply everything is included.

**Robotic Transfer Analyzer** (2.855.3020)

The complete package for the determination of acid and base contents in very high numbers of samples contains all the components for a fully automatic acid/base titration in the smallest possible space in a minimum of time. Instruments, accessories, software and application know-how – simply everything is included.

# Sample preparation systems
## An overview of sample preparation



# Robotic Soliprep

The Metrohm automation program has long offered you the opportunity of transferring your titration applications to a completely automated system. The Robotic Soliprep is a new version of the proven 815 Robotic USB Sample Processor that makes everyday routine work easier. The main area of utilization for the Robotic Soliprep systems is professional sample preparation. The Robotic Soliprep family is comprised of four packages that cover the different standard sample preparation steps. All Soliprep systems offer the possibility of homogenizing solid samples quickly and conveniently.

Up to 59 samples can be processed in a single run with the **Robotic Titration Soliprep**. The sample needs only be weighed into the beaker and placed on the sample rack. The reduction of the sample takes place subsequently with the Polytron 1300 D. After homogenization, the sample is titrated at the other workstation.

Up to 24 samples can be placed on the rack of the **Robotic Filtration Soliprep**. The reduction of the sample takes place with the Polytron 1300 D. During the following preparation steps, the Polytron aggregate is cleaned in the external rinsing station. After the homogenization, an aliquot of the sample is aspirated and subsequently filtered through a commercially available syringe filter (Luer connector). The Dosino used for the sample transport doses the sample at uniform speed onto the filter, thus ensuring optimum filtration results. Needles and filters are replaced for each sample and disposed of safely in the collection container after use.

Up to 10 samples can be placed on the rack of the **Robotic Flexible Soliprep**. Further steps proceed as already described for the Robotic Filtration Soliprep. The filtrate can subsequently be pipetted, either directly or after additional dilution, in septum-sealed vials (11.6 mm). After completion of the series, the prepared sam-ples can be easily removed from the sample rack in order to set the samples on the analyzer (e.g., IC or HPLC).

Up to 24 samples can be placed on the **Robotic Flexible Soliprep for LC**. After homogenization, an aliquot of the sample is aspirated using a metal-free plastic needle and subsequently transported through a commercially available syringe filter (Luer connector) and the Luer connector directly into the sample loop of the liquid chromatograph (LC).

The control of this preparation system takes place completely using the proven and flexible ***tiamo***™ titration software or the **MagIC Net** chromatography software that can also document the individual preparation steps for each sample in a database.

815 Robotic Filtration Soliprep

| **Ordering Information** | |
|---|---|
| 2.815.1110 | 815 Robotic Titration Soliprep |
| 2.815.2110 | 815 Robotic Flexible Soliprep |
| 2.815.3110 | 815 Robotic Filtration Soliprep |
| 2.815.4110 | 815 Robotic Soliprep for LC |
| **Options** | |
| 6.9012.000 | Dispersing aggregate for Polytron, 125 mm |
| 6.9012.010 | Dispersing aggregate for Polytron, 157 mm |

# Automation peripheral devices
## Membrane pumps

Liquids must frequently be pumped during titrations. The aspiration of the titered-out sample solution is particularly convenient with automation. Following automatic run-through of the preprogrammed rinsing and aspiration cycles, the cleaned sample beakers and the electrodes that were used are available immediately for the next determination. The waste is transferred to canisters standing by for convenient disposal.

The **823 Membrane Pump** is a pump that can be used for many different applications. It was designed especially for operations and laboratory application and can be used for a broad spectrum of applications. It is suitable for pumping liquid media of any type and opens up a wide spectrum of applications with a flow rate of at least 450 mL/min.

The **843 Pump Station** (membrane) has two built-in membrane pumps. These can be controlled either via the interface either directly using remote signals or manually at the press of a button.

The two instruments are available in different versions that differ primarily with respect to the accessories supplied with them.


843 Pump Station Membrane

**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 for Compact Sample Changer |
| 2.843.0050 | 843 Pump Station (membrane) - rinse/ aspirate for Sample Processors |

# Peristaltic pumps

Liquids must frequently be pumped during titrations. The aspiration of the titered-out sample solution is particularly convenient with automation. Following automatic run-through of the preprogrammed rinsing and aspiration cycles, the cleaned sample beakers and the electrodes that were used are available immediately for the next determination. The waste is transferred to canisters standing by for convenient disposal. A membrane pump can no longer be used with liquids that contain solids such as silver chloride precipitates.

A peristaltic pump such as the **772 Pump Unit** is to be preferred in such cases. Here, the user has the opportunity of using pump tubing made of a wide variety of materials and thus to adjust the resistance of the tubing to the medium to be pumped in optimal fashion. One tubing for aqueous applications and one for organic solvents are shipped as standard equipment along with the Pump Unit.

The **843 Pump Station** (peristaltic) has two built-in peristaltic pumps. These can be controlled either via the interface either directly using remote signals or manually at the press of a button. The two instruments are available in various versions that differ primarily with respect to the accessories supplied with them.


843 Pump Station Peristaltic

| Ordering Information | |
|---|---|
| 2.843.0120 | 843 Pump Station (peristaltic) |
| 2.843.0130 | 843 Pump Station (peristaltic) - rinse/ aspirate for Compact Sample Changer |
| 2.843.0150 | 843 Pump Station (peristaltic) - rinse/ aspirate for Sample Processors |
| 2.772.0110 | 772 Pump Unit |
| 2.772.0120 | 772 Pump Unit – aspirate |
| 2.772.0130 | 772 Pump Unit – rinse |

# 849 Level Control

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 849 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 run dry). Thanks to the conductivity measurement technique the level sensors can be used in different media.

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 849 Level Control can be used in all Metrohm systems in which it is possible to scan remote lines.

849 Level Control with canister

**Ordering Information**

| | |
|---|---|
| 2.849.0010 | 849 Level Control |
| 2.849.0020 | 849 Level Control metal-free (for canisters) |
| 2.849.0030 | 849 Level Control MF (for bottles) |

# 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 1'150 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.

Various Metrohm devices can be connected to the Relay Box via their remote interfaces. 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

**Ordering Information**

2.731.0010 731 Relay Box

# 786 Swing Head

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

With a Swing Head, the number of samples and their sizes can be varied within a wide range. This increased flexibility results from the considerable extension of the range of positions that can be reached on the Sample Processor. The Swing Head works with highest accuracy: it moves pipette / transfer tips from one position to the next, millimetre by millimetre. 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 analyzed in the cell, the next sample is already being prepared; this means an additional gain in time. In addition, the Swing Head can also be equipped with Robotic Arms that can take up and eject tools or serve as a holder for a homogenizer for comminuting tablets.

Reinforced 786 Swing Head

| 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 |
| 2.786.0240 | 786 Swing Head, right-swinging, reinforced |

# Stirrer

**741 Magnetic Stirrer** (2.741.0010)

Magnetic stirrer for sample changers.
The magnetic stirrer is located beneath the sample rack.

**802 Stirrer** (2.802.0020)

Rod stirrer for sample changer and Sample Processor.
With 6.1909.020 Propeller stirrer 104 mm and fixed cable.

# Polarography, voltammetry and CVS


Waste

# Polarography, voltammetry and CVS

# Trace analysis with voltammetry
## Determination of total metal and metal species

Voltammetry instruments from Metrohm are modest in terms of servicing requirements, procurement price and dimensions, but nonetheless great in their detection capabilities.

Traces of toxic heavy metals can be analyzed in extremely low concentrations without great effort. The detection limits are to be found without exception in the ppt range, which means that the necessary sensitivity can be achieved in all cases. Voltammetry is one of the few methods in existence for the speciation of analytes.

Metal analyses can be carried out with equivalent or better sensitivity, at a fraction of the procurement price of an AAS or ICP instrument. An additional plus for voltammetry are the low costs of ownership. Except for small quantities of reagents, only tiny amounts of high-purity nitrogen are required. No expensive flammable gases, no conversion of the laboratory with special gas supply and flue gas outlets, no expensive lamps and no time-consuming calibration of the analysis system.

**Applications that convince**

***Analysis of traces of metals***

In addition to the determination of total concentrations, as is usual with spectroscopic methods, with voltammetry it is also possible to specify between the different oxidation stages of metal ions or the biological availability of heavy metals. A distinction can be made between free and bound metal ions. This makes voltammetry an indispensable element of environmental analysis. It is not possible for spectroscopy to yield comparable statements except after tedious separation of the metal species. Thanks to its compact dimensions, the instrument can also be used in mobile laboratories.

Samples with high ion concentrations present no problem for voltammetry. Voltammetry is predestined for the analysis of:

- Water, waste water and sea water
- Foods
- Salts, pure chemicals
- Galvanic baths

***Specific analysis of organics***

It is not only metals that can be determined, but also various organic compounds. The technology is used in organic chemistry, e.g. for the analysis of contaminations, or in pharmaceutical chemistry for the determination of active ingredient concentrations.

Examples of interesting determinations:

- 4-carboxybenzaldehyde in terephthalic acid
- Free styrol in polystyrene
- Vitamins in juices, vitamin preparations

***Determination of anions***

Some anions can also be determined with voltammetry. Of particular interest is the analysis of the species cyanide, sulfide, nitrite, nitrate and iodide.-

| | |
|---|---|
| $Sb^{III}$ / $Sb^{V}$ | 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 | 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

# 797 VA Computrace for trace analysis

**The 10 most important benefits**

- Voltammetric trace analysis and additive determination in galvanics with a single instrument
- Maximum sensitivity thanks to the combination of the unique Multi-Mode Electrode pro with the installed potentiostat
- Automation with the 863 Compact VA Autosampler or the 838 Advanced VA Sample Processor
- Archiving of the data in the Autodatabase program with report generator
- More than 220 important analysis methods are included in the scope of delivery
- Output of the result in an unlimited number of formats
- Unique EXPLORATORY mode, specially designed for education at schools and universities
- Metrohm monographs „Introduction to Polarography and Voltammetry" and „Practical Voltammetry"
- Built-in quality assurance with GLP mode, access rights for each user and automatic electrode test
- Simple operation using the clearly organized user interface oriented to the Windows operating concept
- Connection to the USB port of the PC

The 797 VA Computrace is a modern voltammetric measuring stand that is connected to a PC via a USB port. The computer software provided controls the measurement, records the measured data and evaluates it. Operation is most straightforward due to the well-laid-out structure of the program. The integrated potentiostat with galvanostat guarantees the highest sensitivity with reduced noise.

Voltammetry system for trace analysis and education. Complete accessories with VA Computrace software and all electrodes for a complete measurement system: Multi-Mode Electrode pro (MME pro), Ag/AgCl reference electrode and Pt auxiliary electrode.

**797 VA Computrace – Manual or automated**

The 797 VA Computrace is a completely functional analysis system for meeting the highest expectations in terms of accuracy and sensitivity. All solutions are added manually. The various extension options, e.g., Dosinos or the additions of auxiliary and standard solutions, sample changer and automatic rinsing provide greater convenience.

797 VA Computrace

**Ordering Information**

| | |
|---|---|
| 2.797.0010 | 797 VA Computrace for trace analysis |

# 797 VA Computrace with automatic standard addition for trace analysis

Easy to operate, partially automated analysis system for voltammetric trace analysis and education, comprised of 797 VA Computrace with two 800 Dosinos for the automatic addition of auxiliary solutions. The computer software provided controls the measurement, records the measured data and evaluates it. Operation is most straightforward due to the well-laid-out structure of the program. The integrated potentiostat with galvanostat guarantees the highest sensitivity with reduced noise.

**Partially automated voltammetry system for inexpensive convenience**

Two auxiliary solutions can be added automatically to the measuring vessel. Calibration in voltammetry is accomplished by means of standard addition or calibration curve and is carried out automatically by one of the 800 Dosinos. The second 800 Dosino adds the electrolytes or buffer automatically. The Dosinos are completely controlled by the 797 VA Computrace. One additional 800 Dosino can be connected directly, as can four additional ones by using an 846 Dosing Interface. A maximum of seven 800 Dosinos can thus be used.

The sample is handled manually. The sample is added in the measuring vessel by using a pipette and the analysis is started. This system is intended for users who value elegant and convenient operation at an attractive price without having to use a sample changer.

Complete accessories in the scope of delivery with VA Computrace software and all electrodes for a complete measurement system: Multi-Mode Electrode pro (MME pro), Ag/AgCl reference electrode and Pt auxiliary electrode.

MVA-02

**Ordering Information**

| | |
|---|---|
| MVA-02 | 797 VA Computrace with automatic standard addition for trace analysis |

# 797 VA Computrace fully automated for trace analysis

Fully automated analysis system for voltammetric trace analysis and education, comprised of 797 VA Computrace with 863 Compact VA Autosampler and two 800 Dosinos for the automatic addition of auxiliary solutions. The computer software provided controls the measurement, records the measured data and evaluates it. Operation is most straightforward due to the well-laid-out structure of the program. The integrated potentiostat with galvanostat guarantees the highest sensitivity with reduced noise.

**Fully automated voltammetry system**

Up to 18 samples can be investigated automatically, precisely and reproducibly. The software of the 797 VA Computrace controls the complete analysis sequence. The samples are placed on the sample rack of the 863 Compact VA Autosampler, and the rest takes place automatically: the transfer of the samples into the measuring vessel with the built-in peristaltic pump, the voltammetric determination with the automatic addition of all of the auxiliary solutions by using two 800 Dosinos and the automatic rinsing with the 843 Pump Station. The reproducible and efficient rinse minimizes carry-overs and thus enhances the accuracy of the determinations. In order to increase the number of auxiliary solutions, one additional 800 Dosino can be connected directly, as can four additional ones by using an 846 Dosing Interface. A maximum of seven 800 Dosinos can thus be used.

This system is the optimum solution for the automatic analysis of small sample series that must be analyzed for one or two analytes in a single analysis run.

Complete accessories in the scope of delivery with VA Computrace software and all electrodes for a complete measurement system: Multi-Mode Electrode pro (MME pro), Ag/AgCl reference electrode and Pt auxiliary electrode.

MVA-03

| Ordering Information | |
|---|---|
| MVA-03 | 797 VA Computrace fully automated for trace analysis |

# Electrode kits for trace analysis

**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.

**scTRACE Gold equipment** (6.5340.000)

Complete accessories kit for the determination of arsenic with the scTRACE Gold as described in Application Bulletin 416. Contains electrode holder, scTRACE Gold (4 pieces), measuring vessel, stirrer and additional accessories.

# Sample preparation for trace analysis
## 909 UV Digester (230 V)

- Control unit and wet end in a single housing
- Digital input of digestion temperature and digestion time
- Microprocessor-controlled regulation of digestion temperature and digestion time
- Air cooling
- Digestion of up to 12 samples simultaneously
- Short digestion times
- Largely blank value-free, as only very small amounts of reagents are required
- Also suitable for elements that form highly volatile compounds, e.g., mercury, arsenic and selenium

Digestion instrument for UV photolysis of water samples with low to medium organic load. For sample preparation in trace element determination by means of voltammetry, ion chromatography and spectroscopy (AAS, ICP). Integrated instrument with operating unit and wet end. With air cooling and automatic control of digestion temperature and time. For 12 samples with a maximum of 12 mL sample volume each. Instrument for 220 - 240 V and 50 - 60 Hz.

Digestion is indispensable for the reliable determination of traces and ultratraces of metals in natural samples, as organic sample components are generally disruptive to analysis. The 909 UV Digester was designed for the digestion of suspended particle-free water samples containing low to medium contents of organic material, e.g., natural surface waters. As a result of its low heavy metal content, contaminations can very easily lead to disruptions during determination. Liquid biological samples such as urine or some foodstuffs such as fruit juices and alcoholic beverages can however also be digested with a modified procedure. A great advantage of the UV digestion is that only small amounts of digestion reagents need to be used and therefore the blank values can be kept low.

12 samples can be radiated simultaneously in the 909 UV Digester.

909 UV Digester

**Ordering Information**

2.909.0014 909 UV Digester (230 V)

# CVS – Cyclic Voltammetric Stripping
## Introduction CVS

*Cyclic Voltammetric Stripping Analysis* (CVS) and *Cyclic Pulse Voltammetric Stripping Analysis* (CPVS) are methods widely used in the electroplating industry for the determination of organic additives in electroplating baths. A robust, inexpensive rotating disk electrode of simple construction made of platinum is installed in the VA stand for these analyses in place of the Multi-Mode electrode that is otherwise used. This method is an indispensable part of production control for many types of technical coatings and particularly in the manufacturing of printed circuit boards for electronic equipment. The most important fields of application are acidic copper baths and tin-lead baths. Quantitative determination of the additives takes place indirectly via their influence on the plating of the main component of the electroplating bath. As the measurement utilizes a procedure that corresponds to the production process, the activity of the additives and thus their effectiveness in the electroplating process is measured directly.

The quantification of the various types of additives requires special calibration techniques, all of which are available in Metrohm CVS systems. The so-called brighteners are determined with the aid of the *Linear Approximation Technique* (LAT) or the *Modified Linear Approximation Technique* (MLAT). *Dilution Titration* (DT) is used for the determination of the suppressors while levelers are determined via *Response Curve* (RC).

The concentrations of the additives can be determined exactly with CVS or CPVS. The effective concentration of the respective additive in the bath sample is displayed and printed out directly in mL of additive per L of bath. Topping-up to achieve nominal concentration thus can be carried out very precisely as a result. This guarantees a continuous, malfunction-free production process. The accuracy of the analysis results in particular have led to the general acceptance of the method in the electroplating industry.

Other methods, e.g., the classical Hull cell method, do not allow the concentration to be determined, but only provide an assessment of the quality of the deposited metal layer.

One of the pre-installed methods is loaded to perform the determination. The analysis can be started once a few parameters have been adjusted. Pre-finished methods that have been formulated in our Applications Laboratory for the most important bath types of leading manufacturers are supplied along with the instrument.

# 894 Professional CVS manual

**The most important benefits**

- Compact instrument with small installation area
- Measuring head that can be replaced with a single hand movement
- Built-in certified calibrator for automatic instrument adjustment before each measurement
- Flexible Liquid Handling with 800 Dosinos
- Flexible automation options with 858 Professional Sample Processor, 919 IC Autosampler plus and 843 Pump Station
- Connection to the USB port of the PC

894 Professional CVS manual is the introductory instrument for the high-end determinations of organic additives in electroplating baths with „Cyclic Voltammetric Stripping" (CVS). The proven Metrohm electrode technique in combination with a completely newly designed potentiostat/galvanostat and the extremely high-performance **viva** software opens up new perspectives in CVS. The replaceable measuring head enables rapid changes between various applications with different electrodes. The potentiostat with certified calibrator readjusts itself automatically before each measurement and guarantees a maximum in precision.


894 Professional CVS manual

The **viva** software is required for control, data recording and evaluation.

The 894 Professional CVS manual is supplied with extensive accessories and measuring head for rotating disk electrodes. Electrode set and **viva** license are to be ordered separately.

**Manual system with versatile extension options**

With the appropriate electrode set, the 894 Professional CVS manual is a completely functional analysis system for meeting the highest expectations in terms of accuracy and sensitivity. The measurement system offers maximum flexibility through modular extension options and the practically unlimited configurability available with the **viva** software.

**viva**

The Professional CVS system is controlled with **viva**. The new software for CVS offers previously unachieved flexibility with respect to method adjustment and automation and thus sets new standards in the determination of organic additives with CVS. **viva** is available in a single-user version or as a network option for one client-server installation.

**Ordering Information**

| | |
|---|---|
| 2.894.0210 | 894 Professional CVS manual |

# 894 Professional CVS semiautomated

**The most important benefits**

- Compact instrument with small installation area
- Two 800 Dosinos for the automatic addition of auxiliary solutions
- Liquid Handling can be extended without limit with additional 800 Dosinos
- Measuring head that can be replaced with a single hand movement
- Built-in certified calibrator for automatic instrument adjustment before each measurement
- Flexible automation options with 858 Professional Sample Processor, 919 IC Autosampler plus and 843 Pump Station
- Connection to the USB port of the PC

894 Professional CVS semiautomated is a convenient high-end routine analyzer for determinations of organic additives in electroplating baths with „Cyclic Voltammetric Stripping" (CVS). The proven Metrohm electrode technique in combination with a completely newly designed potentiostat/galvanostat and the extremely high-performance **viva** software opens up new perspectives in CVS. The replaceable measuring head enables rapid changes between various applications with different electrodes. The potentiostat with certified calibrator readjusts itself automatically before each measurement and guarantees a maximum in precision.

Two 800 Dosinos (supplied) permit the automatic addition of auxiliary solutions during the determination, e.g., VMS, standard solutions or samples for the Dilution Titration technique (DT).

The **viva** software is required for control, data recording and evaluation.

The 894 Professional CVS semiautomated is supplied with extensive accessories and measuring head for rotating disk electrodes. Electrode set and **viva** license are to be ordered separately.

**Convenient routine measurements**

With the appropriate electrode set, the 894 Professional CVS semiautomated enables the determination of suppressors with Dilution Titration (DT). All solutions are added automatically during the determination by the two supplied 800 Dosinos, e.g., VMS, standard solutions or samples for the Dilution Titration technique (DT). The determination proceeds automatically, from the preparation of the sample to the calculation of the final result. The performance capability can be further increased through modular extension options and the practically unlimited configurability available with the **viva** software.

**viva**

The Professional CVS system is controlled with **viva**. The new software for CVS offers previously unachieved flexibility with respect to method adjustment and automation and thus sets new standards in the determination of organic additives with CVS. **viva** is available in a single-user version or as a network option for one client-server installation.


894 Professional CVS semiautomated with 800 Dosino

**Ordering Information**

| | |
|---|---|
| 2.894.1210 | 894 Professional CVS semiautomated |

# 894 Professional CVS fully automated for small sample series

Automated analysis system for the determination of organic additives in electroplating baths using the CVS technique („Cyclic Voltammetric Stripping"). Comprised of 894 Professional CVS, 919 IC Autosampler plus, four 800 Dosinos, 843 Pump Station, measuring head for rotating disk electrodes and extensive accessories. For small sample series of up to 14 samples.

The **viva** software is required for control, data recording and evaluation. PC, electrode set and **viva** license are to be ordered separately.

**Fully automated analysis system for the determination of organic additives with CVS in routine laboratory work**

MVA-20 is the version in our top system for fully automated additive determination in electroplating baths with CVS (Cyclic Voltammetric Stripping) for small sample series. Up to 27 samples can be investigated with respect to suppressor content with the 919 IC Autosampler plus. Up to 14 samples can be analyzed automatically during brightener determination. The possibility of recalibrating methods during a sample series guarantees the highest of accuracy. And different methods can be combined in a single measurement sequence.

The system is based on the 894 Professional CVS with four 800 Dosinos for the automatic addition of auxiliary solutions. VMS and the electroplating bath sample are added by using 800 Dosinos in cases of suppressor determination. For the determination of brighteners, the intercept solution and brightener standard solution are added by 800 Dosino dosing systems; the peristaltic pump of the 919 IC Autosampler plus is used for transferring the sample automatically from the sample vessel on the sample rack into the measuring vessel on the 894 Professional CVS. The attached 843 Pump Station empties and rinses the measuring vessel automatically after each sample.

**viva**

The Professional CVS system is controlled with **viva**. The new software for CVS offers previously unachieved flexibility with respect to method adjustment and automation and thus sets new standards in the determination of organic additives with CVS. **viva** is available in a single-user version or as a network option for one client-server installation.

MVA-20

| Ordering Information | |
|---|---|
| MVA-20 | 894 Professional CVS fully automated for small sample series |

# 894 Professional CVS fully and flexibly automated for large sample series

Automated analysis system for high-performance, flexible determination of organic additives in electroplating baths using the CVS technique („Cyclic Voltammetric Stripping"). Comprised of 894 Professional CVS, 858 Professional Sample Processor, four 800 Dosinos, 843 Pump Station, measuring head for rotating disk electrodes and extensive accessories. For sample series of up to 56 samples.

The **viva** software is required for control, data recording and evaluation. PC, electrode set and **viva** license are to be ordered separately.

**Fully automated analysis system for the determination of organic additives with CVS in routine laboratory work**

MVA-21 is the version in our top system for fully automated additive determination in electroplating baths with CVS (Cyclic Voltammetric Stripping) for large sample series. Up to 56 samples can be investigated with respect to suppressor content with the 858 Professional Sample Processor. Up to 28 samples can also be analyzed automatically during brightener determination. The possibility of recalibrating methods during a sample series guarantees the highest of accuracy. And different methods can be combined in a single measurement sequence.

The system is based on the 894 Professional CVS with four 800 Dosinos for the automatic addition of auxiliary solutions. VMS and the electroplating bath sample are added by using 800 Dosinos in cases of suppressor determination. For the determination of brighteners, the intercept solution and brightener standard solution are added by 800 Dosino dosing systems; the peristaltic pump of the 858 Professional Sample Processor is used for transferring the sample automatically from the sample vessel on the sample rack into the measuring vessel on the 894 Professional CVS. The attached 843 Pump Station empties and rinses the measuring vessel automatically after each sample.

**viva**

The Professional CVS system is controlled with **viva**. The new software for CVS offers previously unachieved flexibility with respect to method adjustment and automation and thus sets new standards in the determination of organic additives with CVS. **viva** is available in a single-user version or as a network option for one client-server installation.

MVA-21

| Ordering Information | |
|---|---|
| MVA-21 | 894 Professional CVS fully and flexibly automated for large sample series |

# Electrode kits for CVS

**CVS electrode equipment with 1 mm platinum electrode for Professional CVS instruments** (6.5339.000)

Complete electrode set for the determination of organic additives in electroplating baths with CVS (Cyclic Voltammetric Stripping). Contains rotating platinum working electrode (electrode diameter: 1 mm), reference electrode, platinum auxiliary electrode and electrolyte solutions.


