xylem
Lab Solutions

Titration

TITRATORS, SAMPLE CHANGERS, SOFTWARE AND ELECTRODES

SI Analytics

a xylem brand

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Overview

1 SI Analytics – the first address for titration

2 Titrators without interchangeable modules; for single use

Burettes: TitroLine® 5000
Titrators: TITRONIC® 300

3 Our standard models for volumetric titration, with interchangeable modules

Burettes: TITRONIC® 500
Titrators: TitroLine® 7000

4 Our top models for volumetric and for Karl Fischer titration, with interchangeable modules

Titrators: TitroLine®7750/7800

5 Instruments for volumetric and for coulometric Karl Fischer titrationn

Titrators: TitroLine® 7500 KF/7500 KFtrace
Headspace oven: TO 7280
Sample changer: TW 7650

6 Sample changer for automated titrationn

Sample changer: TW7200 and TW7450

7 Software for TitroLine® titrators:

TitriSoft 3.5 and 3.5 P

8 Titration electrodes, buffer, accessories

ScienceLine
OptiLine

Contents

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

8. Titration electrodes and accessories

1. SI Analytics – The First Address for Titration

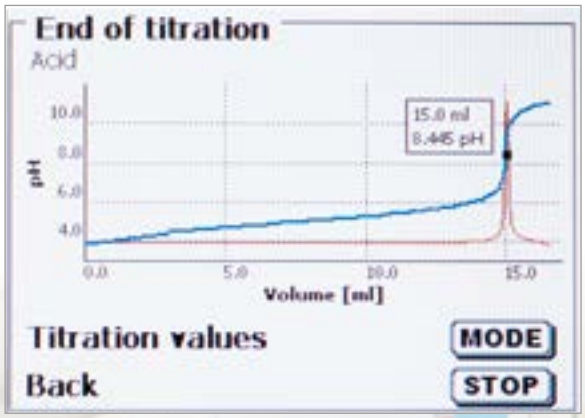
Titrators with innovative features

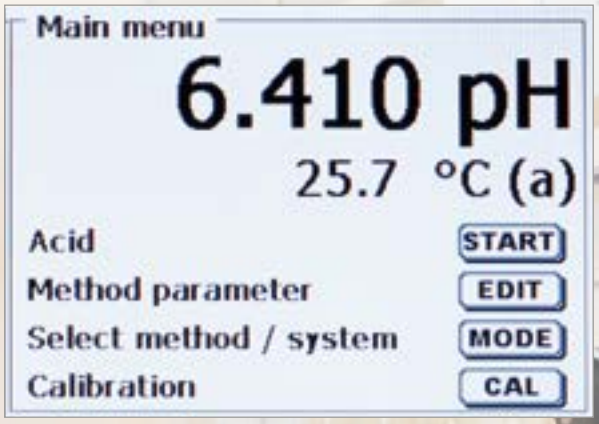
High visibility graphic display

Exceptional high visibility graphic display for viewing even at extreme angles.

Clear graphic representation of titration curves and the first derivative curve (TitroLine®).

Equivalence point values are displayed in the titration curve (TitroLine®).





SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Intelligent, interchangeable modules for TitroLine 7XXX and TITRONIC 500

TitroLine® 7xxx and TITRONIC® 500 are provided with compact interchangeable modules for switching between different titrations. Size options of 5, 10, 20 and 50 ml are available.

All relevant reagent and unit data are stored in the modules' integrated RFID-chip including:

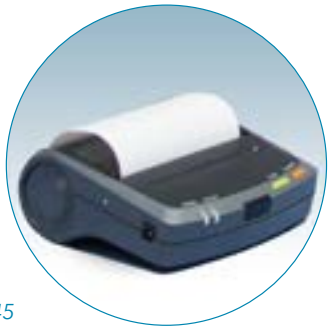
- Burette size (ml)
- Titrant name
- Titrant concentration or titer value of solution
- Date of manufacture or expiry date of the reagent.