**CVS electrode equipment with 2 mm platinum electrode for Professional CVS instruments** (6.5339.010)

Complete electrode set for the determination of organic additives in electroplating baths with CVS (Cyclic Voltammetric Stripping). Contains rotating platinum working electrode (electrode diameter: 2 mm), reference electrode, platinum auxiliary electrode and electrolyte solutions.

**CVS electrode equipment with 3 mm platinum electrode for Professional CVS instruments** (6.5339.020)

Complete electrode set for the determination of organic additives in electroplating baths with CVS (Cyclic Voltammetric Stripping). Contains rotating platinum working electrode (electrode diameter: 3 mm), reference electrode, platinum auxiliary electrode and electrolyte solutions.

# viva – Software for CVS

Modern, user-friendly software for the performance of CVS determinations. Thanks to its easy operation and maximum flexibility, **viva** enables individual and problem-oriented method programming for CVS measuring technology for the first time.

The „Workplace" program part is the cockpit of **viva**. Here all of the information necessary for the determination is visible at a glance. It goes without saying that the „Workplace" can be individually configured so that only the data relevant to the user is displayed. The method used and the associated evaluation parameters are logically structured and clearly displayed in the method window. The measured voltammograms and the associated calibration curve are displayed in the curve window.

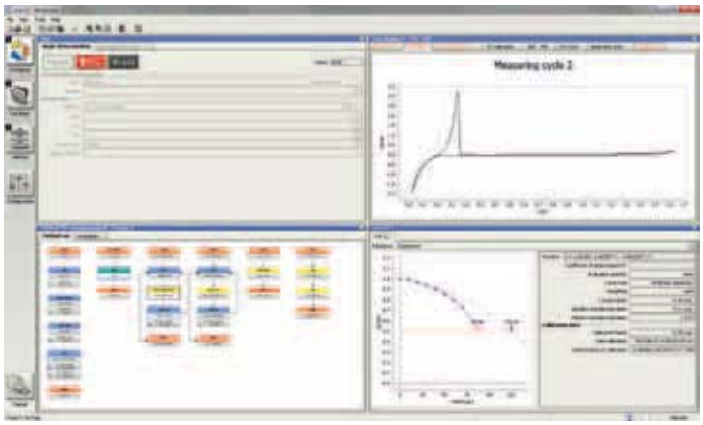
**viva** is the first and only software for CVS that enables individual, problem-oriented method programming with the aid of a graphical method editor. Numerous templates simplify method development. The intelligence functions of **viva** make it possible to have the run of the method be made dependent on results of the current measurement that have already been calculated. Thus, for example, standard addition volumes can be calculated autonomously.

All determinations are stored in a database for convenient data management where they can be viewed along with all of the determination, method and instrument parameters.

**The most important features at a glance:**

- Freely configurable determination overview
- High-performance sort, search and filter functions that are simple to operate
- Recalculation and recalibration functions
- Report generator for customized structuring of the analysis report
- Client-server version for the central storage of all methods and determinations on a single server. All measured data is thus available throughout the company
- Freely definable access permissions for each user

**viva** is available in the **viva** Full single-user version with 1 license for one computer. The alternative is the **viva** Multi client-server version with 3 licenses for three computers for company networks, which makes it possible to store all of the data on a central server. Separate licenses can be obtained for additional computers.



viva workplace

| Ordering Information | |
|---|---|
| 6.6065.102 | viva 1.0 Full CD: 1 license |
| 6.6065.103 | viva 1.0 Multi CD: 3 licenses |

# Portable potentiostat
## 910 PSTAT mini

- Small and compact
- Mobile
- Inexpensive
- All of the important electrochemical measurement techniques
- Maintenance-free disposable sensors
- Power supply via USB
- Simple, intuitive PSTAT software
- Monograph „Electrochemistry – A workbook for 910 PSTAT mini“

**The ideal introductory instrument for electrochemistry**

910 PSTAT mini is a small and compact, PC-controlled potentiostat with USB connector for training purposes as well as simple applications in research and development. The PSTAT software provided is easy and intuitive to operate and covers the most important electrochemical measuring techniques. Included in the scope of delivery are inexpensive disposable thick film sensors that can be utilized directly, without preparation and conditioning.

The 910 PSTAT mini is supplied with extensive accessories in a transport case.


910 PSTAT mini

**The most important applications**

- Training in electrochemistry (student internships, demonstration experiments)
- Electrochemical research and development (sensor development, reversibility of electrochemical reactions, reaction kinetics)

**PSTAT software**

As a result of its intuitive operability, PSTAT software is particularly suitable for training in electrochemistry. Measurement is of the essence. That is why the software includes only those functions that are really important for measurement, i.e. measuring parameters, curves and manual signal evaluation. All of the fundamental electrochemical measurement techniques are available: Cyclic Voltammetry (CV) for investigating the mechanism and kinetics of electrode reactions or for characterizing modified sensors; Differential Pulse Voltammetry (DP) and Square Wave Voltammetry (SWV) for quantitative determination of electrochemically active substances such as mercury, organic substances or cadmium and lead after modification. Chronoamperometric Detection (AD) for demonstrating the functional principle of an amperometric biosensor such as a glucose sensor.

**Screen-printed electrodes (SPE)**

Inexpensive disposable thick film electrodes make electrochemistry easy. The electrode is inserted into the holder and measurement can begin without further preparation. Each sensor contains the 3 required electrodes: the working electrode, made of carbon, gold or platinum, a silver reference electrode and a carbon auxiliary electrode on a ceramic holder.

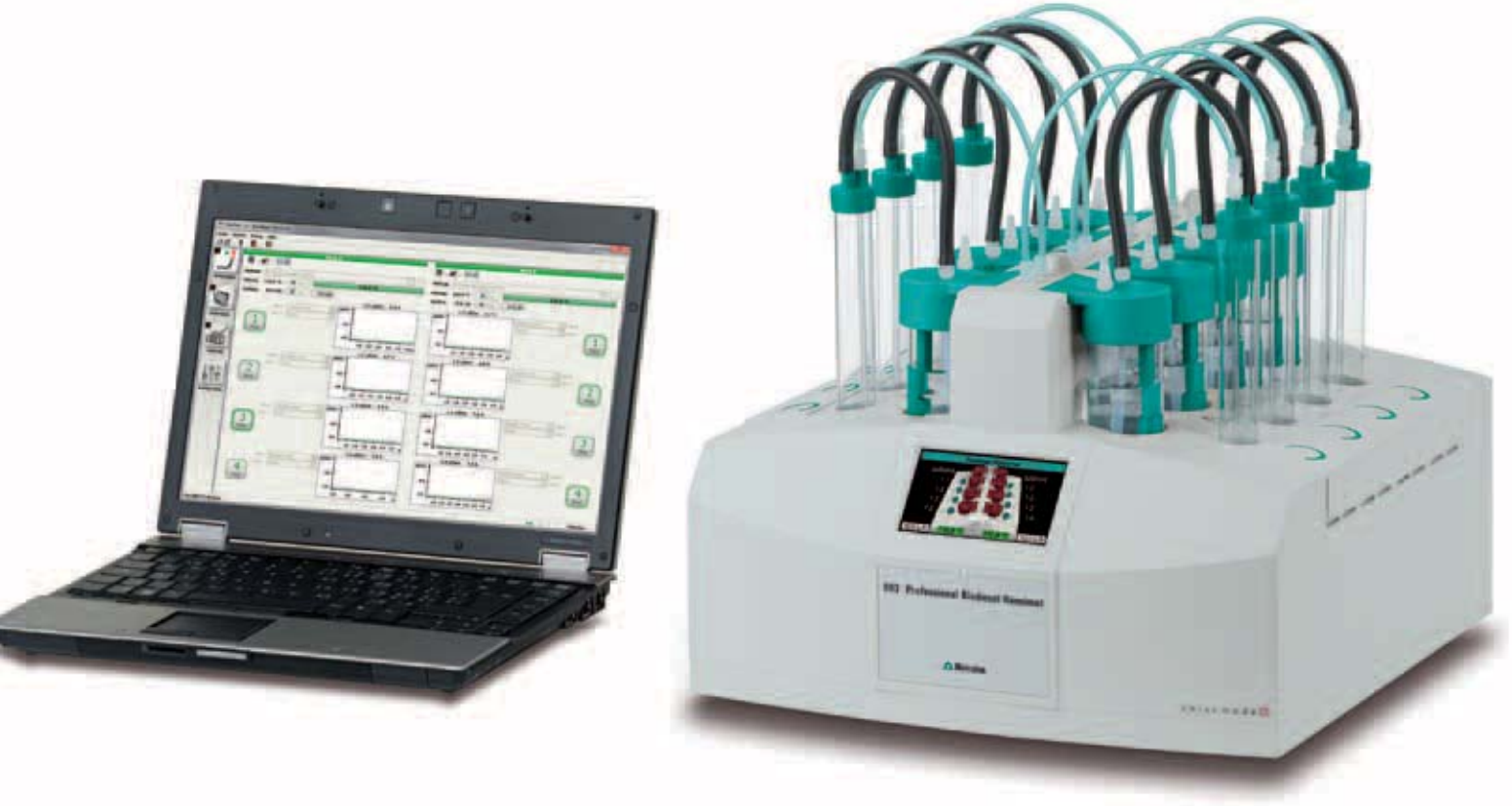
**Monograph „Electrochemistry – A workbook for 910 PSTAT mini“**

The monograph provides an easy introduction to the field of electrochemistry. The book in its handy format includes experiments that describe fundamental phenomena of electrochemical analytics. These experiments can be readily carried out with the 910 PSTAT mini and the electrodes supplied.

**Ordering Information**

| | |
|---|---|
| 2.910.0010 | 910 PSTAT mini |

# Stability measuring instruments



# Stability measuring instruments

# Oxidation stability of fats and oils
## 892 Professional Rancimat

- Control of all the instrument functions from the computer
- Individual start of each measuring position directly on the instrument
- Overview of the status of all measuring positions on the instrument display
- Highest reliability and simple operation through unique accessories
- Inexpensive disposable glass components
- Robust conductivity measuring cell with electrical connections integrated in the lid
- 2 heating blocks with 8 measuring positions per instrument. Up to 4 instruments can be connected to a PC
- Expanded gas flow range: 1 - 25 L/h
- USB connector
- Compact dimensions and low weight

Analysis system for the simple and safe determination of the oxidation stability of natural fats and oils with the well-established Rancimat method. All accessories necessary for carrying out determinations are included in the scope of delivery. The StabNet software is required for instrument control, data recording and evaluation and for data storage.

892 Professional Rancimat

**Oxidation stability of fats and oils in the food industry**

The Rancimat method is used as a default parameter in the food industry for quality control during the manufacture of fats and oils, or for incoming goods checks in processing industries. In addition to vegetable oils and fats, it is also possible to check animal fats such as lard, tallow or fish oil. It is also possible, with the help of the 892 Professional Rancimat, to characterize the effectiveness of antioxidants that are added to foods in order to slow down oxidative decomposition.

**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 fat-containing foods**

The 892 Professional Rancimat can also be used for the determination of the oxidation stability of fat-containing foods. Examples:

- Instant noodle dishes
- Nuts, almonds
- Cookies, biscuits
- Potato chips and similar snacks

**Oxidation stability of cosmetics**

In addition to foods, the oxidation stability of aliphatic cosmetics or of cosmetics additives can also be determined with the help of the 892 Professional Rancimat.

**Ordering Information**

| | |
|---|---|
| 2.892.0010 | 892 Professional Rancimat |

# Oxidation stability of biodiesel and biodiesel blends
## 893 Professional Biodiesel Rancimat

- Control of all the instrument functions from the computer
- Individual start of each measuring position directly on the instrument
- Overview of the status of all measuring positions on the instrument display
- Highest reliability and simple operation through unique accessories
- Inexpensive disposable glass components
- Robust conductivity measuring cell with electrical connections integrated in the lid
- 2 heating blocks with 8 measuring positions per instrument. Up to 4 instruments can be connected to a computer
- Expanded gas flow range: 1 - 25 L/h
- USB connector
- Compact dimensions and low weight

Analysis system for simple and safe determination of the oxidation stability of biodiesel (fatty acid methyl esters, FAME) and biodiesel blends in accordance with the standards EN 14112, EN 15751 and EN 16568. All accessories necessary for carrying out determinations are included in the scope of delivery. The StabNet software is required for instrument control, data recording and evaluation and for data storage.

893 Professional Biodiesel Rancimat

**Oxidation stability of biodiesel (fatty acid methyl esters, FAME), biodiesel blends and diesel**

Biodiesel has relatively little storage stability, as it (like natural fats and oils) is slowly oxidized by atmospheric oxygen. The substances that arise thereby could lead to damage in the motor. It is for this reason that oxidation stability is an important default parameter in a series of standards that define the minimum quality standards of biodiesel. This determination can be carried out simply and reliably with the 893 Professional Biodiesel Rancimat.

### Standards

***Testing requirements***

- ASTM D 6751 (ASTM - American Society for Testing and Materials) „Standard specification for biodiesel fuel blend stock (B100) for middle distillate fuels“
- ASTM D 7467 „Standard Specification for Diesel Fuel Oil, Biodiesel Blend (B6 to B20)“
- EN 14214 „Liquid petroleum products - Fatty acid methyl esters (FAME) for use in diesel engines and heating applications - Requirements and test methods“
- EN 590 „Automotive fuels - Diesel - Requirements and test methods“

***Test methods***

- EN 14112 „Fat and oil derivatives - Fatty acid methyl esters (FAME) - Determination of oxidation stability (accelerated oxidation test)“
- EN 15751 „Automotive fuels - Fatty acid methyl esters (FAME) fuel and blends with diesel fuel - Determination of oxidation stability by accelerated oxidation method“
- EN 16568 „Automotive fuels - Fatty acid methyl esters (FAME) fuel and blends with diesel fuel - Determination of oxidation stability by rapidly accelerated oxidation method at 120 °C“

**Ordering Information**

| | |
|---|---|
| 2.893.0010 | 893 Professional Biodiesel Rancimat |

# Thermostability of PVC
## 895 Professional PVC Thermomat

- Control of all the instrument functions from the computer
- Individual start of each measuring position directly on the instrument
- Overview of the status of all measuring positions on the instrument display
- Highest reliability and simple operation through unique accessories
- Inexpensive disposable glass components
- Robust conductivity measuring cell with electrical connections integrated in the lid
- 2 heating blocks with 8 measuring positions per instrument. Up to 4 instruments can be connected to a computer
- Expanded gas flow range: 1 - 25 L/h
- USB connector
- Compact dimensions and low weight

Analysis system for the automatic determination of the thermostability of poly(vinyl chloride) (PVC) and related copolymers. All accessories necessary for carrying out determinations are included in the scope of delivery. The StabNet software is required for instrument control, data recording and evaluation and for data storage.

**Thermostability of PVC**

Chlorinated plastics based on poly(vinyl chloride) (PVC) decompose at higher temperatures with accompanying release of gaseous HCl. The thermostability of the PVC material is defined as the time until HCl is released and is determined by the measurement of a defined conductivity change in the measuring cell.

**Standards**

- DIN 53381-1 „Testing of plastics; determination of thermostability of polyvinyl chloride (PVC); dehydrochlorination methods“
- ISO 182-3 „Plastics - Determination of the tendency of compounds and products based on vinyl chloride homopolymers and copolymers to evolve hydrogen chloride and any other acidic products at elevated temperatures - Part 3: Conductometric method“


895 Professional PVC Thermomat

**Ordering Information**

| | |
|---|---|
| 2.895.0010 | 895 Professional PVC Thermomat |

# Software for stability measuring instruments
## StabNet

Modern, user-friendly software for control and data handling of stability measuring instruments. The software permits checks, data acquisition, evaluation and monitoring, as well as report generation of stability measurements.

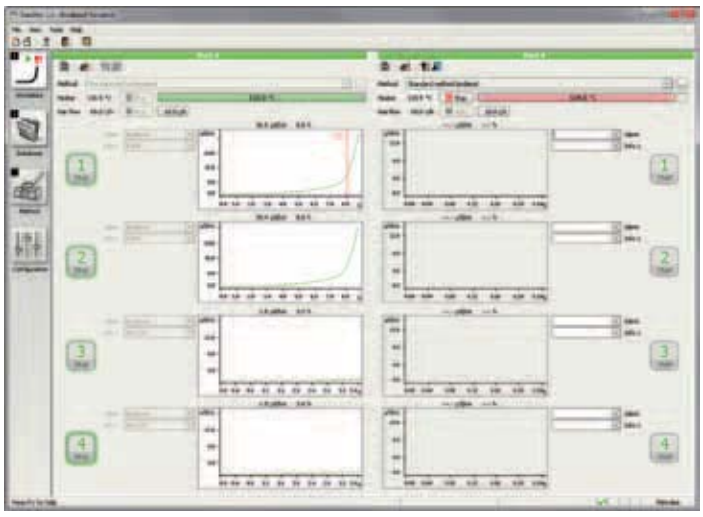
Graphical user interface for routine operations, extensive database programs, method development, system configuration, very flexible user administration, extensive data export functions, individually configurable report generator. StabNet fulfills the directives pursuant to FDA 21 CFR Part 11.

All determinations are stored in a database for convenient data management where they can be viewed along with all of the determination, method and instrument parameters.

**The most important features at a glance:**

- Clear and structurally well-organized user interface
- Database with flexible functions for filtering, sorting and statistics
- High transparency of results by storage of all determination, method and instrument parameter data and the history when measured data is reevaluated or recalculated
- High data security due to manipulation-proof database and automatic backup functions
- User administration with freely configurable access rights
- In compliance with all GLP and FDA requirements

StabNet is available in the StabNet Full single-user version with 1 license for a max. of 4 stability measuring instruments on one computer. The alternative is the StabNet Multi client-server version with 3 licenses for three computers for company networks, which makes it possible to store all of the data on a central server. Separate licenses can be obtained for additional computers.



StabNet workplace

| Ordering Information | |
|---|---|
| 6.6068.102 | StabNet 1.0 Full CD: 1 license |
| 6.6068.103 | StabNet 1.0 Multi CD: 3 licenses |


# Near-infrared spectroscopy


NIRS XDS MultiVial Analyzer
designed by FOSS

# Near-infrared spectroscopy

# Introduction to near-infrared spectroscopy
## Overview of NIRS instruments

Near-infrared spectroscopy (NIRS) is a versatile analysis procedure that has been applied successfully in the pharmaceutical and chemical industries for more than 25 years.

This simple, rapid (< 30 s measuring time) and non-destructive physical measurement method offers, for practically every sample matrix, an accurate and precise analysis of chemical and physical parameters comparable to reference methods. As an additional major benefit, near-infrared (NIR) analyses require no sample preparation or the use of hazardous chemicals, solvents or reagents.

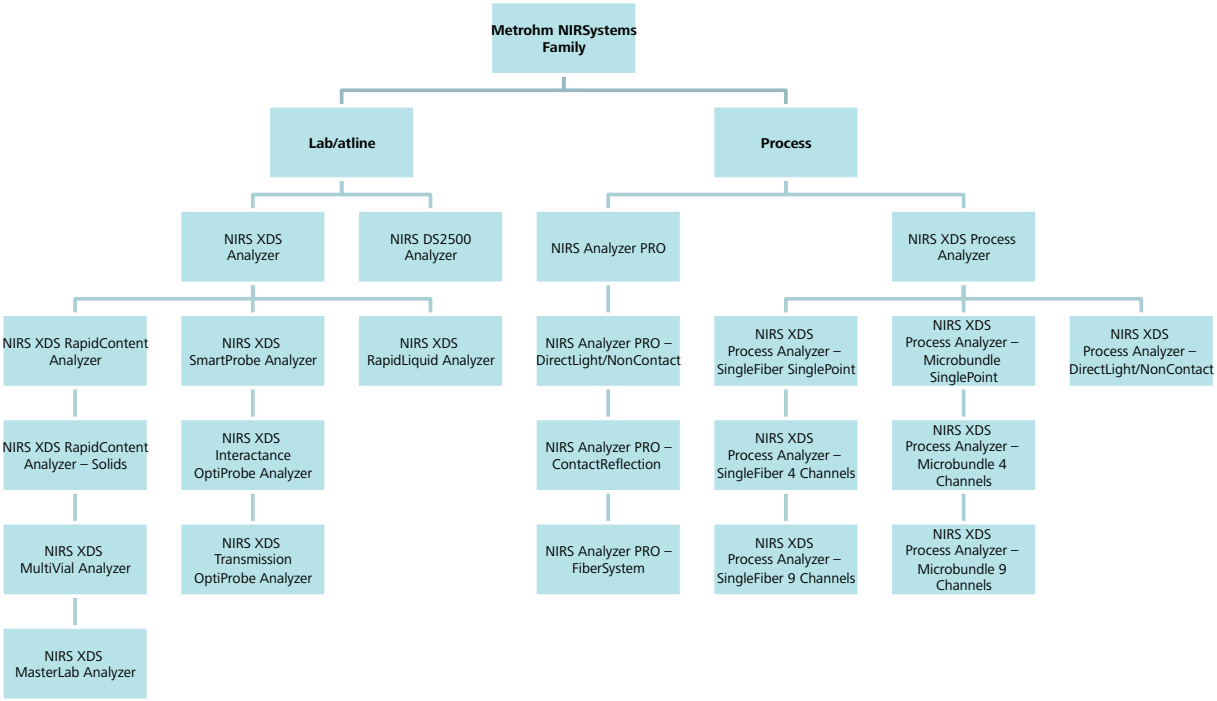
The Metrohm NIR product range comprises not only the simple and intuitive NIR laboratory analyzers, but also robust, user-friendly NIR process analyzers.

- ● Dedicated systems
- ● Temperature controller up to 65 °C
- ● Optional temperature controller up to 200 °C
- ▲ Different fiber optic probes are available
- ▲ With transflectance options

| Sample type | Laboratory analyzer, atline analyzer | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | XDS Rapid ContentAnalyzer | XDS Rapid Content Solid Analyzer | XDS MultiVial Analyzer | XDS MasterLab Analyzer | XDS RapidLiquid Analyzer | XDS SmartProbe Analyzer | XDS Interactance OptiProbe Analyzer | XDS Transmission OptiProbe Analyzer | DS2500 Analyzer |
| |  | | | |  |  | | |  |
| Powders | ● | ● | ● | ● | | ● | ● | | ● |
| Coarse solids/ granulates | | ● | ● | ● | | ● | ● | | ● |
| Solids/film/paper | ● | ● | ● | ● | | | | | ● |
| Tablets/capsules in reflection | ● | ● | ● | ● | | | | | |
| Tablets/capsules in transmission | | | | ● | | | | | |
| Opaque liquids | ● | ● | ▲ | ▲ | | ● | ● | | ● |
| Pastes/creams | ▲ | ▲ | ▲ | ▲ | | ● | ● | | ▲ |
| Viscous liquids/gels | ▲ | ▲ | ▲ | ▲ | ● | ● | ● | ● | |
| Clear liquids | ▲ | ▲ | ▲ | ▲ | ● | ▲ | ▲ | ● | ▲ |

# Metrohm NIRSystems

Metrohm offers NIR applications for all process environments. Metrohm NIRSystems instruments can be installed in the laboratory, atline or directly into a process stream, dryer, extruder, or reactor. The measurement mode and location of the analyzer depend on the optical properties of the samples, the required analyte selectivity and sensitivity, the duration of the process run and the monitoring and control requirements. Below is a short overview of Metrohm NIRSystems instruments. A suitable analyzer is available for every sample type and processing environment.




| Sample type | Process analyzer | | | | | |
|---|---|---|---|---|---|---|
| | XDS Process Analyzer | | | NIRS Analyzer PRO | | |
| | SingleFiber | MicroBundle | DirectLight | ContactReflection | Fiber | DirectLight |
| | |  | | |  | |
| Powders | | ▲ | ● | ● | ▲ | ● |
| Coarse solids/ granulates | | ▲ | ● | ● | ▲ | ● |
| Solids/film/paper | | ▲ | ● | ● | ▲ | ● |
| Tablets/capsules in reflection | | | | | | |
| Tablets/capsules in transmission | | | | | | |
| Opaque liquids | ▲ | ▲ | | | ▲ | |
| Pastes/creams | ▲ | ▲ | | ● | ▲ | |
| Viscous liquids/gels | ▲ | ▲ | | | ▲ | |
| Clear liquids | ▲ | ▲ | | | ▲ | |

# Laboratory and atline for solid samples
## Introduction

Metrohm NIRSystems laboratory analyzers with their patented monochromator can be operated in all laboratories: from quality control through research and development to plant laboratories. Modular sampling accessories allow for analyses of powders, granules, solids, slurries, gels, pastes, and turbid or clear liquids. Since NIR analyses are performed on unmodified samples, presenting the samples to the instrument is the most important aspect of NIR analysis. The modular design of Metrohm NIRSystems laboratory analyzers ensures that analyses are optimized for specific sample types.

The NIRS DS2500 Analyzer enables simple routine analyses in difficult environments and meets the standards of protection class IP65. True transmission and reflection measurements for solid dosage forms are carried out with the NIRS XDS MasterLab Analyzer.

The NIRS XDS RapidContent Analyzer performs reflectance analysis on materials in bags, vials, or sample beakers and transflectance analysis of liquids in beakers. The NIRS XDS RapidContent Analyzer with Solids Module provides large area sampling for nonhomogeneous powders, fibrous materials, flakes, and pellets.

# NIRS DS2500 Analyzer

- Compact analyzer for reflectance measurements
- Maximum optical performance across the entire wavelength range (400 to 2,500 nm)
- Consistent results, even in harsh environments
- Network-capable via LAN (local) or direct PC connection
- New predispersive monochromator
- Several optional sampling accessories

Near-infrared analyses are becoming ever better. With the compact NIRS DS2500 Analyzer, near-infrared analysis has taken yet another step into the future of routine analysis. This dedicated analyzer offers exceptional accuracy across a broad wavelength range of 400 to 2,500 nm and is designed for use in the receiving area or atline in the nutraceutical industry.

**Unmatched optical performance**

The predispersive monochromator technology now being utilized in the NIRS DS2500 guarantees a high degree of versatility and stability across the entire spectral range from 400 to 2,500 nm. The NIRS DS2500 uses signal-noise ratio to perform, in less than one minute, high-precision analyses of parameters ranging from very simple to sophisticated. With this high-performance instrument, you and your team can be sure that you are getting the highest level of quality control at all stages of production.

**Specially developed for this purpose**

The NIRS DS2500 Analyzer was created as a high-performance instrument for harsh production environments. Robust, easy-to-use and IP65 certified, it withstands humidity, dust, vibrations and temperature fluctuations. This solidity of its construction makes the NIRS DS2500 Analyzer suitable for atline use by anyone in any production plant. The NIRS DS2500 complies with pharma regulations and supports the workflows of the nutraceutical industry.

NIRS DS2500 Analyzer

**Ordering Information**

| | |
|---|---|
| 2.922.0010 | NIRS DS2500 Analyzer |

# NIRS XDS – the all-rounder

The NIRS XDS family guarantees more rapid analyses and even more accurate results for quality control in the laboratory. With the NIRS XDS Analyzers, you can replace routine tests, reduce product hold time and virtually eliminate quarantine time.

The NIRS XDS Analyzer is part of a generation of dedicated NIR analysis instruments for rapid nondestructive measurements of solid chemical and pharmaceutical samples in addition to liquid samples. Special modules support optimum analysis performance. The presence of modules that can be exchanged during operation provides great flexibility.

Identification, qualitative and quantitative methods are easily created with the advanced, user-friendly, network-compatible Vision® software. Precise and accurate analysis is accomplished with the press of a key or click of the mouse.

**Advantages**

- Ease-of-use
- Robust and accurate
- Flexible
- Effortless method transferability


NIRS XDS RapidContent Analyzer

**NIRS XDS RapidContent Analyzer/Solids**

Composition or material identification testing is performed either in the laboratory or atline, on samples contained in their original vials, bags or bottles. The Solids Module extends analysis to virtually any solid form from fine powders to coarse granular materials, pellets, and flakes. An optional variable spot-size feature enables the sample illumination to be adjusted based on the physical properties of your samples.

**NIRS XDS MultiVial Analyzer**

The NIRS XDS MultiVial Analyzer supports acquisition of spectra in an unattended mode, freeing the operator to prepare other samples, analyze data, etc. The versatile sampling mechanism of the NIRS XDS MultiVial Analyzer offers a movable (X-Y) sampling platform, suitable for handling a tray of multiple vials. An integrated variable spot-size feature enables the sample illumination to be adjusted based on the diameter of the vials being used.

**NIRS XDS MasterLab Analyzer**

The NIRS XDS MasterLab Analyzer offers pharmaceutical manufacturers a rapid, reliable test method covering the full array of solid dosage forms: layered, coated or cored tablets, capsules, caplets, gel tabs and gel caps. The versatile sampling mechanism of the NIRS XDS MasterLab Analyzer offers an automated and unattended reflectance or transmission analysis of tablets or vials.

The optional sample cell for coarse granular substances extends analysis to nonhomogeneous solid forms ranging from fine powders to coarse granular materials, pellets and flakes by averaging over a large area.

**Ordering Information**

| | |
|---|---|
| 2.921.1110 | NIRS XDS RapidContent Analyzer |
| 2.921.1120 | NIRS XDS RapidContent Analyzer – Solids |
| 2.921.1210 | NIRS XDS MultiVial Analyzer |
| 2.921.1310 | NIRS XDS MasterLab Analyzer |

# Laboratory and atline for liquid samples
## Introduction

Metrohm NIRSystems offers dedicated NIR analyzers for the analysis of clear or viscous liquids that can be easily used in the quality control laboratory or at the production site. Temperature monitoring during measurement is very important with temperature-dependent aqueous and liquid samples. Because many oil-based samples are in solid form at room temperature, a heater and a temperature controller are required for increasing sample transparency for NIR spectral consistency.

It is for this reason that a temperature control feature is integrated into the Metrohm NIRS XDS RapidLiquid Analyzer for higher performance and accurate measurement. The NIRS XDS RapidLiquid Analyzer performs liquid analysis in controlled temperature environments at room temperature and up to 65 °C. The optional Vial Heater Module, with which the temperature can be heated up and controlled up to as high as 200 °C, is available for the NIRS XDS Transmission OptiProbe Analyzer.

# NIRS XDS RapidLiquid Analyzer

- NIR XDS technology guarantees simple utilization and effortless method transferability
- Uses standard quartz cuvettes and disposable vials
- Temperature controlled analysis of virtually all liquids or suspensions
- No sample preparation, no reagents, no waste
- Network-capable analyzer for centralized database management
- Hot-swappable modules that can be replaced in just a few minutes without performance loss.

The NIRS XDS RapidLiquid Analyzer, based on XDS near-infrared technology, provides the next generation of dedicated NIR systems for the rapid and nondestructive analysis of liquid chemical and pharmaceutical formulations. The NIRS XDS RapidLiquid Analyzer is designed to provide rapid quantitative and qualitative results for quality control and assurance.

The NIRS XDS RapidLiquid Analyzer is designed to provide rapid quantitative and qualitative results for quality control and assurance. With this Analyzer, virtually any liquid or suspension can be analyzed in both laboratory and atline situations. Samples are effortlessly analyzed in quartz cuvettes or disposable vials for trouble-free clean up. A temperature-controlled sample compartment provides the stable sample environment essential for precise measurements.

Only the XDS platform offers maximum system performance and instrument matching for decreased method development time, and effortless method transfer. Identification, qualitative and quantitative methods are easily implemented with the user-friendly, network-capable Vision® software. Precise and accurate analysis is accomplished with the press of a key or click of the mouse.


NIRS XDS RapidLiquid Analyzer

**Ordering Information**

2.921.1410 NIRS XDS RapidLiquid Analyzer

# Fiber Optics – the flexible ones

The NIRS XDS Fiber Optics Analyzer family offers fiber optics modules for a wide variety of customer applications. The NIRS XDS SmartProbe Analyzer enables analyses of solids and liquids to be performed directly in shipping containers. Fiber optic probes attached to the NIRS XDS Interactance OptiProbe or to the NIRS XDS Transmission OptiProbe Analyzer also permit the use of laboratory instruments for scale-up and reaction monitoring. Solid or liquid samples can be analyzed using different probe types.

**NIRS XDS SmartProbe Analyzer**
With the NIRS XDS SmartProbe Analyzer, you can replace routine tests, expedite the production process and virtually eliminate quarantine time. The NIRS XDS SmartProbe Analyzer is ruggedly manufactured for either the warehouse or plant environments. The ergonomic, handheld design is straightforward; simply place the probe in the sample and press the trigger. Pass/fail results are displayed on the handle after each test.

**NIRS XDS Interactance OptiProbe Analyzer**
With the NIRS XDS Interactance OptiProbe Analyzer, you receive both reflectance and immersion probes for a wide variety of sample types. The reflectance probe is used for scanning solids, highly scattering liquids and slurries. The immersion probe analyzes aqueous products, clear liquids and solvents. The fiber optics design of the NIRS XDS Interactance OptiProbe Analyzer allows it to be directly interfaced in difficult and hazardous sampling environments.

**NIRS XDS Transmission OptiProbe Analyzer**
With the NIRS XDS Transmission OptiProbe Analyzer, you can replace routine tests, expedite the production process, and minimize laboratory analysis times. The NIRS XDS Transmission OptiProbe Analyzer is designed for laboratory monitoring of aqueous products, clear liquids and solvents, as well as viscous samples. The NIRS XDS Transmission OptiProbe Analyzer is well-suited for scale-up process applications and atline measurements. Determinations of viscous samples can be carried out easily with this analyzer using disposable vials, thus reducing the amount of cleanup time to a minimum. With the optional Vial Heater Module, the system also provides automatic sample temperature equilibration prior to data analysis, thus increasing laboratory efficiency.

NIRS XDS SmartProbe Analyzer

| Ordering Information | |
|---|---|
| 2.921.1510 | NIRS XDS Interactance OptiProbe Analyzer |
| 2.921.1520 | NIRS XDS Transmission OptiProbe Analyzer |
| 2.921.1530 | NIRS XDS Transmission OptiProbe Analyzer – Heated Vials |
| 2.921.1610 | NIRS XDS SmartProbe Analyzer – 2 m Fiber |
| 2.921.1620 | NIRS XDS SmartProbe Analyzer – 3 m Fiber |

# Process analyzers
## Introduction

NIR process analyzers offer information about chemical processes practically in real time, no matter how harsh the processing conditions may be. The process sample interface is dictated by the sample type and process conditions. Contact transmission and reflectance probes are used for analyzing clear to opaque liquids and solids.

Noncontact reflectance measurements are performed on materials transported in hoppers, transport and conveyor lines. Generally, NIR light from the instrument is transferred to the process sample interface using fiber optics. The number of fibers used in the fiber optic bundle is increased in order to maintain analytical performance as the light scattering properties of the process sample increase.

Single-fiber process NIR analyzers are typically employed to analyze clear liquids. Microbundle process NIR analyzers monitor slightly scattering liquid media, suspensions, and drying processes. Full-bundle process NIR analyzers are used for the most challenging of applications such as monitoring the drying of hydrated media or analyzing low-level constituents.

The length of the fiber optic interface can be from 1 m (large fiber bundle) to 150 m (single fiber optic). The use of longer fiber optic lengths enables a process analyzer to be set up outside of electrically classified or safety classified areas or under harsh operating conditions such as those with large temperature fluctuations. Up to nine separate process streams or sampling points can be monitored using a multiplexer NIR Process Analyzer from Metrohm NIRSystems. Multiplexing decreases both the costs per measuring point and the overall implementation costs for an NIR process analyzer.

Metrohm NIRSystems analyzers, software, application support and services meet a full range of process industry needs – process development, raw materials testing, process monitoring, endpoint determination, fluid bed drying, quality control and stability testing.

| Fiber optic interface | Fiber size/count | Fiber length [m] | Sample type | Mode |
|---|---|---|---|---|
| Single fiber | 600 µm,<br>1 illumination/1 collection | 1–150 | Clear liquids, thin films, gases | Transmission |
| Small fiber bundles | 200 µm,<br>40 illumination/40 collection | 1–75 | Turbid liquids and suspensions | Transmission |
| Small fiber bundles | 200 µm,<br>40 illumination/40 collection | 1–75 | Powders and films | Reflectance |
| Large fiber bundles | 200 µm,<br>210 illumination/210 collection | 1–15 | Pastes, slurries, pellets, fibers | Reflectance |

Comparison of fiber optic interface, fiber bundle size, and measurement mode. To maintain analytical performance, fiber count is increased as the turbidity of process sample increases.

# NIRS XDS Process Analyzers – SingleFiber

- Direct inline measurement yields real-time analysis and data availability in seconds
- Interface made of simple optical fiber optimized for process streams, as with clear liquids and films
- Single-point or multiplex analyzer (four or nine sample channels)
- NEMA 4X/IP65 rated, ATEX ready
- Optional upgrade to hazardous area classification

The NIRS XDS Process Analyzer – SingleFiber belongs to the next generation of process analyzers for real-time analysis in the pharmaceutical and chemical industries. Nondestructive, accurate measurements are performed directly in the process line or in the reaction vessel.

Typical measurements include reaction monitoring and end point determination in refinery, petrochemical and polymer processes, solvent recovery in pharmaceutical API plants, and analysis of extruded polymer films and coatings. The use of single fiber optics and the associated probes and flow-through cells allows for cost-effective analysis of a wide variety of sample types ranging from clear liquids to transparent films.

The analyzer is available as a single-point or a multiplexer configuration. Two multiplexer process analyzer configurations offer up to either four or nine sampling points. This economical means of performing remote measurements enables the analyzer to be installed in an unrestricted area, reducing installation and operation costs. The patented, robust design of NIRS XDS Process Analyzers supplies a new level of consistent, dependable and reliable instrument performance and analysis while operating in harsh industrial environments.


NIRS XDS Process Analyzer

| Ordering Information | |
|---|---|
| 2.928.0210 | NIRS XDS Process Analyzer – SingleFiber SinglePoint |
| 2.928.0220 | NIRS XDS Process Analyzer – SingleFiber 4 Channels |
| 2.928.0230 | NIRS XDS Process Analyzer – SingleFiber 9 Channels |

# NIRS XDS Process Analyzers – MicroBundle

- Direct inline measurement for real-time analysis and data availability in seconds
- MicroBundle fiber optic interface, optimized for process stream: clear to opaque liquids, slurries, suspensions and powders
- One sample channel or multiplexing of up to nine channels
- Fiber to analyzer connection via SMA fittings
- NEMA 4X/IP65 rated, ATEX ready
- Optional upgrade to hazardous area classification

The NIRS XDS Process Analyzer – MicroBundle belongs to the next generation of process analyzers for real-time analysis in the pharmaceutical and chemical industries. Nondestructive, accurate measurements are performed directly in the process line, granulator, dryer or reaction vessel.

Process analyzers are used throughout the process stream to ensure optimum performance for many types of samples. The multi-fiber bundles used allow for cost-effective analysis of sample types ranging from clear liquids to suspensions and solids. Configure the analyzer with a reflectance probe, an immersion probe or a transmission probe pair for an optimized interface to your particular sample type.

The XDS Process Analyzer – MicroBundle is available as a single-point or a multiplexer configuration for measurement of up to either four or nine sampling points. This economical means of performing remote measurements enables the analyzer to be installed in an unrestricted area, reducing installation and operation costs.

The patented, robust design of NIRS XDS Process Analyzers supplies a new level of consistent, dependable and reliable instrument performance and analysis while operating in harsh industrial environments. Monitoring with near-infrared (NIR) fits in well with Process Analytical Technology (PAT) initiatives as proposed by the FDA.


NIRS XDS Process Analyzer

| Ordering Information | |
|---|---|
| 2.928.0110 | NIRS XDS Process Analyzer – MicroBundle SinglePoint |
| 2.928.0120 | NIRS XDS Process Analyzer – MicroBundle 4 Channels |
| 2.928.0130 | NIRS XDS Process Analyzer – MicroBundle 9 Channels |

# NIRS XDS Process Analyzer – DirectLight/NonContact

- Nondestructive inline near-infrared analysis (NIR) of the moving product
- Noncontact reflectance measurements directly in the product line
- Utilization above conveyor belts, webs for homogeneous or nonhomogeneous products
- Wavelength range from 800 to 2,200 nm
- NEMA 4X/IP65 rated, measuring head IP69K stainless steel

Based on NIR XDS technology, the NIRS XDS Process Analyzer – DirectLight/NonContact is numbered among the next generation of noncontact process analyzers for real-time analysis. Nondestructive, accurate measurements are performed wherever a product is moving and accessible, for instance, above a conveyor belt, web or sheet.

Noncontact reflectance measurement can provide more detailed chemical analysis for loose to densely packed, homogeneous or nonhomogeneous solid products. Noncontact measurement is used for quality control of fibers, sheets, laminates, and web-based products like plastics, papers, and textiles. The measuring head is attached at the terminal end of an optical fiber. A high-intensity light source contained in the sensor head illuminates the sample. Light interacts with the sample and is reflected back to the sensor head, picked up by the collection fiber bundle, and passed on to the instrument for dispersion and signal detection. The patented, robust design of the NIRS XDS Process Analyzers supplies a higher level of consistent, reliable instrument performance and analysis for operation in harsh chemical environments.


NIRS XDS Process Analyzer

**Ordering Information**

| | |
|---|---|
| 2.928.0310 | NIRS XDS Process Analyzer – DirectLight/NonContact |

# NIRS Analyzer PRO

The NIRS Analyzer PRO is a process analyzer based on high-resolution diode array technology. It provides non-destructive analysis of products such as granules, powders, slurries, or opalescent substances directly in the process line without bypass.

The analyzer is housed in a robust cabinet mounted at the relevant location in the production area. Measurements are displayed in the control room and results can be fed into a regulation system for closed-loop automatic control. Additionally, the analyzer helps to optimize the use of raw materials and to run production consistently closer to target specifications. Accurate instrument adjustment enhances method development, minimizes implementation requirements and ensures calibration model transferability between analyzers.

The NIRS Analyzer PRO is available with dedicated interfaces based on reflectance or transmittance technology whichever is best suited for each application area. Measurements are done directly on the moving sample in the process stream. A high-intensity dual-lamp light source illuminates the sample directly or through an optical fiber. The light interacts with the sample and the reflected or transmitted light is measured by the diode array sensor. The backup lamp in the dual-lamp system secures uptime and analytical accuracy is unchanged even after switching to a new lamp.

The complete wavelength range is measured instantaneously enabling measurements also on fast moving samples with high accuracy. Calibrations are transferable between instruments, ensuring easy expansion to other measuring points. Integration to process regulations systems can be done through the Metrohm OPC interface.

**ContactReflection**
Inline analyses of pastes, granules, powders, etc. in pipes or transport systems without bypass can be performed. The products pass over the interface window. The window reflection interface can easily be installed into the production line either by using flow-through cells or by welding an interface flange into the wall of the pipe/transport system.

**FiberSystem**
Process streams of clear to opaque liquids, slurries, suspensions and powders can be measured and optimized inline with this system. Depending on the sample type, the analyzer can be configured with fiber optic MicroBundle reflection or immersion probes.

**DirectLight/NonContact**
Inline analysis of products where direct contact with the product is not a technically feasible solution, i.e., products transported on a conveyor belt.

NIRS Analyzer PRO

| Ordering Information | |
|---|---|
| 2.928.1110 | NIRS Analyzer PRO – ContactReflection |
| 2.928.1120 | NIRS Analyzer PRO – FiberSystem |
| 2.928.1130 | NIRS Analyzer PRO – DirectLight/NonContact |

# Ion chromatography

# Ion chromatography

# Professional IC Vario – Systems
## 940 Professional IC Vario systems – Introduction

**Intelligent ion chromatography**
The 940 Professional IC Vario is the second generation of professional ion chromatography systems with intelligent system components that are optimally coordinated with one another. The path from the sample to the precise result has become simpler, as the system itself is thinking during the procedure and even making logical decisions.

- Intelligence in the hardware of the 940 Professional IC Vario:
  - **iPump**
  - **iDetector**
  - **iReactor**
  - **iCell**
  - **intelligent Dosino**
- Intelligence in the **MagIC Net** software
- Intelligence in the Metrosep **iColumns**

These are the intelligent system components that monitor all functions, optimize them and, if desired, also document them in accordance with FDA requirements. The configuration of the system is as simple as possible, as the components log in automatically and make all relevant information available to the MagIC Net software. Optimum operation of the 940 Professional IC Vario and the results are both monitored. If a parameter lies outside of the specified range, then the user will be informed via e-mail or SMS. The 940 Professional IC Vario is a complex and very high-performance system for which simple and intuitive operation is provided by the MagIC Net software. This applies for experienced users with complex applications and sophisticated calculations as well as for users who value „one-button operation". Every user level is possible. Innovation, flexibility and exceptionally simple operation result from the intelligence of the 940 Professional IC Vario, the 942 Extension Module Vario, the 858 Professional Sample Processor and the MagIC Net software.

**Online configurator**
With just a few mouseclicks, this software tool can be used to configure any imaginable IC system down to the last detail. The path to the tailored solution for individual requirements in ion chromatography has thus become even simpler.

It is precisely here that the new online configurator provides the user with support. Starting from the analysis requirements, the user selects the necessary modules from the comprehensive ion chromatography array on offer from Metrohm and specifies a system, step by step, that optimally meets his requirements. Once the solution has been specified down to the last detail, the user can print out „his" system as a photo-realist graph in PDF format. In addition, he receives a detailed list of the modules and components contained in the respective system along with their order numbers.

Access to the new online configurator is through ic940.metrohm.com

# Professional IC – ProfIC Vario systems

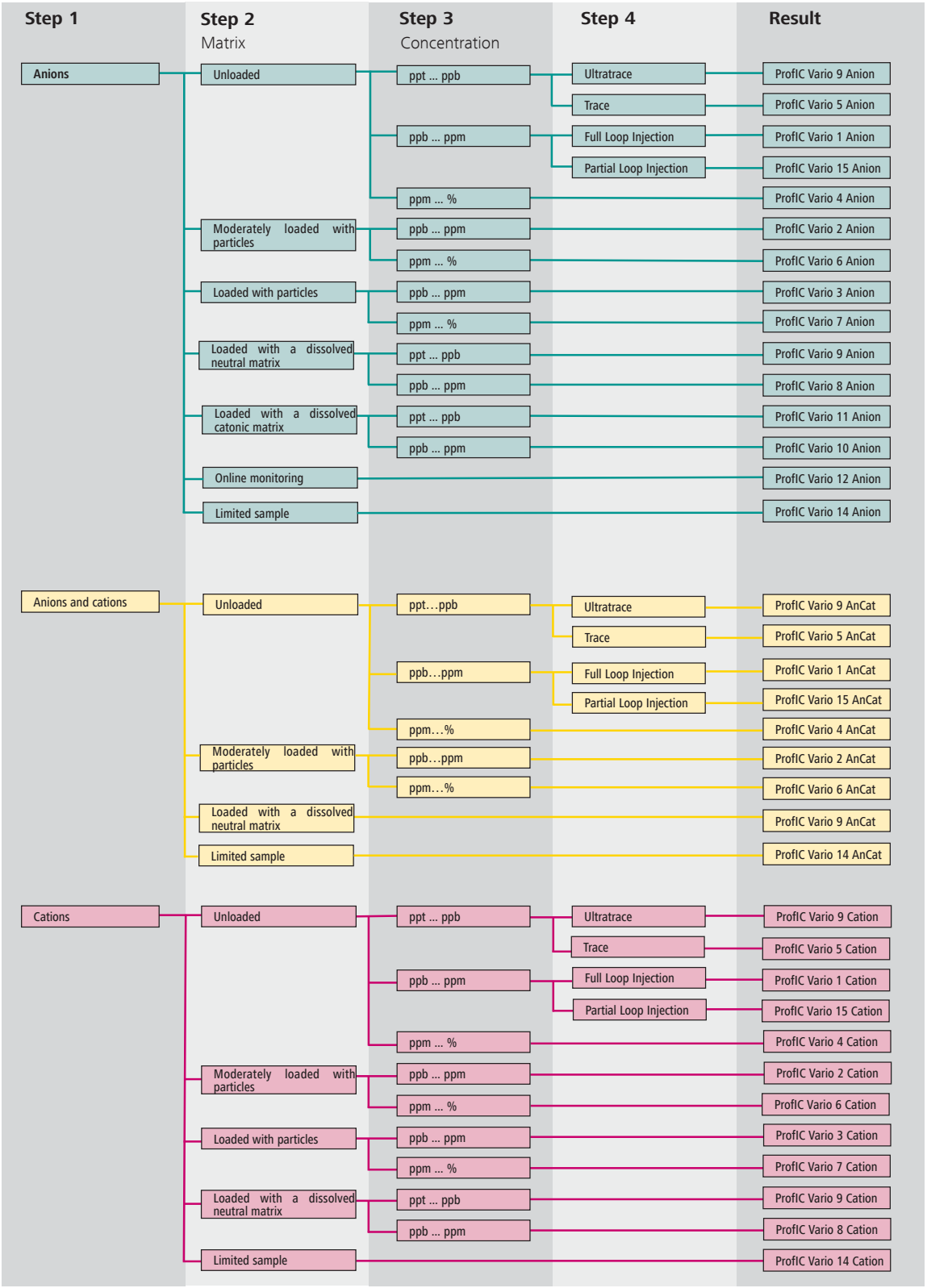
The „ProfIC Vario“ systems are assemblies of Professional IC instruments and accessory parts that are custom-tailored for a particular application group. These systems contain all of the components required to perform the respective application with complete automation. The main components are:

- **940 Professional IC Vario**
- **IC Conductivity Detector**
- **IC Amperometric Detector**
- **944 Professional UV/VIS Detector Vario**
- **945 Professional Detector Vario**
- **858 Professional Sample Processor**
- **942 Extension Module Vario**
- **800 Dosino**

In the respectively required versions with the corresponding accessory parts. Not included in the scope of delivery are the separation column, suppressor rotor, MagIC Net, the sample rack and the sample vessels. This ensures the greatest possible flexibility of the systems.

No matter whether it be determination of anions in the analytical service laboratory with very high sample throughput or the detection of cations in the ultratrace range, as is required in nuclear power plants, the ProfIC Vario systems offer customized solutions for even the most sophisticated measurements in ion chromatography. 37 systems can be called up at www.metrohm.com/com/Produkte2/IC/ProfIC-Vario-Systems.html.

# How to find the right ProfIC Vario system



# „ProfIC Vario 1 Cation“ – Professional IC Vario system for automated ion chromatography

The Professional IC Vario system with ***direct conductivity detection*** enables the fully automated determination of cations or anions (non-suppressed).

Typical areas of application:
- Universal application for cation analysis
- Routine analysis with large numbers of samples without additional sample preparation
- Coupling with MS or ICP/MS instruments for research and development tasks

The „ProfIC Vario 1 Cation“ is comprised of the 940 Professional IC Vario ONE, one „iDetector“ intelligent conductivity detector and one 858 Professional Sample Processor.