Flexible configuration features

Expand and customize your workstation using up to three USB, one LAN and two RS232 ports for a total of five connection options for:

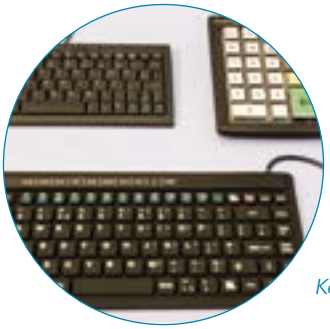
- Magnetic stirrer TM 235 and USB mouse
- USB printer (Standard A4 HP-PCL) and compact printer TZ3863
- USB keyboard
- Network
- Barcode reader
- USB storage device and hub
- Balance and PC
- other SI Analytics devices

USB printer A4 format



Thermo printer DPU S445

USB manual controller



Keyboard

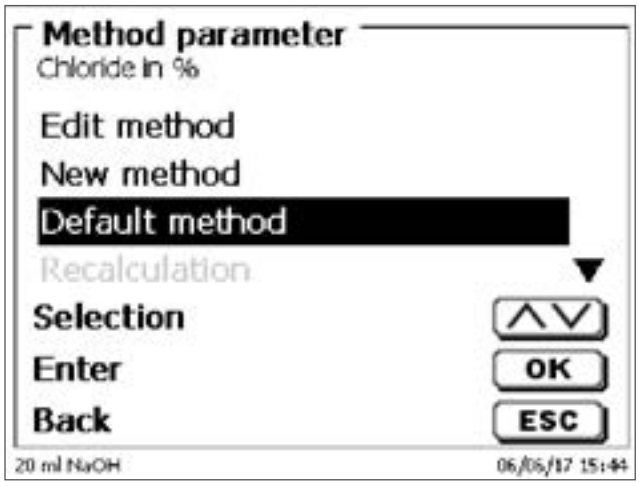
Titrators with innovative features

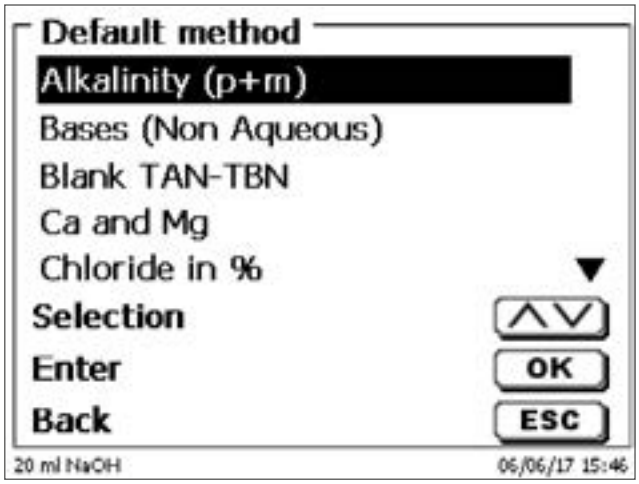
Standard methods

Each piston burette or titrator has already pre-installed standard methods

The standard methods are loaded and can be used, but also modified.

The preinstalled standard method will always stay retained and can be re-installed at any time.