The 940 Professional IC Vario ONE is equipped with the „ONE“ module. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

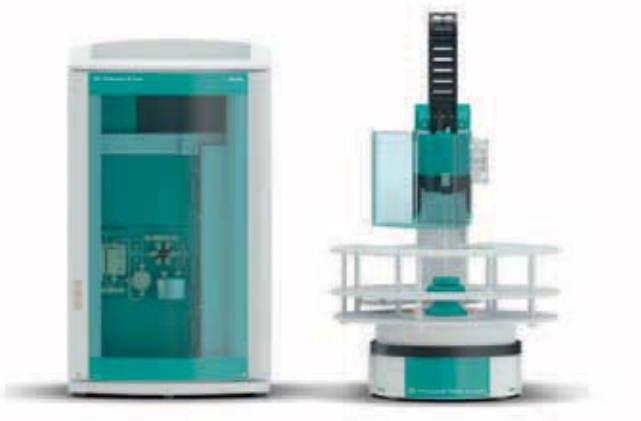
**Technical Information**

Parts

1 x 2.940.1100 940 Professional IC Vario ONE
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor

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

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- MagIC Net



„ProfIC Vario 1 Cation“

**Ordering Information**

ProfIC Vario 1 Cation

# „ProfIC Vario 2 Cation“ – Professional IC Vario system with Inline Ultrafiltration

The Professional IC Vario system with ***Metrohm Inline Ultrafiltration*** and ***conductivity detection*** enables the fully automatic determination of cations or anions (non-suppressed).

Typical areas of application:
- Samples with slight to medium-severe loads of particles, algae or bacteria
- Drinking and surface water
- Process and waste water

The „ProfIC Vario 2 Cation“ is comprised of one 940 Professional IC Vario ONE, one „iDetector“ intelligent conductivity detector, one 858 Professional Sample Processor and an IC equipment for Inline Ultrafiltration.

The 940 Professional IC Vario ONE is equipped with the „ONE“ module. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

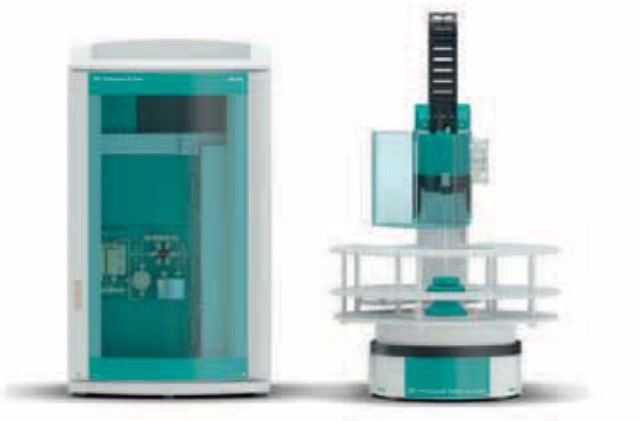
**Technical Information**

Parts
1 x 2.940.1100 940 Professional IC Vario ONE
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.5330.110 IC equipment: Inline Ultrafiltration

The IC equipment for Inline Ultrafiltration contains all of the parts needed for integrating Metrohm Inline Ultrafiltration in the system.

Numerous sample racks are available for volumes in the range of 0.5 - 500 mL for the 858 Professional Sample Processor. A minimum of 5 mL of sample is required for the Inline Ultrafiltration.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- MagIC Net



„ProfIC Vario 2 Cation“

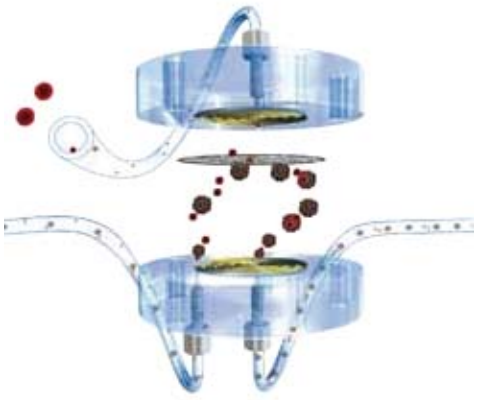
**Ordering Information**

ProfIC Vario 2 Cation

# Metrohm Inline Ultrafiltration and Dialysis

**Metrohm Inline Ultrafiltration**

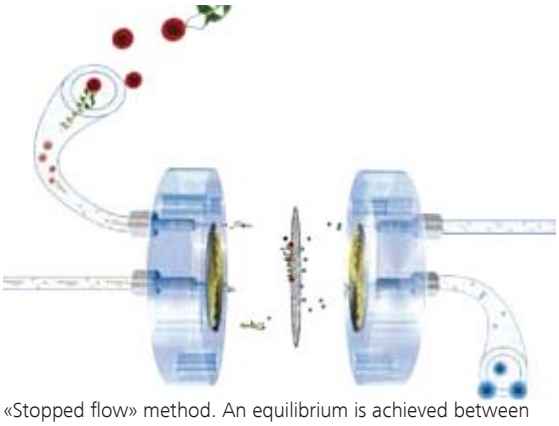
In modern ion chromatography, it is recommended that all samples be filtered before injection. Separation columns with particle sizes of less than 10 µm require absolutely particle-free sample solutions. Unfiltered solutions can lead to pressure increases on the column and thus to a certain extent to a massively shortened lifetime for the separation column. The usual manual filtration takes place with disposable filter cartridges with pore sizes of 0.45 µm or smaller. These become blocked very quickly, particularly with samples containing minuscule particles. As an alternative, sample changers are also used with filter caps. Here the pore size is often larger than it is with the disposable filters. These are expensive and there is also a danger of blockage associated with them. These problems are a thing of the past with Metrohm Inline Ultrafiltration, a membrane separation technique. The samples are placed directly on the turntable. The sample stream is guided into the lower chamber of the ultrafiltration cell and along the membrane to the waste container at the time the samples are processed. The peristaltic pump generates an underpressure in the upper chamber of the cell, thus causing the sample solution to be suctioned through the ultrafiltration membrane. The filtered sample solution reaches the injection loop and is subsequently injected. Less than 20% of the original solution is removed as filtrate, the remainder flows directly into the waste. The formation of a filter cake that could lead to a jamming of the membrane is largely prevented by this and by the geometric alignment of the cell. Metrohm Inline Ultrafiltration is especially suitable for samples with small to medium loads, e.g., drinking water, surface water, sewage, digestion solutions, extractions.



Ultrafiltration

**Metrohm Inline Dialysis**

More severely loaded samples require complex and work-intensive preparatory steps prior to their actual determination. For this, Metrohm Inline Dialysis permits a significant rationalization of the entire analysis. The only condition the sample must meet: It must be present in liquid form or be able to be transformed into one and be largely homogenous. Larger-sized particles are also to be removed with centrifuging. Afterwards, the sample solution is dialyzed in the dialysis cell in accordance with the method patented by Metrohm (European Patent 0 820 804, US Patent 5,861,097). Practically complete dialysis is achieved, thanks to this special „Inline Stopped Flow Dialysis" method. That means that the acceptor solution exhibits the same ion concentration as the original sample (equilibrium dialysis). Afterwards, the acceptor solution is injected directly into the ion chromatograph and analyzed. In the case of ultrafiltration, a pressure differential causes the sample solution to be filtered through the membrane, but with dialysis it is the difference in concentration between the two sides that is the driving force. The ions to be determined diffuse through the membrane, but no sample solution is pressed through the membrane. Accordingly, no filter cake is formed that could block the membrane. With the aid of this technology, it is possible to determine anions and cations, even in cutting oil emulsions, biodiesel, milk products or bodily fluids such as blood and urine. If the system is programmed in such a way that the next sample is dialyzed during the current run, then the total analysis time corresponds to that of a direct injection.



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

# „ProfIC Vario 3 Cation“ – Professional IC Vario system with Inline Dialysis

The Professional IC Vario system with ***Metrohm inline dialysis*** and ***conductivity detection*** enables the fully automatic determination of cations or anions (non-suppressed).

Typical areas of application:
- Samples with severe loads of particles, algae or bacteria
- Process, wash and waste water
- Emulsions, dispersions, cutting oils and samples containing petroleum
- Milk products and other samples containing protein

The „ProfIC Vario 3 Cation“ is comprised of one 940 Professional IC Vario ONE/Prep 1, one „iDetector“ intelligent conductivity detector, one 858 Professional Sample Processor and one IC equipment for Inline Dialysis.

The 940 Professional IC Vario ONE/Prep 1 is equipped with the „ONE“ and „Prep 1“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

In addition, a bidirectional two-channel peristaltic pump for sample preparation or sample injection is located in the lower segment of the instrument („Prep 1“). The position for the installation of the dialysis cell is prepared here.

The IC equipment for Inline Dialysis contains all of the parts required for the Metrohm-patented „Inline Stopped Flow Dialysis“.

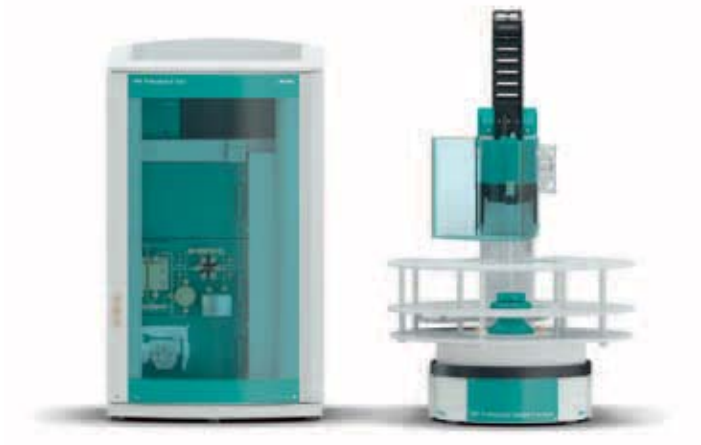
Numerous sample racks are available for volumes in the range of 0.5 - 500 mL for the 858 Professional Sample Processor. At least 10 mL of sample are required for Inline Dialysis.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- MagIC Net

**Technical Information**

Parts

1 x 2.940.1110 940 Professional IC Vario ONE/Prep 1
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.5330.100 IC equipment: Inline Dialysis



„ProfIC Vario 3 Cation“

**Ordering Information**

ProfIC Vario 3 Cation

# „ProfIC Vario 4 Cation“ – Professional IC Vario system with Inline Dilution

The Professional IC Vario system with ***Metrohm's intelligent Inline Dilution*** and ***conductivity detection*** enables the fully automatic determination of cations or anions (non-suppressed) in concentrated solutions.

Typical areas of application:
- Samples with high ion concentration
- Samples from all industries

The „ProfIC Vario 4 Cation“ is comprised of one 940 Professional IC Vario ONE, one „iDetector“ intelligent conductivity detector, one 741 Magnetic Stirrer, one 800 Dosino and one IC equipment for Inline Dilution.

The 940 Professional IC Vario ONE is equipped with the „ONE“ module. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

**Technical Information**

Parts
1 x 2.940.1100 940 Professional IC Vario ONE
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 2.741.0010 741 Magnetic Stirrer
1 x 2.800.0010 800 Dosino
1 x 6.5330.120 IC equipment: Inline Dilution

The „ProfIC Vario 4 Cation“ offers the option of automated inline dilution of every sample. This takes place at an external position on the 858 Professional Sample Processor. The 800 Dosino aspirates the volume to be diluted into the transfer tubing, doses it into the Liquid Handling Station and adds the required volume of dilution medium. All of the parts required are on hand with the IC equipment for Inline Dilution.

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

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- MagIC Net

„ProfIC Vario 4 Cation“

**Ordering Information**

ProfIC Vario 4 Cation

# „ProfIC Vario 5 Cation“ – Professional IC Vario system with Metrohm‘s intelligent preconcentration technique (MiPCT)

The Professional IC Vario system with ***Metrohm‘s intelligent inline sample preconcentration*** and ***conductivity detection*** enables the fully automatic determination of cations or anions (non-suppressed) in solutions with low ion concentration.

Typical areas of application:
- Numerous applications, ranging from ultrapure water analysis to drinking water analysis
- Analyses of different samples from power plants
- Process control and monitoring of rinsing solutions, e.g., in the semiconductor industry

The „ProfIC Vario 5 Cation“ is comprised of one 940 Professional IC Vario ONE, one „iDetector“ intelligent conductivity detector, one 800 Dosino, one 858 Professional Sample Processor and one IC equipment for MiPCT.

The 940 Professional IC Vario ONE is equipped with the „ONE“ module. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

**Technical Information**

Parts
1 x 2.940.1100 940 Professional IC Vario ONE
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0010 858 Professional Sample Processor
1 x 2.800.0010 800 Dosino
1 x 6.5330.140 IC equipment: MiPCT

With the 800 Dosino and the IC equipment for MiPCT, all of the parts required for Metrohm‘s intelligent preconcentration technique are on hand.

The 858 Professional Sample Processor makes the samples available. The transfer takes place with the 800 Dosino. Numerous sample racks are available for volumes in the range of 0.5 - 500 mL.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Preconcentration column
- Sample rack
- MagIC Net

„ProfIC Vario 5 Cation“

**Ordering Information**

ProfIC Vario 5 Cation

# „ProfIC Vario 6 Cation“ – Professional IC Vario system with Inline Dilution and Inline Ultrafiltration

The Professional IC Vario system with ***Metrohm Inline Dilution***, ***Metrohm Inline Ultrafiltration*** and ***conductivity detection*** enables the fully automatic determination of cations or anions (non-suppressed) that are present in very high concentrations and that have matrices containing particles.

Typical areas of application:
- Rinse, process and waste water
- Extractions and digestion solutions
- Food samples

The „ProfIC Vario 6 Cation“ is comprised of one 940 Professional IC Vario ONE, one „iDetector“ intelligent conductivity detector, one 741 Magnetic Stirrer, one 800 Dosino, one 858 Professional Sample Processor, an IC equipment for Inline Dilution and an IC equipment for Inline Ultrafiltration.

The 940 Professional IC Vario ONE is equipped with the „ONE“ module. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

„ProfIC Vario 6 Cation“

**Technical Information**

Parts
1 x 2.940.1100 940 Professional IC Vario ONE
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 2.741.0010 741 Magnetic Stirrer
1 x 2.800.0010 800 Dosino
1 x 6.5330.120 IC equipment: Inline Dilution
1 x 6.5330.110 IC equipment: Inline Ultrafiltration

The „ProfIC Vario 6 Cation“ offers the option of automated inline dilution of every sample. This takes place at an external position on the 858 Professional Sample Processor. The 800 Dosino aspirates the volume to be diluted into the transfer tubing, doses it into the Liquid Handling Station and adds the required volume of dilution medium. All of the parts required are on hand with the IC equipment for Inline Dilution.

The IC equipment for Inline Ultrafiltration contains all of the parts needed for integrating the subsequent Metrohm Inline Ultrafiltration in the system.

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

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- MagIC Net

**Ordering Information**

ProfIC Vario 6 Cation

# „ProfIC Vario 7 Cation“ – Professional IC Vario system with Inline Dilution and Inline Dialysis

The Professional IC Vario system with ***Metrohm Inline Dilution***, ***Inline Dialysis*** and ***conductivity detection*** enables the fully automated determination of cations or anions (non-suppressed) that are present in high concentrations and in difficult matrices.

Typical areas of application:
- Process, wash and waste water
- Samples containing oil
- Inline Extraction for biodiesel analysis

**Technical Information**

Parts
1 x 2.940.1110 940 Professional IC Vario ONE/Prep 1
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 2.741.0010 741 Magnetic Stirrer
1 x 2.800.0010 800 Dosino
1 x 6.5330.120 IC equipment: Inline Dilution
1 x 6.5330.100 IC equipment: Inline Dialysis

The „ProfIC Vario 7 Cation“ is comprised of one 940 Professional IC Vario ONE/Prep 1, one „iDetector“ intelligent conductivity detector, one 741 Magnetic Stirrer, one 800 Dosino, one 858 Professional Sample Processor, an IC equipment for Inline Dilution and an IC equipment for Inline Dialysis.

The 940 Professional IC Vario ONE/Prep 1 is equipped with the „ONE“ and „Prep 1“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

In addition, a bidirectional two-channel peristaltic pump for sample preparation or sample injection is located in the lower segment of the instrument („Prep 1“). The position for the installation of the dialysis cell is prepared here.

The „ProfIC Vario 7 Cation“ offers the option of automated inline dilution of every sample. This takes place at an external position on the 858 Professional Sample Processor. The 800 Dosino aspirates the volume to be diluted into the transfer tubing, doses it into the Liquid Handling Station and adds the required volume of dilution medium. All of the parts required are on hand with the IC equipment for Inline Dilution.

The IC equipment for Inline Dialysis contains all of the parts required for the subsequent Metrohm-patented „Inline Stopped Flow Dialysis“.

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

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- MagIC Net

„ProfIC Vario 7 Cation“

**Ordering Information**

ProfIC Vario 7 Cation

# „ProfIC Vario 8 Cation“ – Professional IC Vario system with Inline Matrix Elimination

The Professional IC Vario system with ***Metrohm Inline Matrix Elimination*** and ***conductivity detection*** enables the determination of cations or anions (non-suppressed) in difficult matrices.

Typical areas of application:
- Trace analysis in polar solvents
- Quality controls in fuels, fuel mixtures and biofuels
- Quality management of chemicals

The „ProfIC Vario 8 Cation“ is comprised of one 940 Professional IC Vario ONE, one „iDetector“ intelligent conductivity detector and one 858 Professional Sample Processor.

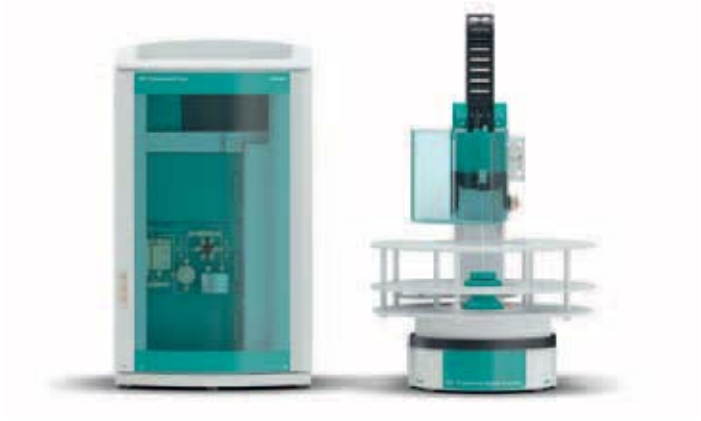
The 940 Professional IC Vario ONE is equipped with the „ONE“ module. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

**Technical Information**

Parts
1 x 2.940.1100 940 Professional IC Vario ONE
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0030 858 Professional Sample Processor
1 x 6.1602.150 Bottle attachment / GL 45 - 3 × UNF
1 x 6.1608.070 Eluent bottle / 2 L / GL 45
1 x 6.1825.230 PEEK sample loop 10 µL

The injector and the peristaltic pump on the 858 Professional Sample Processor and the additional accessory parts enable Inline Matrix Elimination. Numerous sample racks are available for volumes in the range of 0.5 - 500 mL for the 858 Professional Sample Processor. As a rule, only small volumes with a maximum of 1 mL sample are required for matrix elimination.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Preconcentration column
- Sample rack
- MagIC Net



„ProfIC Vario 8 Cation“

**Ordering Information**

ProfIC Vario 8 Cation

# „ProfIC Vario 9 Cation“ – Professional IC Vario system with Metrohm‘s intelligent preconcentration technique and Inline Matrix Elimination (MiPCT-ME)

The Professional IC Vario system with ***Metrohm‘s intelligent inline preconcentration technique***, ***Inline Matrix Elimination*** and ***conductivity detection*** enables ultratrace analysis down to the lowest ppt range (ng/L) of cations in complex matrices.

Typical areas of application:
- Ultratrace analysis in samples from nuclear power plants and conventional power plants
- Trace and ultratrace analysis in extraction agents and organics
- Trace analysis in snow and ice

The „ProfIC Vario 9 Cation“ is comprised of one 940 Professional IC Vario ONE, one „iDetector“ intelligent conductivity detector, one 858 Professional Sample Processor, two 800 Dosinos and one IC equipment for MiPCT-ME.

The 940 Professional IC Vario ONE is equipped with the „ONE“ module. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

The two 800 Dosinos and the IC equipment for MiPCT-ME enable preconcentration of the sample and subsequent matrix elimination. Typical preconcentration volumes are 4 - 4,000 µL.

The 858 Professional Sample Processor makes the samples available. Numerous sample racks are available for volumes in the range of 0.5 - 500 mL.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Preconcentration column
- Sample rack
- MagIC Net

**Technical Information**

Parts
1 x 2.940.1100 940 Professional IC Vario ONE
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0010 858 Professional Sample Processor
2 x 2.800.0010 800 Dosino
1 x 6.5330.160 IC equipment: MiPCT-ME

„ProfIC Vario 9 Cation“

**Ordering Information**

ProfIC Vario 9 Cation

# „ProfIC Vario 14 Cation“ – Professional IC Vario system with Metrohm‘s intelligent Pick-up-Injection Technique (MiPuT)

The Professional IC Vario system with ***Metrohm‘s intelligent Pick-up Injection Technique*** (MiPuT) and ***conductivity detection*** enables the determination of cations or anions (non-suppressed) from the smallest of sample volumes.

Typical areas of application:
- For universal application for all types of samples when only small sample quantities are available
- Investigation of biochemical processes
- Environmental sample extracts

The „ProfIC Vario 14 Cation“ is comprised of one 940 Professional IC Vario ONE, one „iDetector“ intelligent conductivity detector, one 858 Professional Sample Processor, one 800 Dosino and one IC equipment for MiPuT.

The 940 Professional IC Vario ONE is equipped with the „ONE“ module. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

The 800 Dosino and the IC equipment for MiPuT enable Metrohm‘s intelligent Pick-up Injection Technique. 2 - 50 µL of the samples can be removed and injected directly.

Numerous sample racks are available for volumes in the range of 0.5 - 500 mL for the 858 Professional Sample Processor.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack (recommended 6.2041.480 Sample rack 159 x 2 mL + 3 x 300 mL)
- MagIC Net

**Technical Information**

Parts
1 x 2.940.1100 940 Professional IC Vario ONE
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 2.800.0010 800 Dosino
1 x 6.5330.170 IC equipment: MiPuT

„ProfIC Vario 14 Cation“

**Ordering Information**

ProfIC Vario 14 Cation

# „ProfIC Vario 15 Cation“ – Professional IC Vario system with Metrohm‘s intelligent Partial Loop Injection Technique (MiPT)

The Professional IC Vario system with ***Metrohm‘s intelligent Partial Loop Injection Technique*** and ***conductivity detection*** enables the fully automatic determination of cations or anions (non-suppressed). „Partial Loop Injection“ enables the injection of various sample volumes.

Typical areas of application:
- For universal application for all types of samples
- From trace analysis to waste water analysis
- Great differences in concentration in a single sample series

The „ProfIC Vario 15 Cation“ is comprised of one 940 Professional IC Vario ONE, one „iDetector“ intelligent conductivity detector, one 858 Professional Sample Processor, one 800 Dosino and the IC equipment for MiPT.

The 940 Professional IC Vario ONE is equipped with the „ONE“ module. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

The 800 Dosino and the IC equipment for MiPT enable Metrohm‘s intelligent Partial Loop Injection Technique. 2 - 200 µL can be injected.

Numerous sample racks are available for volumes in the range of 0.5 - 500 mL for the 858 Professional Sample Processor.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- MagIC Net

**Technical Information**

Parts
1 x 2.940.1100 940 Professional IC Vario ONE
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0010 858 Professional Sample Processor
1 x 2.800.0010 800 Dosino
1 x 6.5330.180 IC equipment: MiPT

„ProfIC Vario 15 Cation“

**Ordering Information**

ProfIC Vario 15 Cation

# „ProfIC Vario 1 Anion“ – Professional IC Vario system for automated ion chromatography

The Professional IC Vario system with ***sequential suppression*** and ***conductivity detection*** enables the fully automatic determination of anions.

Typical areas of application:
- Universally applicable anion analysis
- Routine analysis with large numbers of samples without additional sample preparation
- Coupling with MS or ICP/MS instruments for research and development tasks

The „ProfIC Vario 1 Anion“ is comprised of one 940 Professional IC Vario ONE/SeS/PP, one „iDetector“ intelligent conductivity detector and one 858 Professional Sample Processor.

The 940 Professional IC Vario ONE/SeS/PP is equipped with the „ONE“ and „SeS/PP“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iCol-umns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

„ProfIC Vario 1 Anion“

**Technical Information**

Parts
1 x 2.940.1500 940 Professional IC Vario ONE/SeS/PP
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor

The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

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

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- Suppressor rotor
- MagIC Net

**Ordering Information**

ProfIC Vario 1 Anion

# „ProfIC Vario 1 Anion DR“ – Professional IC Vario system for automated ion chromatography with Dosino Regeneration of the suppressor

The Professional IC Vario system with ***sequential suppression*** with ***Dosino Regeneration*** of the suppressor and ***conductivity detection*** enables the fully automatic determination of anions.

Typical areas of application:
- Universally applicable anion analysis
- Routine analysis with large numbers of samples without additional sample preparation
- Coupling with MS or ICP/MS instruments for research and development tasks

The „ProfIC Vario 1 Anion DR“ is comprised of one 940 Professional IC Vario ONE/SeS, one „iDetector“ intelligent conductivity detector, one 800 Dosino, the 858 Professional Sample Processor and the IC equipment for Dosino Regeneration.

The 940 Professional IC Vario ONE/SeS is equipped with the „ONE“ and „SeS“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application. The regeneration of the MSM is performed with one Dosino.

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

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- Suppressor rotor
- MagIC Net

**Technical Information**

Parts
1 x 2.940.1400 940 Professional IC Vario ONE/SeS
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 2.800.0010 800 Dosino
1 x 6.5330.190 IC equipment: Dosino Regeneration

„ProfIC Vario 1 Anion DR“

**Ordering Information**

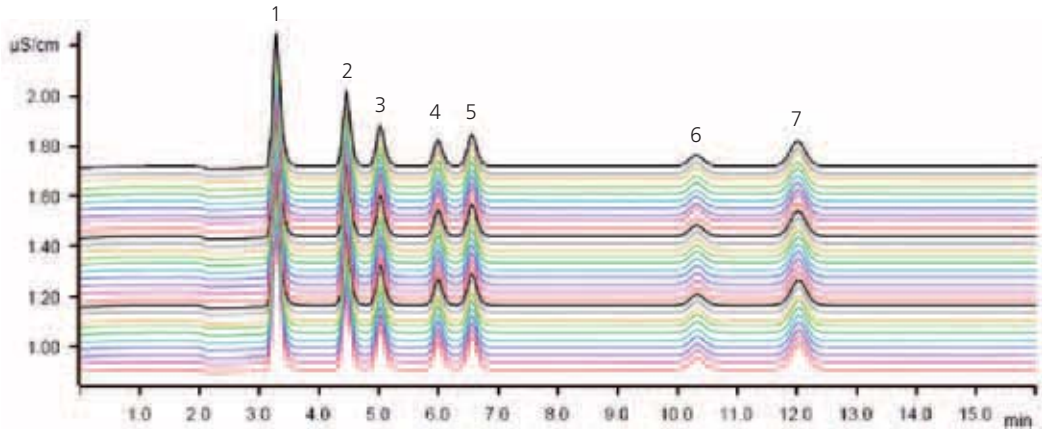
ProfIC Vario 1 Anion DR

# Suppression repeatability

A fresh suppressor cartridge is used for each measurement with the „MSM" Metrohm Suppressor Module. This ensures that one is always working with a cation exchanger that provides full performance: uninterrupted use today, tomorrow and for years into the future. The suppressor is distinguished by its pressure stability, it is 100% solvent-resistant and captivates by the length of its lifetime. Because no sensitive membranes are used, the suppressor achieves equilibrium and is ready for use in no time at all. It is only this way that a 10-year guarantee can be provided for the „MSM".

10 year
suppressor warranty

The Metrohm Suppressor Module is inexpensive and robust. The fact that repeatability of the measurements with the „MSM" is excellent is shown in the chromatograms:




30 injections, separation of standard anions on the Metrosep A Supp 5 - 100/4.0, eluent 3.2 mmol/L $Na_2CO_3$, 1.0 mmol/L $NaHCO_3$, flow 0.7 mL/min, loop 20 µL, 45 °C, sequential suppression.

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

| Ion | Fluoride | Chloride | Nitrite | Bromide | Nitrate | Phosphate | Sulfate |
|---|---|---|---|---|---|---|---|
| **Concentration [mg/L]** | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| **Relative standard deviation in % (n = 30)** | 0.17 | 0.16 | 0.38 | 0.31 | 0.18 | 0.46 | 0.25 |

# Sequential suppression

Sequential suppression is the chemical suppression combination using the „MSM, MSM-HC, MSM-LC" with Metrohm $CO_2$ Suppression (MCS). This makes it possible to detect anions with carbonate/hydrogen carbonate eluents at the low background conductivity of hydroxide eluents.

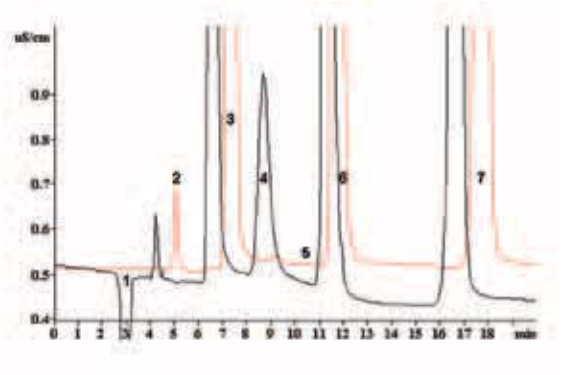
The removal of $CO_2$ prevents the carbonate equilibrium from having a negative influence on the peak areas. The success: Up to 50% larger peak areas (and thus lower detection limits) result with the same concentration and the same sample volume. No carbonate peak also means no irritating interferences during the quantification of certain analyte anions. Chloride and carbonate coelute on many polystyrene-divinylbenzene columns, for example. This problem is now a thing of the past, thanks to the use of the $CO_2$ suppressor.

The extensive absence of the injection peak improves the determination of the rapidly eluting anions, e.g., of fluoride. Even though the separation of injection peak and fluoride peak is already very good on polyalcohol columns, the detection limit can be improved even more when the $CO_2$ suppressor is used. In addition, considerably larger sample volumes can be input, as there is practically no injection peak more to be seen.

No suppressor rotor or SPM rotor has been pre-installed. The rotors can be ordered individually in accordance with the respective application. The table shows the order numbers and the respective main application.

| Suppressor rotor | | |
|---|---|---|
| 6.2832.000 | MSM Rotor A | Suppressor rotor for standard applications |
| 6.2842.000 | MSM-HC Rotor A | Suppressor rotor for use with high-capacity columns or with long chromatogram duration |
| 6.2844.000 | MSM-LC Rotor A | Suppressor rotor for use with 2 mm separation columns |
| 6.2835.000 | SPM Rotor A | Rotor for inline sample preparation with cation exchange |

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




Column: Metrosep A Supp 5 - 100/4.0 (6.1006.510)
Eluent: 3.2 mmol/L $Na_2CO_3$; 1.0 mmol/L $NaHCO_3$
Flow rate: 0.4 mL/min

| Nr. | Ion | Conz. (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 Vario 2 Anion“ – Professional IC Vario system with Inline Ultrafiltration

The Professional IC Vario system with ***Metrohm Inline Ultrafiltration*** and ***conductivity detection*** enables the fully automatic determination of anions.

Typical areas of application:
- Samples with slight to medium-severe loads of particles, algae or bacteria
- Drinking and surface water
- Process and waste water

The „ProfIC Vario 2 Anion“ is comprised of one 940 Professional IC Vario ONE/SeS/PP, one „iDetector“ intelligent conductivity detector, one 858 Professional Sample Processor and the IC equipment for Inline Ultrafiltration.

The 940 Professional IC Vario ONE/SeS/PP is equipped with the „ONE“ and „SeS/PP“ modules.

The 940 Professional IC Vario ONE/SeS/PP can be used with or without chemical suppression. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

„ProfIC Vario 2 Anion“

**Technical Information**

Parts
1 x 2.940.1500 940 Professional IC Vario ONE/SeS/PP
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.5330.110 IC equipment: Inline Ultrafiltration

The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

The IC equipment for Inline Ultrafiltration contains all of the parts needed for integrating Metrohm Inline Ultrafiltration in the system.

Numerous sample racks are available for volumes in the range of 0.5 - 500 mL for the 858 Professional Sample Processor. A minimum of 5 mL of sample is required for the Inline Ultrafiltration.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- Suppressor rotor
- MagIC Net

**Ordering Information**

ProfIC Vario 2 Anion

# „ProfIC Vario 3 Anion“ – Professional IC Vario system with Inline Dialysis

The Professional IC Vario system with ***Metrohm Inline Dialysis*** and ***conductivity detection*** enables the fully automatic determination of anions.

Typical areas of application:

- Samples with severe loads of particles, algae or bacteria
- Process, wash and waste water
- Emulsions, dispersions, cutting oils and samples containing petroleum
- Milk products and other samples containing protein

The „ProfIC Vario 3 Anion“ is comprised of one 940 Professional IC Vario ONE/SeS/PP/Prep 1, one „iDetector“ intelligent conductivity detector, one 858 Professional Sample Processor and one IC equipment for Inline Dialysis.

The 940 Professional IC Vario ONE/SeS/PP/Prep 1 is equipped with the „ONE“, „SeS/PP“ and „Prep 1“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

In addition, a bidirectional two-channel peristaltic pump for sample preparation or sample injection is located in the lower segment of the instrument („Prep 1“). The position for the installation of the dialysis cell is prepared here.

The IC equipment for Inline Dialysis contains all of the parts required for the Metrohm-patented „Inline Stopped Flow Dialysis“.

Numerous sample racks are available for volumes in the range of 0.5 - 500 mL for the 858 Professional Sample Processor. At least 10 mL of sample are required for Inline Dialysis.

The following components must be ordered separately in accordance with the desired application:

- Separation column
- Sample rack
- Suppressor rotor
- MagIC Net

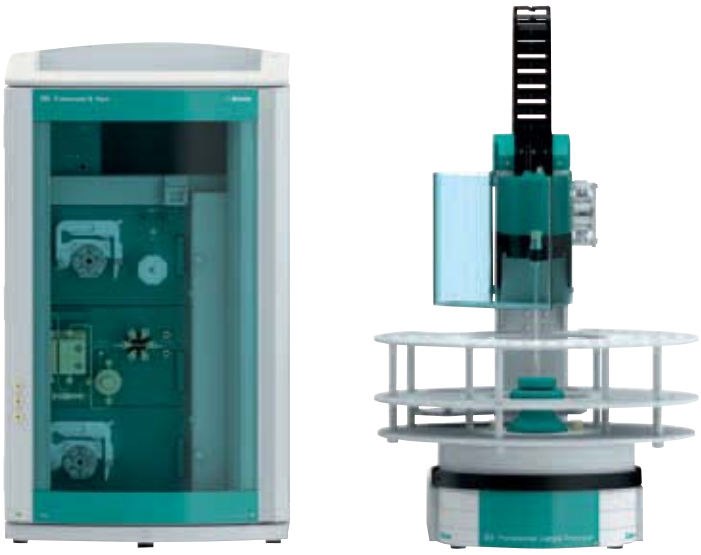
**Technical Information**

Parts

1 x 2.940.1510 940 Prof. IC Vario ONE/SeS/PP/Prep 1
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.5330.100 IC equipment: Inline Dialysis

**Ordering Information**

ProfIC Vario 3 Anion



„ProfIC Vario 3 Anion“

# „ProfIC Vario 4 Anion“ – Professional IC Vario system with Inline Dilution

The Professional IC Vario system with ***Metrohm's intelligent Inline Dilution*** and ***conductivity detection*** enables the fully automatic determination of anions in concentrated solutions.

Typical areas of application:
- Samples with high ion concentration
- Samples from all industries

The „ProfIC Vario 4 Anion“ is comprised of one 940 Professional IC Vario ONE/SeS/PP, one „iDetector“ intelligent conductivity detector, one 741 Magnetic Stirrer, one 800 Dosino and one IC equipment for Inline Dilution.

The 940 Professional IC Vario ONE/SeS/PP is equipped with the „ONE“ and „SeS/PP“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

„ProfIC Vario 4 Anion“

**Technical Information**

Parts
1 x 2.940.1500 940 Professional IC Vario ONE/SeS/PP
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 2.741.0010 741 Magnetic Stirrer
1 x 2.800.0010 800 Dosino
1 x 6.5330.120 IC equipment: Inline Dilution

The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

The „ProfIC Vario 4 Anion“ offers the option of automatic inline dilution of every sample. This takes place at an external position on the 858 Professional Sample Processor. The 800 Dosino aspirates the volume to be diluted into the transfer tubing, doses it into the Liquid Handling Station and adds the required volume of dilution medium. All of the parts required are on hand with the IC equipment for Inline Dilution.

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

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- Suppressor rotor
- MagIC Net

**Ordering Information**

ProfIC Vario 4 Anion

# „ProfIC Vario 5 Anion“ – Professional IC Vario system with Metrohm‘s intelligent preconcentration technique (MiPCT)

The Professional IC Vario system with ***Metrohm‘s intelligent inline sample preconcentration*** and ***conductivity detection*** enables the fully automatic determination of anions in solutions with low ion concentration.

Typical areas of application:
- Numerous applications, ranging from ultrapure water analysis to drinking water analysis
- Analyses of different samples from power plants
- Process control and monitoring of rinsing solutions, e.g., in the semiconductor industry

The „ProfIC Vario 5 Anion“ is comprised of one 940 Professional IC Vario ONE/SeS/PP, one „iDetector“ intelligent conductivity detector, one 800 Dosino, one 858 Professional Sample Processor and one IC equipment for MiPCT.

The 940 Professional IC Vario ONE/SeS/PP is equipped with the „ONE“ and „SeS/PP“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

With the 800 Dosino and the IC equipment for MiPCT, all of the parts required for Metrohm‘s intelligent preconcentration technique are on hand.

The 858 Professional Sample Processor makes the samples available. The transfer takes place with the 800 Dosino. Numerous sample racks are available for volumes in the range of 0.5 - 500 mL.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Preconcentration column
- Sample rack
- Suppressor rotor
- MagIC Net

**Technical Information**

Parts
1 x 2.940.1500 940 Professional IC Vario ONE/SeS/PP
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0010 858 Professional Sample Processor
1 x 2.800.0010 800 Dosino
1 x 6.5330.140 IC equipment: MiPCT

„ProfIC Vario 5 Anion“

**Ordering Information**

ProfIC Vario 5 Anion

# „ProfIC Vario 6 Anion“ – Professional IC Vario system with Inline Dilution and Inline Ultrafiltration

The Professional IC Vario system with ***Metrohm Inline Dilution***, ***Metrohm Inline Ultrafiltration*** and ***conductivity detection*** enables the fully automatic determination of anions that are present in very high concentrations and that have matrices containing particles.

Typical areas of application:
- Rinse, process and waste water
- Extractions and digestion solutions
- Food samples

**Technical Information**

Parts
1 x 2.940.1500 940 Professional IC Vario ONE/SeS/PP
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 2.741.0010 741 Magnetic Stirrer
1 x 2.800.0010 800 Dosino
1 x 6.5330.120 IC equipment: Inline Dilution
1 x 6.5330.110 IC equipment: Inline Ultrafiltration

The „ProfIC Vario 6 Anion“ is comprised of one 940 Professional IC Vario ONE/SeS/PP, one „iDetector“ intelligent conductivity detector, one 741 Magnetic Stirrer, one 800 Dosino, one 858 Professional Sample Processor, an IC equipment for Inline Dilution and an IC equipment for Inline Ultrafiltration.

The 940 Professional IC Vario ONE/SeS/PP is equipped with the „ONE“ and „SeS/PP“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump. The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not pre-mounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

The „ProfIC Vario 6 Anion“ offers the option of automatic inline dilution of every sample. This takes place at an external position on the 858 Professional Sample Processor. The 800 Dosino aspirates the volume to be diluted into the transfer tubing, doses it into the Liquid Handling Station and adds the required volume of dilution medium. All of the parts required are on hand with the IC equipment for Inline Dilution. The IC equipment for Inline Ultrafiltration contains all of the parts needed for integrating the subsequent Metrohm Inline Ultrafiltration in the system.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- Suppressor rotor
- MagIC Net

**Ordering Information**

ProfIC Vario 6 Anion

„ProfIC Vario 6 Anion“

# „ProfIC Vario 7 Anion“ – Professional IC Vario system with Inline Dilution and Inline Dialysis

The Professional IC Vario system with ***Metrohm Inline Dilution***, ***Inline Dialysis*** and ***conductivity detection*** enables the fully automatic determination of anions that are present in high concentrations and in difficult matrices.

Typical areas of application:
- Process, wash and waste water
- Samples containing oil
- Inline Extraction for biodiesel analysis

**Technical Information**

Parts
1 x 2.940.1510 940 Prof. IC Vario ONE/SeS/PP/Prep 1
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 2.741.0010 741 Magnetic Stirrer
1 x 2.800.0010 800 Dosino
1 x 6.5330.120 IC equipment: Inline Dilution
1 x 6.5330.100 IC equipment: Inline Dialysis

The „ProfIC Vario 7 Anion“ is comprised of one 940 Professional IC Vario ONE/SeS/PP/Prep 1, one „iDetector“ intelligent conductivity detector, one 741 Magnetic Stirrer, one 800 Dosino, one 858 Professional Sample Processor, an IC equipment for Inline Dilution and an IC equipment for Inline Dialysis.

The 940 Professional IC Vario ONE/SeS/PP/Prep 1 is equipped with the „ONE“, „SeS/PP“ and „Prep 1“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump. The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not pre-mounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

The „ProfIC Vario 7 Anion“ offers the option of automatic inline dilution of every sample. This takes place at an external position on the 858 Professional Sample Processor. The 800 Dosino aspirates the volume to be diluted into the transfer tubing, doses it into the Liquid Handling Station and adds the required volume of dilution medium. All of the parts required are on hand with the IC equipment for Inline Dilution. The IC equipment for Inline Dialysis contains all of the parts required for the subsequent Metrohm-patented „Inline Stopped Flow Dialysis“.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- Suppressor rotor
- MagIC Net

„ProfIC Vario 7 Anion“

**Ordering Information**

ProfIC Vario 7 Anion

# „ProfIC Vario 8 Anion“ – Professional IC Vario system with Inline Matrix Elimination

The Professional IC Vario system with ***Metrohm Inline Matrix Elimination*** and ***conductivity detection*** enables the determination of anions in difficult matrices.

Typical areas of application:
- Trace analysis in polar solvents
- Quality controls in fuels, fuel mixtures and biofuels
- Quality management of chemicals

The „ProfIC Vario 8 Anion“ is comprised of one 940 Professional IC Vario ONE/SeS/PP, one „iDetector“ intelligent conductivity detector and one 858 Professional Sample Processor.

The 940 Professional IC Vario ONE/SeS/PP is equipped with the „ONE“ and „SeS/PP“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

„ProfIC Vario 8 Anion“

**Technical Information**

Parts
1 x 2.940.1500 940 Professional IC Vario ONE/SeS/PP
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0030 858 Professional Sample Processor
1 x 6.1602.150 Bottle attachment / GL 45 - 3 × UNF
1 x 6.1608.070 Eluent bottle / 2 L / GL 45
1 x 6.1825.230 PEEK sample loop 10 µL

The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

The injector and the peristaltic pump on the 858 Professional Sample Processor and the additional accessory parts enable Inline Matrix Elimination. Numerous sample racks are available for volumes in the range of 0.5 - 500 mL for the 858 Professional Sample Processor. As a rule, only small volumes with a maximum of 1 mL sample are required for matrix elimination.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Preconcentration column
- Sample rack
- Suppressor rotor
- MagIC Net

**Ordering Information**

ProfIC Vario 8 Anion

# „ProfIC Vario 9 Anion“ – Professional IC Vario system with Metrohm‘s intelligent preconcentration technique and Inline Matrix Elimination (MiPCT-ME)

The Professional IC Vario system with ***Metrohm‘s intelligent inline preconcentration technique***, ***Inline Matrix Elimination*** and ***conductivity detection*** enables ultratrace analysis down to the lowest ppt range (ng/L) of anions in complex matrices.

Typical areas of application:
- Ultratrace analysis in samples from nuclear power plants and conventional power plants
- Trace and ultratrace analysis in extraction agents and organics
- Trace analysis in snow and ice

The „ProfIC Vario 9 Anion“ is comprised of one 940 Professional IC Vario ONE/SeS/PP, one „iDetector“ intelligent conductivity detector, one 858 Professional Sample Processor, two 800 Dosinos and one IC equipment for MiPCT-ME.

The 940 Professional IC Vario ONE/SeS/PP is equipped with the „ONE“ and „SeS/PP“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

The two 800 Dosinos and the IC equipment for MiPCT-ME enable preconcentration of the sample and subsequent matrix elimination. Typical preconcentration volumes are 4 - 4,000 µL.

The 858 Professional Sample Processor makes the samples available. Numerous sample racks are available for volumes in the range of 0.5 - 500 mL.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Preconcentration column
- Sample rack
- Suppressor rotor
- MagIC Net

**Technical Information**

Parts
1 x 2.940.1500 940 Professional IC Vario ONE/SeS/PP
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0010 858 Professional Sample Processor
2 x 2.800.0010 800 Dosino
1 x 6.5330.160 IC equipment: MiPCT-ME

„ProfIC Vario 9 Anion“

**Ordering Information**

ProfIC Vario 9 Anion

# „ProfIC Vario 10 Anion“ – Professional IC Vario system with Inline Neutralization

The Professional IC Vario system with ***Metrohm Inline Neutralization*** and ***conductivity detection*** enables the determination of anions in extremely alkali, acidic or metal-polluted matrices.

Typical areas of application:
- Trace analysis in bases and acids
- Starter substances from the electroplating industry
- Contaminations in electroplating baths

The „ProfIC Vario 10 Anion“ is comprised of one 940 Professional IC Vario ONE/SeS/PP/Prep 3, one „iDetector“ intelligent conductivity detector, one 858 Professional Sample Processor and additional accessory parts for Inline Neutralization.

The 940 Professional IC Vario ONE/SeS/PP/Prep 3 is equipped with the „ONE“, „SeS/PP“ and „Prep 3“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

„ProfIC Vario 10 Anion“

**Technical Information**

Parts
1 x 2.940.1530 940 Prof. IC Vario ONE/SeS/PP/Prep 3
1 x 2.850.9010 IC Conductivity Detector
1 x 6.2835.000 SPM Rotor A
1 x 2.858.0030 858 Professional Sample Processor
1 x 6.1602.150 Bottle attachment / GL 45 - 3 × UNF
1 x 6.1608.070 Eluent bottle / 2 L / GL 45
1 x 6.1825.230 PEEK sample loop 10 µL

The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

In addition, the „SPM“ anion sample preparation module and a bidirectional two-channel peristaltic pump are located in the lower segment of the instrument („Prep 3“). Both of these components are used for Inline Neutralization and/or Inline Cation Removal. As a rule, only small volumes with a maximum of 1 mL sample are required for neutralization.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Preconcentration column
- Sample rack
- Suppressor rotor
- MagIC Net

**Ordering Information**

ProfIC Vario 10 Anion

# „ProfIC Vario 11 Anion“ – Professional IC Vario system with Inline Neutralization, intelligent preconcentration technique and Inline Matrix Elimination

The Professional IC Vario system with ***Metrohm Inline Neutralization***, ***Metrohm's intelligent inline preconcentration technique***, ***Inline Matrix Elimination*** and ***conductivity detection*** enables the analysis of anions in complex matrices from the ultratrace down to the mg/L range.

Typical areas of application:
- Trace analysis in concentrated bases and acids
- Ultratrace analysis for nuclear power plants in matrices such as lithium hydroxide/boric acid

The „ProfIC Vario 11 Anion“ combines Inline Neutralization with MiPCT-ME. It is comprised of one 940 Professional IC Vario ONE/SeS/PP/Prep 3, one „iDetector“ intelligent conductivity detector, one 858 Professional Sample Processor, one 800 Dosino and the IC equipment for MiPCT.

The 940 Professional IC Vario ONE/SeS/PP/Prep 3 is equipped with the „ONE“, „SeS/PP“ and „Prep 3“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

„ProfIC Vario 11 Anion“

**Technical Information**

Parts
1 x 2.940.1530 940 Prof. IC Vario ONE/SeS/PP/Prep 3
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0030 858 Professional Sample Processor
1 x 2.800.0010 800 Dosino
1 x 6.2832.000 MSM-A Rotor (for SPM)
1 x 6.2842.020 Adapter sleeve for Suppressor Vario
1 x 6.5330.140 IC equipment: MiPCT
1 x 6.1808.090 Thread adapter M8 outer / M6 inner
1 x 6.1014.200 Metrosep I Trap 1 - 100/4.0

The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

In addition, the „SPM“ anion sample preparation module and a bidirectional two-channel peristaltic pump are located in the lower segment of the instrument („Prep 3“). Both components are used for the Metrohm Inline Neutralization.

The package contains the 800 Dosino and accessories for Metrohm's intelligent preconcentration technique. To accomplish this purpose, the 800 Dosino pumps the precise sample quantity through the SPM module to the preconcentration column and then removes the matrix afterwards with ultrapure water.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Preconcentration column
- Sample rack
- Suppressor rotor
- MagIC Net

**Ordering Information**

ProfIC Vario 11 Anion

# „ProfIC Vario 12 Anion“ – Professional IC Vario system for online monitoring, Metrohm‘s intelligent preconcentration technique and Inline Matrix Elimination

The Professional IC Vario system with ***selection valve*** and ***conductivity detection*** enables ***online*** determination with ***Metrohm‘s intelligent preconcentration technique*** and ***matrix elimination*** of anions from various sample flows.

Typical areas of application:
- Continuous analysis of processes
- Monitoring of drinking and surface water
- Monitoring of cooling water

The „ProfIC Vario 12 Anion“ is comprised of one 940 Professional IC Vario ONE/SeS/PP, one „iDetector“ intelligent conductivity detector, one 942 Extension Module Vario LQH, one 800 Dosino and one IC equipment for MiPCT.

The 940 Professional IC Vario ONE/SeS/PP is equipped with the „ONE“ and „SeS/PP“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iCol-

„ProfIC Vario 12 Anion“

**Technical Information**

Parts
1 x 2.940.1500 940 Professional IC Vario ONE/SeS/PP
1 x 2.850.9010 IC Conductivity Detector
1 x 2.942.0070 942 Extension Module Vario LQH
1 x 2.800.0010 800 Dosino
1 x 6.5330.140 IC equipment: MiPCT

umns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

The 10-port valve contained in the 942 Extension Module LQH is used for selecting the various sample, standard and rinsing solutions.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Preconcentration column
- Sample rack
- Suppressor rotor
- MagIC Net
- Communication between MagIC Net and the process control software

**Ordering Information**

ProfIC Vario 12 Anion

# „ProfIC Vario 14 Anion“ – Professional IC Vario system with Metrohm‘s intelligent Pick-up-Injection Technique (MiPuT)

The Professional IC Vario system with ***Metrohm‘s intelligent Pick-up Injection Technique*** (MiPuT) and ***conductivity detection*** enables the determination of anions from the smallest of sample volumes.

Typical areas of application:
- For universal application for all types of samples when only small sample quantities are available
- Investigation of biochemical processes
- Environmental sample extracts

The „ProfIC Vario 14 Anion“ is comprised of one 940 Professional IC Vario ONE/SeS/PP, one „iDetector“ intelligent conductivity detector, one 858 Professional Sample Processor, one 800 Dosino and one IC equipment for MiPuT.

The 940 Professional IC Vario ONE/SeS/PP is equipped with the „ONE“ and „SeS/PP“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

**Technical Information**

Parts
1 x 2.940.1500 940 Professional IC Vario ONE/SeS/PP
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 2.800.0010 800 Dosino
1 x 6.5330.170 IC equipment: MiPuT

The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

The 800 Dosino and the IC equipment for MiPuT enable Metrohm‘s intelligent Pick-up Injection Technique. 2 - 50 µL of the samples can be removed and injected directly.