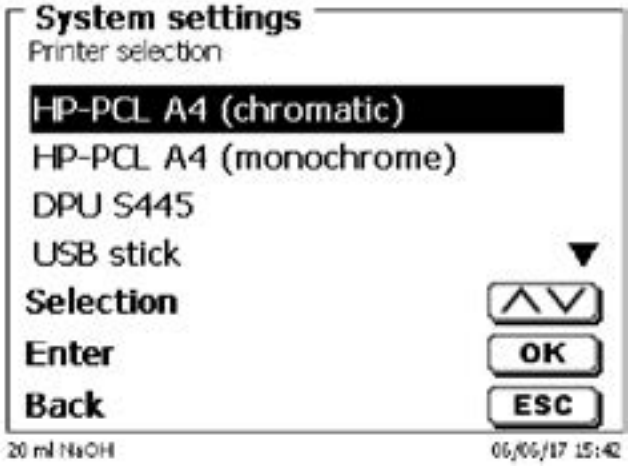
Documentation

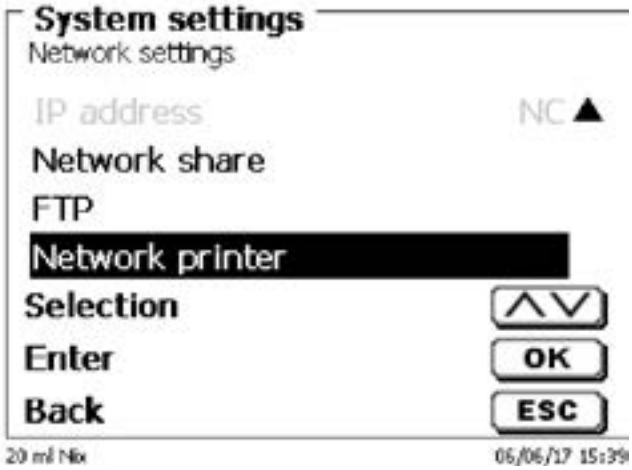
The results are documented on a USB device in PDF and CSV format.

The results can also be printed on a DIN A 4 (color or b / w) or on a thermal printer.

The printer can be connected directly to the titrator / piston burette, or it can be printed via a network printer.

When connected to a network, the PDF and CSV files can be stored in a shared directory.





SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

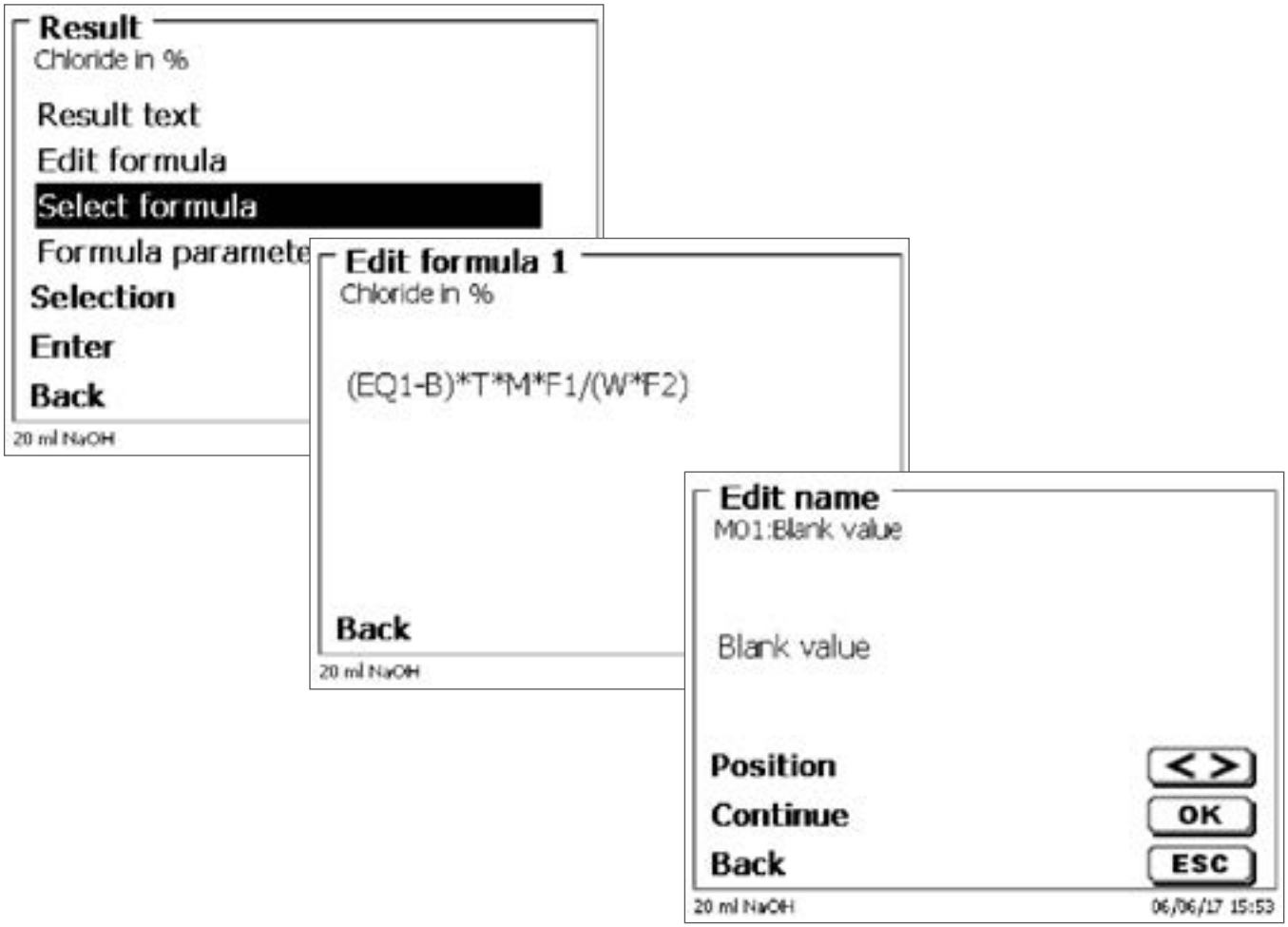
Formula editor

The Formula editor allows the use of individual calculations.

Select one of the standard formulas and modify them if necessary.

In addition to a number of units (%, g/l ...) you can also assign an individual unit.

Results (titre, blank value, etc.) can be automatically written to global memory and reused later.



TITRONIC® burettes and TitroLine® titrators selection table

Application	TITRONIC® 300	TITRONIC® 500	TitroLine® 5000
Intelligent interchangable units (5, 10, 20 and 50 ml)	1)	■	1)
Manual titration	■	■	■
Dosing	■	■	■
Solutions preparation (manually or automatically with connected balance)	–	■	–
Automatic titration (independent with external software)	2)	2)	■
Applications with TitriSoft	■	■	–
pH-stat-applications (enzyme kinetics, soil samples, biotechnology)	–	–	–
Applications with sample changer	–	–	–
pH/mV titrations „aqueous" (Alkalinity, hydrochloric acid, citric acid, Kjeldahl…)	–	–	■
pH/mV titrations „non aqueous"" (TAN/TBN, FFA, titrations with perchloric acid…)	–	–	–
Redox titrations (iodometry, permanganometry….)	–	–	■
Redox titrations (COD)	–	–	■
Halide titrations (chloride, "salt"…)	–	–	■
Hydrogen sulphide and mercaptans	–	–	–
Sulfurous acid in wine and beverages	–	–	–
Bromine number	–	–	–
Water analysis according to KF Volumetric method (10 ppm – 100 %)	–	–	–
Water analysis according to KF Coulometric method (1 ppm – 10 %)	–	–	–
Measuring two parameters at the same time (e.g., pH and Cond)	–	–	–
Photometric titration (OptiLine 6)	–	–	–

1) 20 and 50 ml dosing unit usuable (no intelligent interchangeable units)
2) Can be used as titration and dosing burette in automatic titration systems

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

TitroLine® 7000	TitroLine® 7750	TitroLine®7800	TitroLine® 7500 KF	TitroLine® 7500 KF trace
■	■	■	■	–
■	■	■	–	–
■	■	■	■	–
■	■	■	■	–
■	■	■	■	■
■	■	■	■	■
■	■	■	–	–
■	■	■	–	–
■	■	■	–	–
■	■	■	–	–
■	■	■	–	–
■	■	■	–	–
■	■	■	–	–
■	■	■	–	–
■	■	■	–	–
■	■	■	■	–
■	■	■	■	■
–	■	■	■	–
–	–	–	–	■
–	–	■	–	–
■	■	■	–	–

Applications Overview (examples)



Water and Wastewater Analysis

Application	TitroLine® 5000	TitroLine® 7000 / 7750	TitroLine® 7800
Alkalinity (p+m-value)	■	■	■
COD	■	■	■
Permanganate index	■	■	■
FOS/TAC	■	■	■
pH + Cond + acid capacity	■	■	■
Kjeldahl-nitrogen/ammonia (after destillation)	■	■	■
Chloride in drinking and wastewater	■	■	■
Chlorine in drinking water	■	■	■
Calcium and magnesium hardness (2 equivalence points)	■	■	■
Total hardness (Sum Ca/Mg; 1 equivalence point)	■	■	■