Numerous sample racks are available for volumes in the range of 0.5 - 500 mL for the 858 Professional Sample Processor.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack (recommended 6.2041.480 Sample rack 159 x 2 mL + 3 x 300 mL)
- Suppressor rotor
- MagIC Net

„ProfIC Vario 14 Anion“

**Ordering Information**

ProfIC Vario 14 Anion

# „ProfIC Vario 15 Anion“ – Professional IC Vario system with Metrohm‘s intelligent Partial Loop Injection Technique (MiPT)

The Professional IC Vario system with ***Metrohm‘s intelligent Partial Loop Injection Technique*** and ***conductivity detection*** enables the fully automated determination of anions. „Partial Loop Injection“ enables the injection of various sample volumes.

Typical areas of application:
- For universal application for all types of samples
- From trace analysis to waste water analysis
- Great differences in concentration in a single sample series

The „ProfIC Vario 15 Anion“ is comprised of one 940 Professional IC Vario ONE/SeS/PP, one „iDetector“ intelligent conductivity detector, one 858 Professional Sample Processor, one 800 Dosino and one IC equipment for MiPT.

The 940 Professional IC Vario ONE/SeS/PP is equipped with the „ONE“ and „SeS/PP“ modules. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

„ProfIC Vario 15 Anion“

**Technical Information**

Parts
1 x 2.940.1500 940 Professional IC Vario ONE/SeS/PP
1 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0010 858 Professional Sample Processor
1 x 2.800.0010 800 Dosino
1 x 6.5330.180 IC equipment: MiPT

The instrument is equipped with the drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

The 800 Dosino and the IC equipment for MiPT enable Metrohm‘s intelligent Partial Loop Injection Technique. 2 - 200 µL can be injected.

Numerous sample racks are available for volumes in the range of 0.5 - 500 mL for the 858 Professional Sample Processor.

The following components must be ordered separately in accordance with the desired application:
- Separation column
- Sample rack
- Suppressor rotor
- MagIC Net

**Ordering Information**

ProfIC Vario 15 Anion

# „ProfIC Vario 1 Amperometry“ – Professional IC Vario system for automated ion chromatography with amperometric detection

The Professional IC Vario system with ***amperometric detection*** enables the fully automatic determination of sugar, oxidizable anions and additional oxidizable and reducible components.

Typical areas of application:

- Universally applicable analysis of oxidizable or reducible components
- Routine analysis with large numbers of samples without additional sample preparation
- Sugar analysis with pulsed amperometric detection (PAD)
- Trace analysis of cyanide and sulfide with direct amperometric detection (DC)
- Analysis of additional oxidizable or reducible anions
- Determination of organic components with different potential forms (flexIPAD)

The „ProfIC Vario 1 Amperometry“ is comprised of one 940 Professional IC Vario ONE, one „iDetector“ intelligent amperometric detector and one 858 Professional Sample Processor.

**Technical Information**

Parts

1 x 2.940.1100 940 Professional IC Vario ONE

1 x 2.850.9110 IC Amperometric Detector

1 x 2.858.0020 858 Professional Sample Processor

The 940 Professional IC Vario ONE is equipped with the „ONE“ module. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

The amperometric detector can be operated in four different modes (DC, PAD, flexIPAD and CV) and thus covers the entire application field of amperometric detection.

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

The following components must be ordered separately in accordance with the desired application:

- Separation column
- Amperometric measuring cell with the required electrodes
- Sample rack
- MagIC Net

„ProfIC Vario 1 Amperometry“

**Ordering Information**

ProfIC Vario 1 Amperometry

# „ProfIC Vario 1 UV/VIS“ – Professional IC Vario system for automated ion chromatography with UV/VIS detection

The Professional IC Vario system with ***UV/VIS detection*** enables the fully automated determination of anions, cations and organic compounds with optical absorption.

Typical areas of application:

- Universally applicable analysis for components that absorb UV or VIS light, respectively.
- Routine analysis with large numbers of samples without additional sample preparation

The „ProfIC Vario 1 UV/VIS“ is comprised of one 940 Professional IC Vario ONE, one 944 Professional UV/VIS Detector Vario and one 858 Professional Sample Processor.

The 940 Professional IC Vario ONE is equipped with the „ONE“ module. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

**Technical Information**

Parts

1 x 2.940.1100 940 Professional IC Vario ONE

1 x 2.944.0010 944 Professional UV/VIS Detector Vario

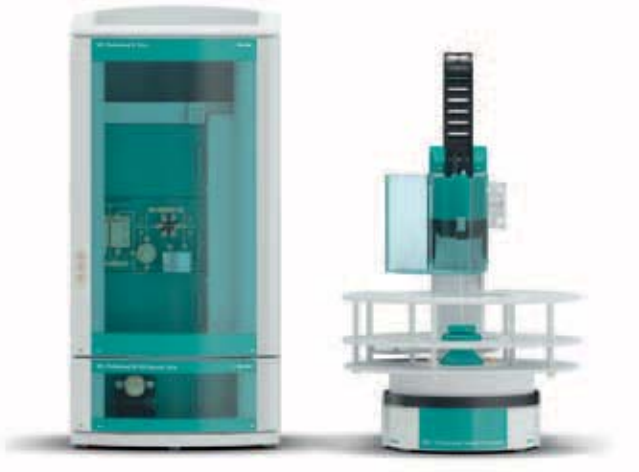
1 x 2.858.0020 858 Professional Sample Processor

The 944 UV/VIS Detector Vario enables data acquisition at up to eight random wavelengths. In addition, the UV/VIS spectrum can be determined in the chromatogram at any time.

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

The following components must be ordered separately in accordance with the desired application:

- Separation column
- Sample rack
- MagIC Net



„ProfIC Vario 1 UV/VIS“

**Ordering Information**

ProfIC Vario 1 UV-VIS

# „ProfIC Vario 1 PCR-UV/VIS“ – Professional IC Vario system for automated ion chromatography with post-column derivatization and UV/VIS detection

The Professional IC Vario system with ***post-column derivatization*** and ***UV/VIS detection*** enables the fully automated determination of anions, cations and additional components that can be converted using post-column derivatization into products with optical absorption.

Typical areas of application:

- Universal analysis with post-column derivatization and UV/VIS detection
- Analysis with large numbers of samples without additional sample preparation
- Trace analysis, e.g., of chromate, bromate, transition metals, etc.

The „ProfIC Vario 1 PCR-UV/VIS“ is comprised of one 940 Professional IC Vario ONE/Prep 1, one 944 Professional UV/VIS Detector Vario, one 943 Professional Reactor Vario and one 858 Professional Sample Processor.

The 940 Professional IC Vario ONE/Prep 1 is equipped with the „ONE“ module. It contains automatic sample and eluent degassing, „iPump“ IC high-pressure pump with intelligent pump head, pulsation absorber, six-way injection valve with Maltese cross drive, column thermostat for cooling and heating two iColumns and an external column position in the room temperature range.

In addition, a bidirectional two-channel peristaltic pump for conveying the post-column derivatization solution is located in the lower segment of the instrument („Prep 1“).

Post-column derivatization is performed in the 943 Professional Reactor Vario at temperatures up to 120 °C (or even up to 150 °C with the HT reactor plate).

The 944 Professional UV/VIS Detector Vario enables data acquisition at up to eight random wavelengths. In addition, the UV/VIS spectrum can be determined in the chromatogram at any time.

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

The following components must be ordered separately in accordance with the desired application:

- Separation column
- Sample rack
- MagIC Net

**Technical Information**

Parts

1 x 2.940.1110 940 Professional IC Vario ONE/Prep 1
1 x 2.943.0110 943 Professional Reactor Vario
1 x 2.944.0010 944 Professional UV/VIS Detector Vario
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.1608.030 Round glass bottle / 1,000 ml / GL 45
1 x 6.1602.150 Bottle attachment / GL 45 - 3 × UNF
1 x 6.1803.030 PTFE capillary 0.5 mm i.d. / 3 m

„ProfIC Vario 1 PCR-UV/VIS“

**Ordering Information**

ProfIC Vario 1 PCR-UV-VIS

# „ProfIC Vario 1 AnCat“ – Professional IC Vario system for automated ion chromatography

The Professional IC Vario system with ***conductivity detection*** and ***two analysis channels*** enables the fully automatic determination of anions and cations, both in parallel and also completely independent from one another as a time-saving feature.

Typical areas of application:
- Universal anion and cation analysis
- Routine analysis with large numbers of samples without additional sample preparation

The „ProfIC Vario 1 AnCat“ is comprised of one 940 Professional IC Vario TWO/SeS/PP, two „iDetector“ intelligent conductivity detectors and one 858 Professional Sample Processor.

The 940 Professional IC Vario TWO/SeS/PP is equipped with two „ONE“ modules and one „SeS/PP“ module, thus resulting in an instrument with two analysis channels.

The instrument comprises automatic sample and eluent degassing for both channels, two „iPump“ IC high-pressure pumps with intelligent pump heads and pulsation absorbers, two six-way injection valves, a column thermostat for the cooling and heating of two „iColumn“ separation columns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

The instrument is equipped with a drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

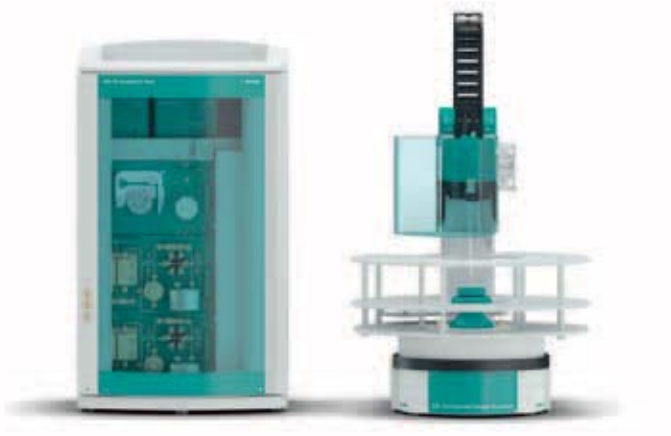
The 858 Professional Sample Processor takes care of the sample transfer. Numerous sample racks are available for volumes in the range of 0.5 - 500 mL.

The following components must be ordered separately in accordance with the desired application:
- Separation columns
- Sample rack
- Suppressor rotor
- MagIC Net

**Technical Information**

Parts

1 x 2.940.2500 940 Professional IC Vario TWO/SeS/PP
2 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor



„ProfIC Vario 1 AnCat“

**Ordering Information**

ProfIC Vario 1 AnCat

# „ProfIC Vario 2 AnCat“ – Professional IC Vario system with Inline Ultrafiltration

The Professional IC Vario system with ***Metrohm Inline Ultrafiltration*** and ***conductivity detection*** enables the fully automatic determination of anions and cations.

Typical areas of application:
- Samples with slight to medium-severe loads of particles, algae or bacteria
- Drinking and surface water
- Process and waste water

The „ProfIC Vario 2 AnCat“ is comprised of one 940 Professional IC Vario TWO/SeS/PP, two intelligent conductivity detectors, one 858 Professional Sample Processor and an IC equipment for Inline Ultrafiltration.

The 940 Professional IC Vario TWO/SeS/PP is equipped with two „ONE“ modules and one „SeS/PP“ module, thus resulting in an instrument with two analysis channels.

The instrument comprises automatic sample and eluent degassing for both channels, two „iPump“ IC high-pressure pumps with intelligent pump heads and pulsation absorbers, two six-way injection valves, a column thermostat for the cooling and heating of two „iColumn“ separation columns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

It is equipped with a drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

The IC equipment for Inline Ultrafiltration contains all of the parts needed for integrating Metrohm Inline Ultrafiltration in the system.

Numerous sample racks are available for volumes in the range of 0.5 - 500 mL for the 858 Professional Sample Processor. A minimum of 7 - 10 mL of sample is required for the Inline Ultrafiltration.

The following components must be ordered separately in accordance with the desired application:
- Separation columns
- Sample rack
- Suppressor rotor
- MagIC Net

**Technical Information**

Parts

1 x 2.940.2500 940 Professional IC Vario TWO/SeS/PP
2 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 6.5330.110 IC equipment: Inline Ultrafiltration

„ProfIC Vario 2 AnCat“

**Ordering Information**

ProfIC Vario 2 AnCat

# „ProfIC Vario 4 AnCat“ – Professional IC Vario system with Inline Dilution

The Professional IC Vario system with ***Metrohm's intelligent Inline Dilution*** and ***conductivity detection*** enables the fully automated determination of anions and cations in concentrated solutions.

Typical areas of application:
- Samples with high ion concentration
- Samples from all industries

The „ProfIC Vario 4 AnCat“ is comprised of one 940 Professional IC Vario TWO/SeS/PP, two „iDetector“ intelligent conductivity detectors, one 741 Magnetic Stirrer, one 800 Dosino and one IC equipment for Inline Dilution.

The 940 Professional IC Vario TWO/SeS/PP is equipped with two „ONE“ modules and one „SeS/PP“ module, thus resulting in an instrument with two analysis channels. It comprises automatic sample and eluent degassing for both channels, two „iPump“ IC high-pressure pumps with intelligent pump heads and pulsation absorbers, two six-way injection valves, a column thermostat for the cooling and heating of two „iColumn“ separation columns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

„ProfIC Vario 4 AnCat“

**Technical Information**

Parts
1 x 2.940.2500 940 Professional IC Vario TWO/SeS/PP
2 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 2.741.0010 741 Magnetic Stirrer
1 x 2.800.0010 800 Dosino
1 x 6.5330.120 IC equipment: Inline Dilution

The instrument is equipped with a drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

The „ProfIC Vario 4 AnCat“ offers the option of automated inline dilution of every sample. This takes place at an external position on the 858 Professional Sample Processor. The 800 Dosino aspirates the volume to be diluted into the transfer tubing, doses it into the Liquid Handling Station and adds the required volume of dilution medium. All of the parts required are on hand with the IC equipment for Inline Dilution.

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

The following components must be ordered separately in accordance with the desired application:
- Separation columns
- Sample rack
- Suppressor rotor
- MagIC Net

**Ordering Information**

ProfIC Vario 4 AnCat

# „ProfIC Vario 5 AnCat“ – Professional IC Vario system with Metrohm’s intelligent preconcentration technique (MiPCT)

The Professional IC Vario system with ***Metrohm’s intelligent inline sample preconcentration*** and ***conductivity detection*** enables the fully automatic determination of anions and cations in solutions with low ion concentration.

Typical areas of application:
- Numerous applications, ranging from ultrapure water analysis to drinking water analysis
- Analyses of different samples from power plants
- Process control and monitoring of rinsing solutions, e.g., in the semiconductor industry
- Trace analysis in snow and ice

The „ProfIC Vario 5 AnCat“ is comprised of one 940 Professional IC Vario TWO/SeS/PP, two „iDetector“ intelligent conductivity detectors, two 800 Dosinos, one 815 Robotic USB Sample Processor XL (2T/0P) with two workstations and two IC equipments for MiPCT.

The 940 Professional IC Vario TWO/SeS/PP is equipped with two „ONE“ modules and one „SeS/PP“ module, thus resulting in an instrument with two analysis channels.

„ProfIC Vario 5 AnCat“

**Technical Information**

Parts
1 x 2.940.2500 940 Professional IC Vario TWO/SeS/PP
2 x 2.850.9010 IC Conductivity Detector
1 x 2.815.0130 815 USB Sample Processor (2T/0P)
2 x 2.800.0010 800 Dosino
2 x 6.5330.140 IC equipment: MiPCT
and additional parts for the Sample Processor

The instrument comprises automatic sample and eluent degassing for both channels, two „iPump“ IC high-pressure pumps with intelligent pump heads and pulsation absorbers, two six-way injection valves, a column thermostat for the cooling and heating of two „iColumn“ separation columns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump. The instrument is equipped with a drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not pre-mounted.

With the two 800 Dosinos and the two IC equipments for MiPCT, all of the parts required for Metrohm’s intelligent preconcentration technique in two-channel operation are on hand.

The two towers of the 814 USB Sample Processor (2T/0P) enable carry-over-free sampling for anion and cation determination through two independent sample needles.

The following components must be ordered separately in accordance with the desired application:
- Separation columns
- Preconcentration columns
- Sample rack
- Suppressor rotor
- MagIC Net

**Ordering Information**

ProfIC Vario 5 AnCat

# „ProfIC Vario 6 AnCat“ – Professional IC Vario system with Inline Dilution and Inline Ultrafiltration

The Professional IC Vario system with ***Metrohm Inline Dilution***, ***Metrohm Inline Ultrafiltration*** and ***conductivity detection*** enables the fully automated determination of anions and cations that are present in very high concentrations and that have matrices containing particles.

Typical areas of application:
- Rinse, process and waste water
- Extractions and digestion solutions
- Food samples

The „ProfIC Vario 6 AnCat“ is comprised of one 940 Professional IC Vario TWO/SeS/PP, two „iDetector“ intelligent conductivity detectors, one 741 Magnetic Stirrer, one 800 Dosino, one 858 Professional Sample Processor, an IC equipment for Inline Dilution and an IC equipment for Inline Ultrafiltration.

The 940 Professional IC Vario TWO/SeS/PP is equipped with two „ONE“ modules and one „SeS/PP“ module, thus resulting in an instrument with two analysis channels. It comprises automatic sample and eluent degassing for both channels, two „iPump“ IC high-pressure pumps with intelligent pump heads and pulsation absorbers, two six-way injection valves, a column thermostat for the cooling and heating of two „iColumn“ separation columns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump. The instrument is equipped with a drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not pre-mounted.

„ProfIC Vario 6 AnCat“

**Technical Information**

Parts
1 x 2.940.2500 940 Professional IC Vario TWO/SeS/PP
2 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 2.741.0010 741 Magnetic Stirrer
1 x 2.800.0010 800 Dosino
1 x 6.5330.120 IC equipment: Inline Dilution
1 x 6.5330.110 IC equipment: Inline Ultrafiltration

The „ProfIC Vario 6 AnCat“ offers the option of automated inline dilution of every sample. This takes place at an external position on the 858 Professional Sample Processor. The 800 Dosino aspirates the volume to be diluted into the transfer tubing, doses it into the Liquid Handling Station and adds the required volume of dilution medium. With the IC equipment for Inline Dilution and for Inline Ultrafiltration, all of the parts needed to integrate Inline Dilution and Inline Ultrafiltration in the system are on hand.

The following components must be ordered separately in accordance with the desired application:
- Separation columns
- Sample rack
- Suppressor rotor
- MagIC Net

**Ordering Information**

ProfIC Vario 6 AnCat

# „ProfIC Vario 9 AnCat“ – Professional IC Vario system with Metrohm‘s intelligent preconcentration technique and Inline Matrix Elimination (MiPCT-ME)

The Professional IC Vario system with ***Metrohm‘s intelligent inline preconcentration technique***, ***Inline Matrix Elimination*** and ***conductivity detection*** enables ultratrace analysis down to the lowest ppt range (ng/L) of anions and cations in complex matrices.

Typical areas of application:

- Ultratrace analysis in samples from nuclear power plants and conventional power plants
- Trace and ultratrace analysis in extraction agents and organics

**Technical Information**

Parts

1 x 2.940.2500 940 Professional IC Vario TWO/SeS/PP
2 x 2.850.9010 IC Conductivity Detector
1 x 2.815.0130 815 USB Sample Processor (2T/0P)
3 x 2.800.0010 800 Dosino
1 x 6.5330.160 IC equipment: MiPCT-ME
1 x 6.5330.140 IC equipment: MiPCT
1 x 6.1014.200 Metrosep I Trap 1 - 100/4.0
and additional parts for the Sample Processor

The „ProfIC Vario 9 AnCat“ is comprised of one 940 Professional IC Vario TWO/SeS/PP, two „iDetector“ intelligent conductivity detectors, three 800 Dosinos, one 815 Robotic USB Sample Processor XL (2T/0P) with two workstations and one IC equipment each for MiPCT and MiPCT-ME.

The 940 Professional IC Vario TWO/SeS/PP is equipped with two „ONE“ modules and one „SeS/PP“ module, thus resulting in an instrument with two analysis channels. It comprises automatic sample and eluent degassing for both channels, two „iPump“ IC high-pressure pumps with intelligent pump heads and pulsation absorbers, two six-way injection valves, a column thermostat for the cooling and heating of two „iColumn“ separation columns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.
The instrument is equipped with a drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted.

One 800 Dosino each per sample channel and the IC equipments for MiPCT or MiPCT-ME, respectively, enable the preconcentration of the sample and the subsequent matrix elimination. Typical preconcentration volumes are 4 - 4,000 µL. The two towers of the 815 Robotic USB Sample Processor XL (2T/0P) enable carry-over-free sampling for anion and cation determination through two independent sample needles.

The following components must be ordered separately in accordance with the desired application:

- Separation column
- Preconcentration column
- Sample rack
- Suppressor rotor
- MagIC Net

„ProfIC Vario 9 AnCat“

**Ordering Information**

ProfIC Vario 9 AnCat

# „ProfIC Vario 14 AnCat“ – Professional IC Vario system with Metrohm‘s intelligent Pick-up Injection Technique (MiPuT)

The Professional IC Vario system with ***Metrohm‘s intelligent Pick-up Injection Technique*** (MiPuT) and ***conductivity detection*** enables the determination of anions and cations from the smallest of sample volumes.

Typical areas of application:
- For universal application for all types of samples when only small sample quantities are available
- Investigation of biochemical processes
- Environmental sample extracts

The „ProfIC Vario 14 AnCat“ is comprised of one 940 Professional IC Vario TWO/SeS/PP, two „iDetector“ intelligent conductivity detectors, one 858 Professional Sample Processor, one 800 Dosino and one IC equipment for MiPuT.

The 940 Professional IC Vario TWO/SeS/PP is equipped with two „ONE“ modules and one „SeS/PP“ module, thus resulting in an instrument with two analysis channels. It comprises automatic sample and eluent degassing for both channels, two „iPump“ IC high-pressure pumps with intelligent pump heads and pulsation absorbers, two six-way injection valves, a column thermostat for the cooling and heating of two „iColumn“ separation columns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

„ProfIC Vario 14 AnCat“

**Technical Information**

Parts
1 x 2.940.2500 940 Professional IC Vario TWO/SeS/PP
2 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0020 858 Professional Sample Processor
1 x 2.800.0010 800 Dosino
1 x 6.5330.170 IC equipment: MiPuT
1 x 6.1825.290 PEEK sample loop 250 µL

The instrument is equipped with a drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

The 800 Dosino and the IC equipment for MiPuT enable Metrohm‘s intelligent Pick-up Injection Technique for both analysis channels. 2 - 50 µL of each of the samples can be removed and injected directly.

The following components must be ordered separately in accordance with the desired application:
- Separation columns
- Sample rack (recommended 6.2041.480 Sample rack 159 x 2 mL + 3 x 300 mL)
- Suppressor rotor
- MagIC Net

**Ordering Information**

ProfIC Vario 14 AnCat

# „ProfIC Vario 15 AnCat“ – Professional IC Vario system with Metrohm‘s intelligent Partial Loop Injection Technique (MiPT)

The Professional IC Vario system with ***Metrohm‘s intelligent Partial Loop Injection Technique*** and ***conductivity detection*** enables the fully automatic determination of anions and cations. „Partial Loop Injection“ enables the injection of various sample volumes.

Typical areas of application:
- For universal application for all types of samples
- From trace analysis to waste water analysis
- Great differences in concentration in a single sample series

The „ProfIC Vario 15 AnCat“ is comprised of one 940 Professional IC Vario TWO/SeS/PP, two „iDetector“ intelligent conductivity detectors, one 858 Professional Sample Processor, one 800 Dosino and the IC equipment for MiPT.

The 940 Professional IC Vario TWO/SeS/PP is equipped with two „ONE“ modules and one „SeS/PP“ module, thus resulting in an instrument with two analysis channels. It comprises automatic sample and eluent degassing for both channels, two „iPump“ IC high-pressure pumps with intelligent pump heads and pulsation absorbers, two six-way injection valves, a column thermostat for the cooling and heating of two „iColumn“ separation columns, an external column position in the room temperature range and a bidirectional two-channel peristaltic pump.

The instrument is equipped with a drive for the „MSM, MSM-HC and MSM-LC“ Metrohm Suppressor Module for chemical suppression and the „MCS“ Metrohm $CO_2$ Suppressor for $CO_2$ suppression. The combination of the two suppressors represents a sequential suppression and permits very sensitive analyses, thanks to the extremely low background conductivity. The suppressor rotor is not premounted. This gives the customer different options to choose from and the suppressor rotor can be used in accordance with the respective application.

The 800 Dosino and the IC equipment for MiPT enable Metrohm‘s intelligent Partial Loop Injection Technique. 2 - 200 µL can be injected.

The following components must be ordered separately in accordance with the desired application:
- Separation columns
- Sample rack
- Suppressor rotor
- MagIC Net

**Technical Information**

Parts
1 x 2.940.2500 940 Professional IC Vario TWO/SeS/PP
2 x 2.850.9010 IC Conductivity Detector
1 x 2.858.0010 858 Professional Sample Processor
1 x 2.800.0010 800 Dosino
1 x 6.5330.180 IC equipment: MiPT
1 x 6.1825.290 PEEK sample loop 250 µL
1 x 6.1841.000 PEEK transfer capillary 2 mL, 5 m
1 x 6.2744.080 M6 thread / UNF 10/32 coupling
1 x 6.2744.290 T connector 3 × UNF 10/32 with holder

„ProfIC Vario 15 AnCat“

**Ordering Information**

ProfIC Vario 15 AnCat

# Professional IC Vario – Instruments
## 940 Professional IC Vario instruments – Introduction

**940 Professional IC Vario – a system of innovative and intelligent components that are optimally coordinated with one another!**

Configuration: The configuration of the system is as simple as possible, as the components log in automatically and make all relevant information available to the MagIC Net software.

Monitoring: The system monitors and optimizes all functions and documents them in accordance with FDA requirements upon request. Optimum operation of the 940 Professional IC Vario and the results are both monitored. If a parameter lies outside of the specified range, then the user will be informed via e-mail or SMS.

Inline Sample Preparation: The path from the sample to the precise result has become faster, as now even complex sample preparation steps are carried out inline and automatically. The system optimizes the sample preconcentration or the sample dilution automatically if required.

Free detector selection: The detection type can be selected to suit. That is the reason why no detector is included in the scope of delivery of the Professional IC Vario instruments.

- **Intelligent pump: iPump**
- **Intelligent detector: iDetector**
- **Intelligent column: iColumn**
- **Intelligent cells: iCell**
- **Intelligent reactors: iReactor**
- **Intelligent Liquid Handling with Dosinos**
- **Extension Module**

# 940 Professional IC Vario – Overview

| | | ONE | Suppression | | | Sample preparation | | | Gradient | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Chemical | Sequential | MCS | Prep 1 | Prep 2 | Prep 3 | HPG | LPG |
| | | iPump + Inj. | MSM | MCS | PP | PP | PP + Inj. | PP + SPM | | |
| **2.940.1100** | Professional IC Vario ONE | **yes** | – | – | – | – | – | – | – | – |
| **2.940.1110** | Professional IC Vario ONE/Prep 1 | **yes** | – | – | – | **yes** | – | – | – | – |
| **2.940.1120** | Professional IC Vario ONE/Prep 2 | **yes** | – | – | – | – | **yes** | – | – | – |
| **2.940.1140** | Professional IC Vario ONE/HPG | **yes** | – | – | – | – | – | – | **yes** | – |
| **2.940.1150** | Professional IC Vario ONE/LPG | **yes** | – | – | – | – | – | – | – | **yes** |
| **2.940.1200** | Professional IC Vario ONE/ChS | **yes** | **yes** | – | – | – | – | – | – | – |
| **2.940.1240** | Professional IC Vario ONE/ChS/HPG | **yes** | **yes** | – | – | – | – | – | – | – |
| **2.940.1250** | Professional IC Vario ONE/ChS/LPG | **yes** | **yes** | – | – | – | – | – | – | – |
| **2.940.1300** | Professional IC Vario ONE/ChS/PP | **yes** | **yes** | – | **yes** | – | – | – | – | – |
| **2.940.1340** | Professional IC Vario ONE/ChS/PP/HPG | **yes** | **yes** | – | **yes** | – | – | – | **yes** | – |
| **2.940.1350** | Professional IC Vario ONE/ChS/PP/LPG | **yes** | **yes** | – | **yes** | – | – | – | – | **yes** |
| **2.940.1400** | Professional IC Vario SeS | **yes** | **yes** | **yes** | – | – | – | – | – | – |
| **2.940.1410** | Professional IC Vario SeS/Prep 1 | **yes** | **yes** | **yes** | – | **yes** | – | – | – | – |
| **2.940.1420** | Professional IC Vario SeS/Prep 2 | **yes** | **yes** | **yes** | – | – | **yes** | – | – | – |
| **2.940.1430** | Professional IC Vario SeS/Prep 3 | **yes** | **yes** | **yes** | – | – | – | **yes** | – | – |
| **2.940.1440** | Professional IC Vario SeS/HPG | **yes** | **yes** | **yes** | – | – | – | – | **yes** | - |
| **2.940.1450** | Professional IC Vario SeS/LPG | **yes** | **yes** | **yes** | – | – | – | – | – | **yes** |
| **2.940.1500** | Professional IC Vario SeS/PP | **yes** | **yes** | **yes** | **yes** | – | – | – | – | – |
| **2.940.1510** | Professional IC Vario SeS/PP/Prep 1 | **yes** | **yes** | **yes** | **yes** | **yes** | – | – | – | – |
| **2.940.1520** | Professional IC Vario SeS/PP/Prep 2 | **yes** | **yes** | **yes** | **yes** | – | **yes** | – | – | – |
| **2.940.1530** | Professional IC Vario SeS/PP/Prep 3 | **yes** | **yes** | **yes** | **yes** | – | – | **yes** | – | – |
| **2.940.1540** | Professional IC Vario SeS/PP/HPG | **yes** | **yes** | **yes** | **yes** | – | – | – | **yes** | – |
| **2.940.1550** | Professional IC Vario SeS/PP/LPG | **yes** | **yes** | **yes** | **yes** | – | – | – | – | **yes** |
| **2.940.2100** | Professional IC Vario TWO | **yes (2x)** | – | – | – | – | – | – | – | – |
| **2.940.2200** | Professional IC Vario TWO/ChS | **yes (2x)** | **yes** | – | – | – | – | – | – | – |
| **2.940.2300** | Professional IC Vario TWO/ChS/PP | **yes (2x)** | **yes** | – | **yes** | – | – | – | – | – |
| **2.940.2400** | Professional IC Vario TWO/SeS | **yes (2x)** | **yes** | **yes** | – | – | – | – | – | – |
| **2.940.2500** | Professional IC Vario TWO/SeS/PP | **yes (2x)** | **yes** | **yes** | **yes** | – | – | – | – | – |

# Professional IC Vario instruments

**940 Professional IC Vario ONE** (2.940.1100)

The 940 Professional IC Vario ONE is the intelligent IC instrument for applications ***without suppression***. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/Prep 1** (2.940.1110)

The 940 Professional IC Vario ONE/Prep 1 is the intelligent IC instrument ***without suppression*** in combination with Metrohm Inline Sample Preparation, e.g., ***Inline Ultrafiltration*** or ***Inline Dialysis***. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/Prep 2** (2.940.1120)

The 940 Professional IC Vario ONE/Prep 2 is the intelligent IC instrument ***without suppression*** in combination with Metrohm Inline Sample Preparation, e.g., ***Inline Matrix Elimination*** or ***Inline Calibration***. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/HPG** (2.940.1140)

The 940 Professional IC Vario ONE/HPG is the intelligent IC instrument ***without suppression*** with ***binary high-pressure gradient***. It can be extended with the 942 Extension Modules to up to a quaternary gradient system. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/LPG** (2.940.1150)

The 940 Professional IC Vario ONE/LPG is the intelligent IC instrument ***without suppression*** with ***low-pressure gradient***. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/ChS** (2.940.1200)

The 940 Professional IC Vario ONE/ChS is the intelligent IC instrument with ***chemical suppression***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/ChS/HPG** (2.940.1240)

The 940 Professional IC Vario ONE/ChS/HPG is the intelligent IC instrument with ***chemical suppression*** and ***binary high-pressure gradient***. It can be extended with the 942 Extension Modules to up to a quaternary gradient system. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/ChS/LPG** (2.940.1250)

The 940 Professional IC Vario ONE/ChS/LPG is the intelligent IC instrument with ***chemical suppression*** and ***low-pressure gradient***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/ChS/PP** (2.940.1300)

The 940 Professional IC Vario ONE/ChS/PP is the intelligent IC instrument with ***chemical suppression*** and a ***peristaltic pump*** for suppressor regeneration. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/ChS/PP/HPG** (2.940.1340)

The 940 Professional IC Vario ONE/ChS/PP/HPG is the intelligent IC instrument with ***chemical suppression***, a ***peristaltic pump*** for suppressor regeneration and ***binary high-pressure gradient***. It can be extended with the 942 Extension Modules to up to a quaternary gradient system. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/ChS/PP/LPG** (2.940.1350)

The 940 Professional IC Vario ONE/ChS/PP/LPG is the intelligent IC instrument with ***chemical suppression***, a ***peristaltic pump*** for suppressor regeneration and ***low-pressure gradient***. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/SeS** (2.940.1400)

The 940 Professional IC Vario ONE/SeS is the intelligent IC instrument for applications with ***sequential suppression***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/SeS/Prep 1** (2.940.1410)

The 940 Professional IC Vario ONE/SeS/Prep 1 is the intelligent IC instrument with ***sequential suppression*** in combination with Metrohm Inline Sample Preparation, e.g., ***Inline Ultrafiltration*** or ***Inline Dialysis***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/SeS/Prep 2** (2.940.1420)

The 940 Professional IC Vario ONE/SeS/Prep 2 is the intelligent IC instrument with ***sequential suppression*** in combination with Metrohm Inline Sample Preparation, e.g., ***Inline Matrix Elimination*** or ***Inline Calibration***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/SeS/Prep 3** (2.940.1430)

The 940 Professional IC Vario ONE/SeS/Prep 3 is the intelligent IC instrument with ***sequential suppression*** in combination with Metrohm Inline Sample Preparation, e.g., ***Inline Neutralization*** or ***Inline Cation Removal***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/SeS/HPG** (2.940.1440)

The 940 Professional IC Vario ONE/SeS/HPG is the intelligent IC instrument with ***sequential suppression*** and ***binary high-pressure gradient***. It can be extended with the 942 Extension Modules to up to a quaternary gradient system. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/SeS/LPG** (2.940.1450)

The 940 Professional IC Vario ONE/SeS/LPG is the intelligent IC instrument with ***sequential suppression*** and ***low-pressure gradient***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/SeS/PP** (2.940.1500)

The 940 Professional IC Vario ONE/SeS/PP is the intelligent IC instrument with ***sequential suppression*** and a ***peristaltic pump*** for suppressor regeneration. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/SeS/PP/Prep 1** (2.940.1510)

The 940 Professional IC Vario ONE/SeS/PP/Prep 1 is the intelligent IC instrument with ***sequential suppression*** and a ***peristaltic pump*** for suppressor regeneration in combination with Metrohm Inline Sample Preparation, e.g., ***Inline Ultrafiltration*** or ***Inline Dialysis***. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/SeS/PP/Prep 2** (2.940.1520)

The 940 Professional IC Vario ONE/SeS/PP/Prep 2 is the intelligent IC instrument with ***sequential suppression*** and a ***peristaltic pump*** for suppressor regeneration in combination with Metrohm Inline Sample Preparation, e.g., ***Inline Matrix Elimination*** or ***Inline Calibration***. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/SeS/PP/Prep 3** (2.940.1530)

The 940 Professional IC Vario ONE/SeS/PP/Prep 3 is the intelligent IC instrument with ***sequential suppression*** with a ***peristaltic pump*** for suppressor regeneration in combination with Metrohm Inline Sample Preparation, e.g., ***Inline Neutralization*** or ***Inline Cation Removal***. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/SeS/PP/HPG** (2.940.1540)

The 940 Professional IC Vario ONE/SeS/PP/HPG is the intelligent IC instrument with ***sequential suppression***, a ***peristaltic pump*** for suppressor regeneration and ***binary high-pressure gradient***. It can be extended with the 942 Extension Modules to up to a quaternary gradient system. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario ONE/SeS/PP/LPG** (2.940.1550)

The 940 Professional IC Vario ONE/SeS/PP/LPG is the intelligent IC instrument with ***sequential suppression***, a ***peristaltic pump*** for suppressor regeneration and ***low-pressure gradient***. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario TWO** (2.940.2100)

The 940 Professional IC Vario TWO is the intelligent ***two-channel*** IC instrument ***without suppression***. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario TWO/ChS** (2.940.2200)

The 940 Professional IC Vario TWO/ChS is the intelligent ***two-channel*** IC instrument with a ***chemical suppressor***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario TWO/ChS/PP** (2.940.2300)

The 940 Professional IC Vario TWO/ChS/PP is the intelligent ***two-channel*** IC instrument with a ***chemical suppressor*** and a ***peristaltic pump*** for suppressor regeneration. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario TWO/SeS** (2.940.2400)

The 940 Professional IC Vario TWO/SeS is the intelligent ***two-channel*** IC instrument with ***sequential suppression*** (one channel). An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**940 Professional IC Vario TWO/SeS/PP** (2.940.2500)

The 940 Professional IC Vario TWO/SeS/PP is the intelligent ***two-channel*** IC instrument with ***sequential suppression*** (one channel) and a ***peristaltic pump*** for suppressor regeneration. The instrument can be used with any separation and detection methods.

# Professional IC Vario – Detectors

**IC Conductivity Detector** (2.850.9010)

Compact and intelligent high performance conductivity detector for intelligent IC instruments. Outstanding temperature stability, the complete signal processing within the protected detector block and the latest generation of DSP – Digital Signal Processing – guarantee the highest precision of the measurement. No change of measuring ranges (not even automatic ones) is required, due to the dynamic working range.

**IC Amperometric Detector** (2.850.9110)

Compact and intelligent amperometric detector for intelligent IC instruments. Outstanding selectivity due to the four measuring modes: DC, PAD, flexIPAD and CV, as well as the excellent signal/noise ratio and the very fast stabilization of the measuring signal guarantee the highest in measurement precision.

**944 Professional UV/VIS Detector Vario** (2.944.0010)

The 944 Professional UV/VIS Detector Vario is the intelligent UV/VIS detector from Metrohm. It permits a secure and reliable quantification of substances active in the ultraviolet or visible range. Detection takes place via a Diode Array.

**945 Professional Detector Vario – Conductivity** (2.945.0010)

Intelligent stand-alone detector equipped with a high-performance IC Conductivity Detector. For use with intelligent IC instruments or as independent conductivity detector.

**945 Professional Detector Vario – Amperometry** (2.945.0020)

Intelligent stand-alone detector equipped with the IC Amperometric Detector. Outstanding selectivity due to the four measuring modes: DC, PAD, flexIPAD, CV. The excellent signal/noise ratio and the very fast start-up guarantee the highest in measurement precision. For use with intelligent IC instruments or as independent detector.

**945 Professional Detector Vario – Conductivity & Amperometry** (2.945.0030)

Intelligent stand-alone detector equipped with the high performance IC Conductivity Detector and the IC Amperometric Detector, with the four measuring modes DC, PAD, flexIPAD and CV. For use with intelligent IC instruments or as independent detector for conductivity and amperometric detection.

# Inline Eluent Preparation – Introduction

**Inline Eluent Preparation**
Inline Eluent Preparation increases the duration of unattended operation in that with this system, the exhausted eluent is refilled fully automatically while the ion chromatograph is in operation. The eluent is diluted in portions with ultrapure water from an eluent concentrate for this purpose.

For automatic Inline Eluent Preparation, the 940 Professional IC Vario intelligent ion chromatography systems or the instruments in the Compact IC line need only be expanded to include a 941 Eluent Production Module. While the latter monitors the eluent fill level, the 800 Dosino is responsible for all dosing and Liquid Handling tasks.

Tests with injections of 250 µg/L standard solutions, spread out over a time period of approximately 20 days, have demonstrated outstanding stability with respect to retention times. After more than 800 sample injections, the relative standard deviations for a series of anions and cations were less than 0.55 and 0.41 percent, respectively. During a test sequence over a 24-hour period, the precision of the retention times for anions and cations were better than 0.09 and 0.08 percent, respectively. In short, Inline Eluent Preparation with the 941 Eluent Production Module increases the reproducibility of retention times, thus permitting the exact analysis of anions and cations over extended periods, and does so without manual eluent production.

# 941 Eluent Production Module

The 941 Eluent Production Module enables the automatic production of an eluent. It enables continuous working without manual intervention and guarantees stable retention times. It can be combined with all Metrohm IC instruments and is monitored by MagIC Net.

The 941 Eluent Production Module is equipped for the production of an eluent and contains an 800 Dosino. Additional eluents can be produced and monitored when it is expanded to include an 800 Dosino with the IC equipment for additional eluents (6.5330.090).

In addition, it offers the possibility of directly connecting an ultrapure water system (ELGA PURELAB® flex 5 or flex 6).

- „Inline Eluent Preparation“
- Enhances laboratory safety
- Protects eluents against idle running
- Can be used for all types of eluents
- Simple assembly and configuration
- Guarantees stable retention times
- Uninterrupted working without manual intervention

941 Eluent Production Module

**Ordering Information**

2.941.0010 941 Eluent Production Module

# Extension Module Vario – Overview

| | | ONE | LQH | Suppression | | | Sample preparation | | Gradient |
|---|---|---|---|---|---|---|---|---|---|
| | | | | chemical | sequential | | Prep 2 | Prep 3 | HPG |
| | | iPump + Injector | PP + Inj. + Selector | MSM | MCS | PP | PP + Inj. | PP + SPM | |
| **2.942.0020** | Extension Module Vario Prep 2 | – | – | – | – | – | yes | – | – |
| **2.942.0040** | Extension Module Vario HPG | – | – | – | – | – | – | – | yes |
| **2.942.0070** | Extension Module Vario LQH | – | yes | – | – | – | – | – | – |
| **2.942.0300** | Extension Module Vario ChS/PP | – | – | yes | – | yes | – | yes | – |
| **2.942.0500** | Extension Module Vario SeS/PP | – | – | yes | yes | yes | – | – | – |
| **2.942.1060** | Extension Module Vario ONE/Deg | yes | – | – | – | – | – | – | – |

# Extension Module Vario

**942 Extension Module Vario Prep 2** (2.942.0020)

The 942 Extension Module Vario Prep 2 is an extension module for the Professional IC Vario line of instruments. It multiplies the possibilities of ***Inline Sample Preparation*** and ***Liquid Handling*** in Professional IC Vario systems.

**942 Extension Module Vario HPG** (2.942.0040)

The 942 Extension Module Vario HPG is an extension module for the Professional IC Vario line of instruments. It permits the addition of a further eluent in a Professional IC Vario ***high-pressure gradient system***.

**942 Extension Module Vario LQH** (2.942.0070)

The 942 Extension Module Vario LQH is an extension module for the Professional IC Vario line of instruments. It expands the possibilities of ***Metrohm Inline Sample Preparation „MISP“*** and ***Liquid Handling*** and opens a Professional IC system for ***Online Monitoring***.

**942 Extension Module Vario ChS/PP** (2.942.0300)

The 942 Extension Module Vario ChS/PP is an extension module for the Professional IC Vario line of instruments. It permits the integration of a complete ***chemical suppression*** with a ***peristaltic pump*** for suppressor regeneration or ***Inline Neutralization*** or ***Inline Cation Removal***, respectively, in a Professional IC Vario system.

**942 Extension Module Vario SeS/PP** (2.942.0500)

The 942 Extension Module Vario SeS/PP is an extension module for the Professional IC Vario line of instruments. It permits the integration of a complete ***sequential suppression*** with ***peristaltic pump*** for suppressor regeneration in a Professional IC Vario system.

**942 Extension Module Vario ONE/Deg** (2.942.1060)

The 942 Extension Module Vario ONE/Deg is an extension module for the Professional IC Vario line of instruments. It permits the installation of an additional ***IC analysis channel*** in a Professional IC Vario system.

# Compact IC Flex – Instruments
## Compact IC Flex – Introduction

**The intelligent instrument generation of the Compact ion chromatographs**

***930 Compact IC Flex and 883 Basic IC plus***

**Intelligent. Safe. Precise.**

The top model for ion chromatography from Metrohm is the 940 Professional IC Vario. Its intelligent system components set standards with respect to the precision of the results and operating convenience. This technology is also available in the intelligent generation of the Compact line of instruments. The 930 Compact IC Flex is oriented to users from all industries that have a defined need for analysis. Determination of anions, cations and polar substances in the µg/L to g/L range is accurate and securely possible.

All intelligent functions of the Professional IC Vario instrument series are also integrated in the 940 Compact Flex and 883 Basic instruments: iPump, iDetector, iColumn technology. They guarantee precise results and exclude the possibility of operator errors to a maximum extent. The MagIC Net chromatography software controls all system components and permits the monitoring of all relevant parameters.

Depending on the version selected, the 930 Compact IC Flex instruments are equipped with chemical or sequential suppression, one column oven and eluent and sample degassers. The type of detection can be selected to suit. That is the reason why no detector is included in the scope of delivery of the Compact IC instruments.

The 883 Basic IC plus is the optimum instrument for training purposes. It can be operated only with the supplied IC Conductivity Detector.

Access to the new online configurator for the 930 Compact IC Flex instruments is through ic930.metrohm.com

# Compact IC Flex – Overview

| | | Suppression | | | Column oven | Degasser | Automation capability | 863 Autosampler included | Software included |
|---|---|---|---|---|---|---|---|---|---|
| | | chemical | sequential | | | | | | |
| | | MSM | MCS | PP | | | | | |
| 2.930.1100 | Compact IC Flex | – | – | – | – | – | yes | – | – |
| 2.930.1160 | Compact IC Flex Deg | – | – | – | – | yes | yes | – | – |
| 2.930.1200 | Compact IC Flex ChS | yes | – | – | – | – | yes | – | – |
| 2.930.1260 | Compact IC Flex ChS/Deg | yes | – | – | – | yes | yes | – | – |
| 2.930.1300 | Compact IC Flex ChS/PP | yes | – | yes | – | – | yes | – | – |
| 2.930.1360 | Compact IC Flex ChS/PP/Deg | yes | – | yes | – | yes | yes | – | – |
| 2.930.1400 | Compact IC Flex SeS | yes | yes | – | – | – | yes | – | – |
| 2.930.1460 | Compact IC Flex SeS/Deg | yes | yes | – | – | yes | yes | – | – |
| 2.930.1500 | Compact IC Flex SeS/PP | yes | yes | yes | – | – | yes | – | – |
| 2.930.1560 | Compact IC Flex SeS/PP/Deg | yes | yes | yes | – | yes | yes | – | – |
| 2.930.2100 | Compact IC Flex Oven | – | – | – | yes | – | yes | – | – |
| 2.930.2160 | Compact IC Flex Oven/Deg | – | – | – | yes | yes | yes | – | – |
| 2.930.2200 | Compact IC Flex Oven/Chs | yes | – | – | yes | – | yes | – | – |
| 2.930.2260 | Compact IC Flex Oven/ChS/Deg | yes | – | – | yes | yes | yes | – | – |
| 2.930.2300 | Compact IC Flex Oven/ChS/PP | yes | – | yes | yes | – | yes | – | – |
| 2.930.2360 | Compact IC Flex Oven/ChS/PP/Deg | yes | – | yes | yes | yes | yes | – | – |
| 2.930.2400 | Compact IC Flex Oven/SeS | yes | yes | – | yes | – | yes | – | – |
| 2.930.2460 | Compact IC Flex Oven/SeS/Deg | yes | yes | – | yes | yes | yes | – | – |
| 2.930.2500 | Compact IC Flex Oven/SeS/PP | yes | yes | yes | yes | – | yes | – | – |
| 2.930.2560 | Compact IC Flex Oven/SeS/PP/Deg | yes | yes | yes | yes | yes | yes | – | – |
| 2.883.0020 | Basic IC plus | yes | – | yes | – | – | yes | – | yes |
| 2.883.1020 | Basic IC plus Package | yes | – | yes | – | – | yes | yes | yes |

# Compact IC Flex

**930 Compact IC Flex** (2.930.1100)

The 930 Compact IC Flex is the intelligent Compact IC instrument ***without suppression***. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex Deg** (2.930.1160)

The 930 Compact IC Flex Deg is the intelligent Compact IC instrument ***without suppression*** with built-in ***degasser***. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex ChS** (2.930.1200)

The 930 Compact IC Flex ChS is the intelligent Compact IC instrument with ***chemical suppression***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex ChS/Deg** (2.930.1260)

The 930 Compact IC Flex ChS/Deg is the intelligent Compact IC instrument with ***chemical suppression*** and built-in ***degasser***. An 800 Dosino is used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex ChS/PP** (2.930.1300)

The 930 Compact IC Flex ChS/PP is the intelligent Compact IC instrument with ***chemical suppression*** and a ***peristaltic pump*** for regeneration. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex ChS/PP/Deg** (2.930.1360)

The 930 Compact IC Flex ChS/PP/Deg is the intelligent Compact IC instrument with ***chemical suppression*** and a ***peristaltic pump*** for regeneration and a built-in ***degasser***. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex SeS** (2.930.1400)

The 930 Compact IC Flex SeS is the intelligent Compact IC instrument with ***sequential suppression***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex SeS/Deg** (2.930.1460)

The 930 Compact IC Flex SeS/Deg is the intelligent Compact IC instrument with ***sequential suppression*** and built-in ***degasser***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex SeS/PP** (2.930.1500)

The 930 Compact IC Flex SeS/PP is the intelligent Compact IC instrument with ***sequential suppression*** and a ***peristaltic pump*** for suppressor regeneration. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex SeS/PP/Deg** (2.930.1560)

The 930 Compact IC Flex SeS/PP/Deg is the intelligent Compact IC instrument with ***sequential suppression*** and a ***peristaltic pump*** for suppressor regeneration, in addition to a built-in ***degasser***. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex Oven** (2.930.2100)

The 930 Compact IC Flex Oven is the intelligent Compact IC instrument with ***column oven*** and ***without suppression***. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex Oven/Deg** (2.930.2160)

The 930 Compact IC Flex Oven/Deg is the intelligent Compact IC instrument with ***column oven***, ***without suppression*** and with built-in ***degasser***. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex Oven/ChS** (2.930.2200)

The 930 Compact IC Flex Oven/ChS is the intelligent Compact IC instrument with ***column oven*** and ***chemical suppression***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex Oven/ChS/Deg** (2.930.2260)

The 930 Compact IC Flex Oven/ChS/Deg is the intelligent Compact IC instrument with ***column oven***, ***chemical suppression*** and built-in ***degasser***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex Oven/ChS/PP** (2.930.2300)

The 930 Compact IC Flex Oven/ChS/PP is the intelligent Compact IC instrument with ***column oven***, ***chemical suppression*** and a ***peristaltic pump*** for suppressor regeneration. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex Oven/ChS/PP/Deg** (2.930.2360)

The 930 Compact IC Flex Oven/ChS/PP/Deg is the intelligent Compact IC instrument with ***column oven***, ***chemical suppression*** and a ***peristaltic pump*** for suppressor regeneration and built-in ***degasser***. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex Oven/SeS** (2.930.2400)

The 930 Compact IC Flex Oven/SeS is the intelligent Compact IC instrument with ***column oven*** and ***sequential suppression***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex Oven/SeS/Deg** (2.930.2460)

The 930 Compact IC Flex Oven/SeS/Deg is the intelligent Compact IC instrument with ***column oven***, ***sequential suppression*** and built-in ***degasser***. An 800 Dosino can be used for the regeneration of the suppressor. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex Oven/SeS/PP** (2.930.2500)

The 930 Compact IC Flex Oven/SeS/PP is the intelligent Compact IC instrument with ***column oven***, ***sequential suppression*** and ***peristaltic pump*** for suppressor regeneration. The instrument can be used with any separation and detection methods.