Food

Application	TitroLine® 5000	TitroLine® 7000 / 7750	TitroLine® 7800
Total acidity in wine and soft drinks	■	■	■
Total acidity in food (ketchup, salad dressing)	■	■	■
Ash alkalinity	■	■	■
Chloride ("salt") in food and mineral water	■	■	■
Sulfurous acid (SO_2), free and total	■	■	■
Volatile acids	■	■	■
Titratable acidity in milk (Soxlet Henkel (SH) index)	■	■	■
Reducing sugars	■	■	■
Ascorbic acid (vitamin C)	■	■	■
Calcium in milk and dairy products	■	■	■
Calcium and magnesium in mineral water	■	■	■
Formol index	■	■	■
Nitrite in pickling salt	■	■	■
Iodine number	■	■	■
Peroxide number	■	■	■
Saponification number	■	■	■
Acidity (FFA) in fats and oils	■	■	■

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com



Industrial Products

Application	TitroLine® 5000	TitroLine® 7000 / 7750	TitroLine® 7800
Titration with perchloric acid (waterfree)	■	■	■
Hydroxyl number	■	■	■
NCO (Isocyanate) number	■	■	■
Epoxy number	■	■	■
Acid number in resins and other industrial products	■	■	■
Total acidity in mineral oils (“TAN”)	■	■	■
Total base number (“TBN”) in oils	■	■	■
Electroplating (Metals, acids, leach, etc.)	■	■	■

■ Excellent application suitability

■ Titration is possible for this application with restrictions and must be evaluated

■ Not applicable

2. Burettes and Titrators for single applications

TITRONIC® 300 – Titrating manually, perfectly dosing

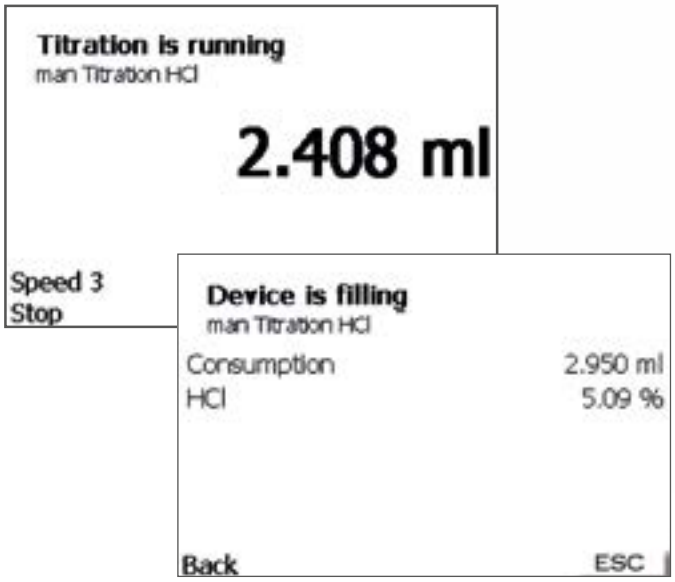
The TITRONIC® 300 is a perfect motor-driven burette for manual titration and precise dosing instrument for dispensable liquids, solvents and titrating agents.

The TITRONIC® 300 is not only a stand-alone device, but also shows its strengths in the computer-controlled

Manual Titration

While automatic titration is gaining ground, manual titration remains one of the standard cost-effective applications in the lab, wherever high precision and flexibility are required.

- Titration with hand controller (mouse).
- Titration rate can be adjusted in five different steps to optimize the titration speed and accuracy.
- Automatic calculation of results in different units and exportation to a printer or USB memory device.
- Automatic weight recording when a balance is connected. „Daisy Chain" network. Up to 16 devices can be connected one behind the other.



SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Dosing

Beside the titration, there are various routine dosing tasks that must be performed in the lab. A piston burette is the ideal device for precise dosing tasks:

- Adjustable dosing and filling rate for each method.
- Adjustable filling between each dose step.
- The intelligent filling function checks if a dosing step is feasible without filling in advance. This reduces faulty operations during a serial dosing process.

Benefits TitroLine®/TITRONIC®

- **High visibility, full color display that can be easily viewed from a distance and at extreme angles**
- **Standard methods for manual titrations and dosing**
- **Export the results as PDF or CSV**
- **USB-A and -B and RS232 interfaces for connection of keyboard, printer, PC, bar code reader, USB storage media and laboratory balance**

TitroLine® 5000 - The easiest titration ever...

The TitroLine® 5000 is the first choice if you are looking for a very easy-to-use automatic titrator for an application. A special training or a deeper knowledge of automatic titration was not necessary to get precise and quick results. That and much more is exactly what the new TitroLine® 5000 stands for:

- High resolution pH/mV-measurement input for pH-, ORP-, silver - and further mV-electrodes
- Pt 1000 and NTC 30 temperature measurement input for automatic temperature compensation
- Pre-installed standard methods for FOS/TAC, alkalinity, total acidity in drinks, chloride etc.
- Linear and dynamic titration to equivalence points
- Titration to pH and mV-end points
- Same manual titration and dosing function as the piston burette TITRONIC® 300

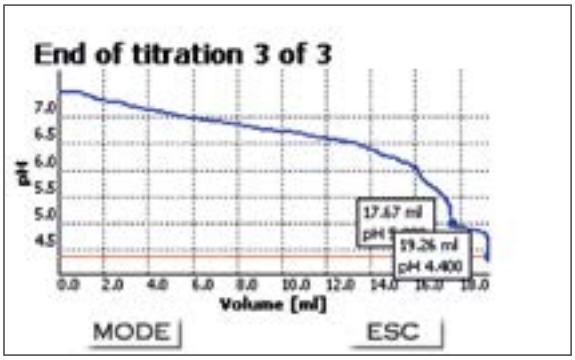
TitroLine® 5000

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

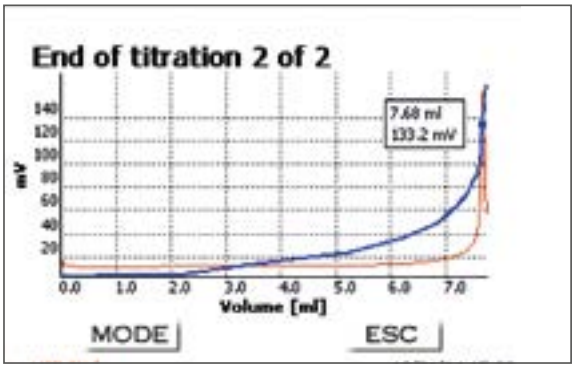
Typical applications of water/wastewater and environmental analysis

- pH-value, alkalinity (p+m-value)
- FOS/TAC (see titration curve and result screen as example)
- Total Kjeldahl nitrogen
- Permanganate index and COD
- Chloride in wastewater



Typical applications of food analysis

- Salt content (chloride, sodium chloride, see titration curve as example)
- pH-value, total acidity in wine, drinks, and other food products
- Ascorbic acid
- Protein determination (Kjeldahl nitrogen in milk and dairy products)
- Iodine and peroxide value



Specifications TITRONIC® 300

Interfaces:	1 x USB-A and 1 x USB-B, 2 x RS-232-C
Stirrer connection:	TM 50, power supply directly through piston burette
Keyboard:	The unit is operated using the keys on the device itself, the controller TZ 3880 and optional PC-keyboard (USB)
Display:	Graphics-capable TFT display
Volume display:	0000.000...9999.999 ml
Display resolution:	0.005-0.025 ml (depending on dosing unit)
Dosing speed:	Max. 100 ml/min (with 50 ml unit)
Filling speed	Min 30 s to 999 s adjustable (time according to the cylinder volume)
Dosing units:	20 ml or 50 ml dosing unit, interchangeable
Burette resolution:	8000
Dosing accuracy:	Systematic error 0.15 %, **random error 0.05 % in compliance with EN ISO 8655-6**
Power supply:	100 -240 V~; 50/60 Hz, power input 30 VA
Conformity:	ISO 8655, part 6
CE-mark:	EMC: 2004/108/EG; safety EG- Directive 2006/95
Dimensions	135 x 310 x 205 mm (W x H x D), including dosing unit, without stirrer
Weight:	2 kg (without stirrer)
Ambient conditions	Ambient temperature: + 10 ... + 40 °C for operation and storage. Humidity according to EN 61 010, Part 1: Max. relative humidity 80 % for temperatures up to 31 °C, linear decrease down to 50 % relative humidity at a temperature of 40 °C

Ordering information TITRONIC® 300

Type No.	Order No.	Description
T 300/20 M1	285225800	**TITRONIC® 300 without magnetic stirrer** TITRONIC® 300 basic unit with ready to use assembled 20 ml dosing unit, manual controller, titration clamp, stand rod and power supply 100-240 V
T 300/50 M1	285225810	**TITRONIC® 300 without magnetic stirrer** TITRONIC® 300 basic unit with ready to use assembled 50 ml dosing unit, manual controller TZ 3880, titration clamp, stand rod and power supply 100-240 V
T 300/20 M2	285225820	**TITRONIC® 300 with magnetic stirrer** TITRONIC® 300 basic unit with ready to use assembled 20 ml dosing unit, magnetic stirrer TM 50, manual controller, titration clamp, stand rod and power supply 100-240 V
T 300/50 M2	285225830	**TITRONIC® 300 with magnetic stirrer** TITRONIC® 300 basic unit with ready to use assembled 50 ml dosing unit, magnetic stirrer TM 50, manual controller, titration clamp, stand rod and power supply 100-240 V

Accessories TITRONIC® 300 and TitroLine®

Type No.	Order No.	Description
TM 50,	285225840	Magnetic stirrer
TZ 3835	285220410	USB keyboard
TZ 3830	285220420	USB hub
TZ 3803	285220590	Reagent bottle, amber, 1 L

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Specifications TitroLine® 5000

Measurement input pH/mV:	pH/mV-input with Electrode socket according to DIN 19 262 or additional with BNC socket insert (Z 860)
Measurement input temperature.:	Pt 1000/NTC 30: (socket 2 x 4 mm)
Interfaces:	1 x USB-A and 1 x USB-B, 2 x RS-232-C
Stirrer connection:	TM 50 power supply directly through piston burette
Keyboard:	The unit is operated using the keys on the device itself, the controller TZ 3880 and optional PC-keyboard (USB)
Display:	Graphics-capable TFT display
Volume display:	0000,000...9999,999 ml
Display resolution:	0.005-0.025 ml (depending on dosing unit)
Dosing speed:	Max. 100 ml/min (with 50 ml unit)
Filling speed:	Min 30 s to 999 s adjustable (time according to the cylinder volume)
Dosing units:	20 ml or 50 ml dosing unit, interchangeable
Burette resolution:	8000
Dosing accuracy:	Systematic error 0.15 %, random error 0.05 % in compliance with EN ISO 8655-6
Power supply:	100 -240 V~; 50/60 Hz, power input 30 VA
Conformity:	ISO 8655, part 6
CE-mark:	EMC: 2004/108/EG; safety EG- Directive 2006/95
Dimensions:	135 x 310 x 205 mm (W x H x D), including dosing unit, without stirrer
Weight:	2.3 kg (without stirrer)
Ambient conditions:	Ambient temperature: + 10 ... + 40 °C for operation and storage. Humidity according to EN 61 010, Part 1: Max. relative humidity 80 % for temperatures up to 31 °C, linear decrease down to 50 % relative humidity at a temperature of 40 °C