**930 Compact IC Flex Oven/SeS/PP/Deg** (2.930.2560)

The 930 Compact IC Flex Oven/SeS/PP/Deg is the intelligent Compact IC instrument with ***column oven***, ***sequential suppression***, a ***peristaltic pump*** for suppressor regeneration and built-in ***degasser***. The instrument can be used with any separation and detection methods.

# Basic IC plus – Instruments

**883 Basic IC plus** (2.883.0020)

The 883 Basic IC plus is an intelligent, very compact ion chromatograph for education and routine analysis. For determining cations and anions with and without chemical suppression. Conductivity Detector, MagIC Net Basic software and textbook included.

**883 Basic IC plus Package** (2.883.1020)

Package for automated analysis with the 883 Basic IC plus. For education and routine analysis. For determining cations and anions with and without chemical suppression. 883 Basic IC plus, 863 Compact IC Autosampler, MagIC Net Basic software and textbook included.

# Additional IC Vario components
## Alternative IC components – Introduction

Ion chromatography has established itself in laboratories as a high-performance and flexible method. The range of analytes that can be determined is improved with additional IC components, and sensitivity and selectivity can be improved as well.

Heatable modules can be used not only for Metrohm Inline Sample Preparation (MISP) but also for post-column reaction systems. Data converters enable the import of external detector signals. On the other hand, analog signals can be output to external evaluation systems with the 891 Professional Analog Out.

# Heatable reactors and column compartments

**943 Professional Reactor Vario** (2.943.0110)

The 943 Professional Reactor Vario is a heatable reactor, especially developed for pre- and post-column derivatization. It captivates by its robustness, the fast heating rate and the possibility of carrying out reactions at up to 150 °C.

**943 Professional Thermostat Vario** (2.943.0210)

The 943 Professional Thermostat Vario is a stand-alone column oven for up to two columns with a maximum length of 150 mm. It captivates by its fast heating rate and the possibility of operating two separation columns together at up to 80 °C.

# Data Converters

**771 IC Compact Interface** (2.771.0010)

The universally applicable analog-digital converter with two channels and 24 Bit resolution. The data is passed along to the PC through the RS-232C interface and can be processed further there with IC Net or with MagIC Net.


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

IC Compact Interface with the MagIC Net Professional software. The 771 Compact Interface combines the analog signal of the existing IC instruments (Compact, Modular, Advanced) with the improved possibilities of the modern MagIC Net software.


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

IC Compact Interface with the MagIC Net Compact software. The 771 Compact Interface combines the analog signal of the existing IC instruments (Compact, Modular, Advanced) with the improved possibilities of the modern MagIC Net software.


**891 Professional Analog Out** (2.891.0010)

The 891 Professional Analog Out is an additional module for intelligent IC instruments. It allows to transfer analog signals of different chromatographic data to external data systems.

# Professional IC Vario – Hyphenated systems
## IC Vario coupling techniques – Introduction

The world of ion chromatography is extended considerably when Metrohm IC is coupled with other analysis methods, sample preparation techniques or detection systems.

The possibilities are practically unlimited. Any system that can process or supply aqueous solutions as samples can be coupled to Metrohm IC instruments.

This means that ion chromatography can be combined with Metrohm titrators and measuring instruments to form hyphenated systems. These TitrIC Vario or VoltIC Vario systems enable, for example, the entire water analysis, down to ion balance, simultaneously from a single sample. Additional typical examples include the coupling of the IC with MS or ICP-MS, the Combustion IC and air monitoring systems.

# Hyphenated IC systems

**TitrIC Vario pro I – The basic hyphenated system for IC and titration** (TitrIC Vario pro I)

Fully automatic system for direct measurement of temperature, conductivity and pH value; the titrimetric determination of p value, m value, calcium and magnesium and the determination of anions by ion chromatography.

**TitrIC Vario pro II – The hyphenated IC and titration system for comprehensive anion and cation analysis** (TitrIC Vario pro II)

Fully automatic system for direct measurement of temperature, conductivity and pH value; the titrimetric determination of p and m value, the determination of cations including calcium and magnesium, as well as anions by ion chromatography.

**TitrIC Vario pro III – The professional hyphenated IC and titration system with lockable sample vessels** (TitrIC Vario pro III)

Fully automatic system for direct measurement of temperature, conductivity and pH value; the titrimetric determination of p and m value, the determination of cations including calcium and magnesium, as well as anions by ion chromatography. The sample changer is equipped with the DisCover function for automatic sample vessel cover removal.

**VoltIC Vario pro I – The hyphenated IC and voltammetry system for parallel determination of anions, cations and heavy metals** (VoltIC Vario pro I)

VoltIC Vario I is the perfect combination of IC and voltammetry for simultaneous determination of anions, cations and heavy metals. MagIC Net controls IC instruments, starts voltammetric determination, and summarizes the results from IC and voltammetry.

**930 Metrohm Combustion IC** (2.930.9010)

The 930 Metrohm Combustion IC enables the analysis of halogens and sulfur in flammable samples of all types using inline combustion digestion with subsequent ion chromatography determination (Combustion IC). It includes all required components. If necessary, the 930 Metrohm Combustion IC package can be supplemented with an Autosampler for solid or liquid samples (MMS 5000 Autosampler). The entire analysis, including sample input and combustion, is completely controlled by MagIC Net.

**920 Absorber Module** (2.920.0010)

The 920 Absorber Module combines the Combustion Module with the ion chromatograph. The 920 Absorber Module ensures that the gaseous compounds of the analytes are dissolved and channeled to the IC. It is responsible for the entire Liquid Handling. In addition to Combustion IC, it can also be used for gas analysis.

**MMS 5000 Autosampler** (2.136.0800)

MMS 5000 Autosampler from Analytik Jena for use with the Metrohm Combustion IC for fully automatic analysis of liquid and solid samples. In order to match the modular Multi-Matrix sampler with the correct sample type, either the liquid kit (6.7303.000) or the solid kit (6.7302.000) must be used.

**Combustion Module ( Oven + ABD )** (2.136.0700)

The Combustion Module (Oven + ABD ) enables the sample digestion of flammable samples of all types under pyrolysis and oxidation. The Combustion Module is comprised of the combustion oven and the Auto Boat Driver (automatic sample introduction). Both are products of Analytik Jena which have been optimized specially for coupling with ion chromatographs.

**Auto Boat Drive** (2.136.0710)

The Auto Boat Drive (ABD) automatically guides the sample scoops into the combustion oven. The sample injection into the boat can proceed manually or with a corresponding sampler. The Analytik Jena product has been optimized specially for coupling with ion chromatographs.

**LPG/GSS Module** (2.136.0720)

The LPG/GSS Module is a sample injection system for either liquefied gases or gases under enhanced pressure. The module is controlled automatically and moves the respective amounts of gas to the combustion oven for combustion. The Analytik Jena product has been optimized specially for coupling with ion chromatographs.

**Combustion Module (Oven + LPG/GSS)** (2.136.0730)

The Combustion Module (Oven + LPG/GSS) enables sample digestion during the pyrolysis of liquefied gases and gases under pressure. The Combustion Module (Oven + LPG/GSS) is comprised of the combustion oven and the LPG/GSS module. Both are products of Analytik Jena which have been optimized specially for coupling with ion chromatographs.

**PILS, Particle Into Liquid Sampler** (2.136.0400)

Coupling with ion chromatographs allows automatic determination of the ionic composition of the aerosols without requiring additional sample preparation.

**MARGA, Monitor for AeRosols and Gases in ambient Air** (MARGA)

MARGA is a fully automated online system that determines anions and cations in gases and aerosols. The acid and alkali gases are absorbed in water in a „Wet Rotating Denuder" and the aerosols in a „Steam Jet Aerosol Collector" and investigated with two Compact ICs for their anion and cation content. MARGA is designed for prolonged autonomous operation.

MARGA is distributed by Applikon (www.metrohm-applikon.com).

# Automation in ion chromatography
## Overview of IC automation

**Sample changers**

Automation in ion chromatography ranges all the way from simple automatic sample injection to complex sample preparation with combined methods. It must be possible to process sample quantities ranging from a few µL to several mL. A number of sample changers with different areas of application are available for this purpose.

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.

In addition to the 858 Professional Sample Processor, the 889 IC Sample Center, the 919 IC Autosampler plus, the 863 Compact IC and the entire series of the 814 and 815 Sample Processors are available from the titration range.

**Metrohm Inline Sample Preparation (MISP)**

Samples such as milk, chocolate, caustic soda, biodiesel or heavily contaminated waste waters require sample preparation before they can be analyzed with IC. Together with the 858 Professional Sample Processor, the 940 Professional IC Vario offers extensive possibilities for completely automated Inline Sample Preparation, e.g., Inline Ultrafiltration, Inline Dialysis, Inline Preconcentration, Inline Matrix Elimination, Inline Matrix Neutralization and Inline Calibration.

# IC Automation – Instruments

**858 Professional Sample Processor** (2.858.0010)

The 858 Professional Sample Processor processes samples from 500 µL to 500 mL. The sample transfer takes place either by means of a peristaltic pump on the 850 Professional IC system or with an 800 Dosino.

**858 Professional Sample Processor – Pump** (2.858.0020)

The 858 Professional Sample Processor – Pump processes samples from 500 µL to 500 mL. The sample transfer takes place either with the installed bidirectional two-channel peristaltic pump or with an 800 Dosino.

**858 Professional Sample Processor – Pump – Injector** (2.858.0030)

The 858 Professional Sample Processor – Pump – Injector processes samples from 500 µL to 500 mL. The sample transfer takes place either with the installed bidirectional two-channel peristaltic pump or by means of an 800 Dosino. In addition, a six-way injection valve is available for the sample preparation.

**919 IC Autosampler plus** (2.919.0020)

The 919 IC Autosampler plus fulfills the requirements of laboratories with medium sample numbers. It enables automation of the full range of Metrohm IC instruments.

**863 Compact IC Autosampler** (2.863.0010)

The 863 Compact IC Autosampler is the ideal help for routine analysis. It enables automation of the full range of Metrohm IC instruments.

**815 Robotic Soliprep for LC** (2.815.4110)

The 815 Robotic Soliprep for LC is a complete system for the completely automatic preparation of samples which need to be dissolved, homogenized, diluted or filtered prior to their determination. The samples are conveyed directly into the injector of the chromatograph after preparation.

**889 IC Sample Center** (2.889.0010)

The 889 IC Sample Center is a robust Autosampler for high sample throughput, optimized for the challenges of the modern analytic laboratory. It works in accordance with the x-y-z principle and a syringe control with high resolution for precise sample injection. A double needle system enables the penetration of vessel caps and septa. A PEEK injection valve completes the automation system of the 889 IC Sample Center. It is the appropriate automation solution when you have only a very small amount of sample.

**889 IC Sample Center – cool** (2.889.0020)

The 889 IC Sample Center – cool is the appropriate automation solution when you have only a very small amount of sample. In comparison with the 889 IC Sample Center, it possesses in addition a cooling function and is thus the ideal sample changer for biochemically relevant or thermally unstable samples.

# Additional Sample Processors for IC

**Even more flexibility and choice!**
Even the USB Sample Processors of the titration segment can be actuated with **MagIC Net**. This means that there are practically no limits to automation in ion chromatography. Whether it be small or large sample vessels, whether it be at room temperature or cooled, whether it be automatic sample preparation with one or two sample changer towers – the answer in ion chromatography is always:

**Yes, we can do it!**

The advantages of a sample changer lie not only in the time savings for the laboratory personnel: Automatic systems control operating sequences and thus improve **reproducibility and accuracy**. Errors can be reduced to a minimum.

The system works through the prepared samples, no matter what time of day it is. Whether it be automatic sample preparation, Liquid Handling or sample processing – this Sample Processor generation controls everything that one previously associated only with laboratory robots.

Depending on preference, the USB Sample Processor can be controlled not only with **MagIC Net** but also with **Touch Control**, **PC Control** or conveniently with the ***tiamo***™ titration software.

814 USB Sample Processor with sample rack for 12 x 250 mL

| 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) |
| 2.814.0110 | 814 USB Sample Processor (2T/2P) |
| 2.814.0120 | 814 USB Sample Processor (2T/4P) |
| 2.814.0130 | 814 USB Sample Processor (2T/0P) |
| 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) |
| 2.815.2110 | 815 Robotic Flexible Soliprep |
| 2.815.3110 | 815 Robotic Filtration Soliprep |

# Liquid Handling in ion chromatography
## Liquid Handling in IC – Introduction

**Sample input – Inline Sample Preparation**

In the beginning was the ***syringe*** – manual sample injection continues to be used today. In most cases, however, the samples are transferred automatically into the ion chromatograph. It begins with the simple ***peristaltic pump*** that pumps the sample solution to the injector. Additional components, e.g., valves, filtration and dialysis cells, neutralization modules, etc. thus pave the way to Inline Sample Preparation. The use of the ***800 Dosino*** as module for sample transfer, also and in particular for the exact dosing of several solutions and different volumes, represents yet another massive extension of these possibilities. Logical and flexible dilution – that means free selection of dilution factor and repeated dilution of the sample when the result lies outside of the calibration range – high-precision „Partial-Loop Injection" methods and automatic calibration with variable preconcentration – enables a calibrated working range of up to six decades (e.g., 10 ppt to 10 ppm); these are only a few of the many applications that only became possible with the advent of the 800 Dosino.

**IC equipment for Liquid Handling**

MISP made simple. The IC equipments contain all of the parts required for the respective sample preparation method. This way you can be sure that the method also works.

# Liquid Handling for IC

**800 Dosino** (2.800.0010)

Drive with write/read hardware for intelligent Dosing Units. With fixed cable (length 150 cm).

**846 Dosing Interface** (2.846.0010)

USB-capable control unit for connecting a maximum of four 800 Dosinos or 805 Dosimats for dosing and Liquid Handling tasks. A Touch Control or the connection to a PC with ***tiamo***™, MagIC Net, viva or 797 VA Computrace is required for operation.

**IC equipment: Additional eluent on the Eluent Production Module** (6.5330.090)

Accessory set for Eluent Production Module. Contains all parts necessary for expansion by one eluent. The level sensor must be ordered in accordance with the application.

**IC equipment: Inline dialysis** (6.5330.100)

Accessory set for Inline Dialysis. For use with the 858 Professional Sample Processor and an additional 2-channel peristaltic pump.

**IC equipment: Inline ultrafiltration** (6.5330.110)

Accessory set for Inline Ultrafiltration. For use with the 858 Professional Sample Processor.

**IC equipment: Inline dilution** (6.5330.120)

Accessory set for Inline Dilution. For use with the 858 Professional Sample Processor, 800 Dosino and 741 Magnetic Stirrer.

**IC equipment: Liquid Handling Station, left** (6.5330.130)

Accessory set for assembling the Liquid Handling Station on the Professional Sample Processor. The rinsing water supply can be accomplished by means of a peristaltic pump or a Dosino.

**IC equipment: MiPCT** (6.5330.140)

Accessory set for Inline Preconcentration (MiPCT) including Liquid Handling Station, left.

**IC equipment: Dose-in Gradient** (6.5330.150)

Accessory set for assembling the Dose-in Gradient.

**IC equipment: MiPCT-ME** (6.5330.160)

Accessory set for assembling a Dosino for Metrohm intelligent Preconcentration Technique with Matrix Elimination (MiPCT-ME).

**IC equipment: MiPUT** (6.5330.170)

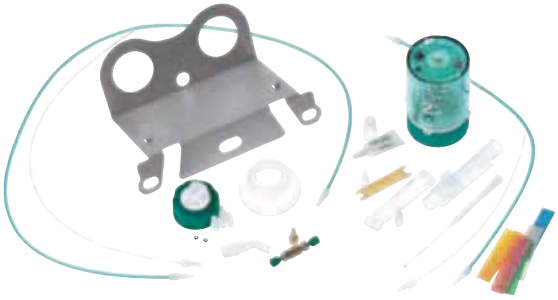
Accessory set for assembling a Dosino for Sample Pickup.

**IC equipment: MiPT** (6.5330.180)

Accessory set for assembling a Dosino for Partial-Loop-Injection.

**IC equipment: Dosino regeneration** (6.5330.190)

Accessory set for the assembly of a Dosino for automatic regeneration of the Metrohm Suppressor Module (MSM).



**IQ/OQ Kit for IC** (6.5333.000)

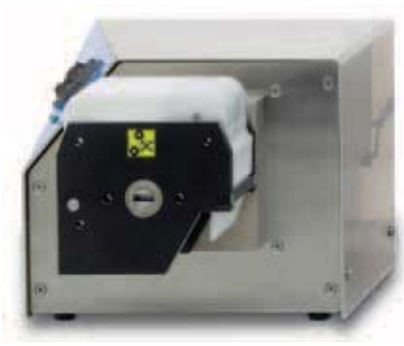
The IQ/OQ Kit contains all parts and standard solutions required for IQ/OQ in ion chromatography.

**IC equipment for Liquid Handling Set for PILS** (6.5335.000)

Accessories set for PILS (Particle Into Liquid Sampler).

**Peristaltic pump, 8-channel** (2.136.0500)

8-channel peristaltic pump for PILS (Particle Into Liquid sampler) for transferring any auxiliary solution.



# Professional Vario IC – Software
## MagIC Net – Introduction

**MagIC Net software for intuitive and simple operation**

**It's MagIC!**
Clear symbols, clear presentation, intuitive operation, „One-Button IC": This is MagIC Net.

Complete system monitoring, control charts for measurements, convenient database functions: This, too, is MagIC Net, the intelligent software – Swiss Made – for controlling and monitoring the Metrohm ion chromatography systems.

The MagIC Net chromatography software controls all intelligent ion chromatographs and records all the data that arises. The current version of MagIC Net is offered in four different versions:

- MagIC Net Professional supports the entire range of intelligent ion chromatographs and sample changers. This means that all of the peripheral devices for Inline Sample Preparation and Liquid Handling can also be operated and other Metrohm instruments or third-party devices that are already in use can be remote-controlled.
- MagIC Net Compact comprises the complete functionality of the MagIC Net Professional version. However, only the Compact IC instruments and one sample changer can be connected for automation purposes.
- MagIC Net Multi makes MagIC Net Professional available in its entirety as a client-server installation.
- MagIC Net Basic is a special version for the 883 Basic IC plus, modified for training requirements. MagIC Net Basic is contained in the instrument.

All four versions are exceptional for their clearly organized presentation, clear symbols and intuitive operation. The checking and monitoring functions of the MagIC Net software are unique: All system parameters, service intervals or expiration data can be checked, as can also all measuring results of samples and standard solutions. When a limit value is exceeded, previously defined actions, e.g., the sending of a message via e-mail or cellular phone or the switching off of the system, can be triggered. Thanks to the modern data management of MagIC Net, one never loses sight of the larger picture, as all of the information required is made available immediately.

All intelligent components are recognized, monitored and actuated automatically:

- IC Amperometric Detector
- IC Conductivity Detector
- iCell
- iColumns
- iReactor
- 771 Compact Interface
- 800 Dosinos
- 814/815 Robotic USB Sample Processors
- 846 Dosing Interface
- 850 Professional IC
- 858 Professional Sample Processor
- 863 Compact IC Autosampler
- 872 Extension Module
- 881 Compact IC pro
- 882 Compact IC plus
- 883 Basic IC plus
- 886 Professional Reactor / Thermostat
- 887 Professional UV/VIS Detector
- 889 IC Sample Center
- 891 Professional Analog Out
- 896 Professional Detector
- 919 IC Autosampler plus
- 930 Compact IC Flex
- 940 Professional IC Vario
- 941 Eluent Production Module
- 942 Extension Module Vario
- 943 Professional Reactor/Thermostat Vario
- 944 Professional UV/VIS Detector Vario
- 945 Professional Detector Vario

Flexible programming of the sequences in the time programs, combined with logical decisions and virtually infinite calculation possibilities, open up the entire world of ion chromatography with MagIC Net. From simple routine applications all the way to highly complex combinations of different sample preparation techniques.

# MagIC Net versions

**MagIC Net 3.0 Compact CD: 1 license** (6.6059.301)

Professional PC program for controlling an intelligent Compact IC instrument, one detector and one Autosampler, or a 771 Compact Interface. The software permits control, data acquisition, data evaluation and data monitoring as well as report generation of ion chromatographic analyses. MagIC Net Compact complies fully with FDA Regulation 21 CFR Part 11 as well as GLP. MagIC Net is available in 14 dialog languages.

**MagIC Net 3.0 Professional CD: 1 license** (6.6059.302)

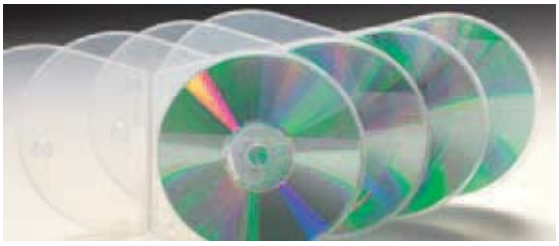
Professional PC program for controlling all of the intelligent Professional IC systems, Compact IC instruments and their peripherals, such as various Autosamplers, 800 Dosino, 771 Compact Interface, etc. The software permits the control, data acquisition, data evaluation, data monitoring and report generation of ion chromatographic analyses. MagIC Net Professional complies fully with FDA Regulation 21 CFR Part 11 as well as GLP. MagIC Net is available in 14 dialog languages.

**MagIC Net 3.0 Multi CD: 3 licenses** (6.6059.303)

Professional PC program for controlling all of the intelligent Professional IC systems, Compact IC instruments and their peripherals, such as various Autosamplers, 800 Dosino, 771 Compact Interface, etc. The software permits the control, data acquisition, data evaluation, data monitoring and report generation of ion chromatographic analyses. MagIC Net Multi complies fully with FDA Regulation 21 CFR Part 11 as well as GLP. MagIC Net is available in 14 dialog languages. Client/server version with 3 licenses.

**Metrohm IC Driver for Empower** (6.6070.000)

Software driver for integrating Metrohm IC instruments in „Empower" from Waters.




# Metrohm Quality Service

# Metrohm Quality Service

**Reliable measurement results for the lifetime of the instrument**

It makes no difference whatsoever whether you perform water analysis with the 940 Professional IC Vario or trace analysis with VA or whether you determine water contents in your pharmaceuticals laboratory with Karl Fischer titration, our Metrohm Quality Service ensures that you can rely 100% on your measurement results for the entire lifetime of the instrument.

**Preventive maintenance – just as important as with your car**

Preventive maintenance carried out on a regular basis extends your analysis systems' trouble-free lifetime and operational capability. Qualification training-certified service technicians perform the maintenance work worldwide. You can select between different types of service contracts. A full service contract, for example, offers you maximum security for troublefree work, while giving you complete control of costs and providing fully compliant documentation.

**Metrohm Compliance Service**

The variety of different laboratory instruments and analysis systems in use today makes compliance with statutory requirements very complicated for companies operating in the regulated sector. Put your trust therefore in the Metrohm Compliance Service when the time comes for the professional initial qualification of your analyzers. As an experienced and trustworthy partner, Metrohm provides your customers rapidly and professionally with everything required for compliance with regulations. Our qualification and validation documents and our services provide you with support for compliance with the requirements of FDA regulations, GLP/GMP standards and GAMP directives.

**Metrohm Quality Service**

With Metrohm Quality Service you are on the safe side from day one. From installation to start-up, to regular maintenance and – if problems arise – to quick repair, we guarantee you precise and correct measuring results.

| Metrohm Quality Service | Customer benefits |
|---|---|
| Metrohm Care Contracts | • Minimizes downtime through preventative maintenance<br>• Cost control and savings through free or discounted replacement materials and consumables<br>• Guaranteed reaction times and rapid on-site repair<br>• Documented instrument certification as an ideal preparation for audits |
| Metrohm Software Maintenance | • High data security and maximum system performance through regular, professional software maintenance |
| Metrohm Compliance Service | • Customized services and documentation for analytical instrument qualification (AIQ)<br>• Professional start-up (IQ/OQ or Certified Installation) and requalification or recertification by specifically trained employees |
| Metrohm Remote Support | • Quick resolution of software and application issues directly at the workplace |
| Metrohm Dosing Test | • Calibration of burettes (e.g., dosing and exchange units) with certification<br>• Accurate measurement results<br>• Verification documentation for compliance with regulations and efficient audits |
| Metrohm Repair Service | • Rapid availability of repaired instruments thanks to decentralized repair workshops around the world and a central workshop at the manufacturer site<br>• Highly qualified service technicians ensure sustainable repair success<br>• Rapid resolution of problems and minimized downtimes through on-site emergency services and express repairs |
| Metrohm Spare Parts | • Original spare parts, made in Switzerland and available worldwide<br>• Short delivery times through warehousing from local distributers<br>• Investment security through ten-year spare parts guarantee after discontinuation |
| Metrohm Application Support | • Access to Metrohm Applications expertise (Application Bulletins, Application Notes, monographs, technical posters and specialized articles)<br>• Rapid and professional resolution of any application issues through personal consultations with our specialists by e-mail, telephone, or remote support<br>• Support for the solution of complex analytical problems, as well as method optimization on-site or at our application laboratory |
| Metrohm Training Programs | • Basic and advanced training with local representatives, at the Metrohm Academy or directly on-site<br>• Efficient and proper use of all analytical methods, as well as results reliability through competently trained users<br>• Training documentation and certificates for trouble-free audits |

Metrohm