Ordering information TitroLine® 5000

Type No.	Order No.	Description
TL 5000/20 M1	285225760	TitroLine® 5000 with 20 ml dosing unit Basic unit without electrode, with ready to use assembled 20 ml dosing unit, manual controller, titration clamp, stand rod, magnetic stirrer TM 50 and power supply 100-240 V
TL 5000/50 M1	285225770	TitroLine® 5000 with 50 ml dosing unit Basic unit without electrode, with ready to use assembled 50 ml dosing unit, manual controller, titration clamp, stand rod, magnetic stirrer TM 50 and power supply 100-240 V
TL 5000/20 M2	285225780	TitroLine® 5000 with 20 ml dosing unit Basic unit with pH electrode and buffer set, with ready to use assembled 20 ml dosing unit, manual controller, titration clamp, stand rod, magnetic stirrer TM 50 and power supply 100-240 V
TL 5000/50 M2	285225790	TitroLine® 5000 with 50 ml dosing unit Basic unit with pH electrode and buffer set, with ready to use assembled 50 ml dosing unit, manual controller, titration clamp, stand rod, magnetic stirrer TM 50 and power supply 100-240 V
TL 5000/20 M3	285225850	TitroLine® 5000 with 20 ml dosing unit Basic unit with Ag-electrode, with ready to use assembled 20 ml dosing unit, manual controller, titration clamp, stand rod, magnetic stirrer TM 50 and power supply 100-240 V
TL 5000/20 Acidity set	285227750	TL 5000 Set for acid-base titrations, includes: TL 5000/20 M 1, with pH combination electrode A 7780 NTC30 DIN N, pH-buffer set L 4895, USB keyboard TZ 3838, USB hub TZ 3830, USB stick TZ 3836 and 1 L amber reagent bottle TZ 3803
TL 5000/20 Salt set	285227760	TL 5000 Set for salt/chloride titrations, includes: TL 5000/20 M 1, with Ag combination electrode AgCl 62 RG, cable L 1 A, USB keyboard TZ 3838, USB hub TZ 3830, USB stick TZ 3836 and 1 L amber reagent bottle TZ 3803
TL 5000/20 Redox set	285227770	TL 5000 Set for redox titrations, includes: TL 5000/20 M 1, with Pt combination electrode Pt 62 RG, cable L 1 A, USB keyboard TZ 3838, USB hub TZ 3830, USB stick TZ 3836 and 1 L amber reagent bottle TZ 3803

3. Burettes and Titrators with interchangeable modules

TITRONIC® 500 - The burette for all purposes

The TITRONIC® 500 is the ideal piston burette for manual titrations, accurate dosing applications as well as the preparation of solutions. When used with TitriSoft 3.5, it acts as a titration burette or with the TitroLine®7000 and TitriSoft 3.5, it is an automatic dosing unit perfect to pre-dose a titrant.

TITRONIC® 500

Benefits TITRONIC® 500:

- **Brilliant TFT display with a wide viewing angle**
- **Intelligent interchangeable modules with 5, 10, 20 and 50 ml volume capacity**
- **Connect to a printer and/or an analytical balance**
- **Remote control access via RS232 or USB interface**
- **Connect up to 16 devices using one USB or RS232 port of a PC with the two integrated RS232 interfaces (Daisy Chain)**

Manual Titration

While the automatic titration is gaining ground, manual titration remains one of the cost-effective standard applications in the lab. Everywhere high precision and flexibility are required; a piston burette with an interchangeable dosing module is the best choice.

- Titration using the manual controller dosing buttons.
- Titration rate can be adjusted to optimize titration speed and accuracy.
- Programmable automatic calculations, printer ready.
- Automatic weight recording when balance is connected.

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Dosing

Besides titration, there are various routine dosing tasks that must be performed in the lab.

- Control dosing using the manual controller and the dedicated keypad.
- Adjustable dosing and filling rates optimize speed and accuracy.
- Store dosing methods with different parameters.

Solutions preparation

A special sample preparation mode is available on the TITRONIC® 500 where a reagent is dosed into a sample until the required concentration is reached. The sample is weighed, the dosing volume is determined. The volume can then be automatically added to the sample. This mode is used for e.g., preparing standard and sample solutions for viscometry.

- Adjustable dosing and filling speed.
- Dosing volume is automatically calculated without additional PC software.
- Several methods with different parameters can be stored.
- Automatic weight recording when balance is connected.

See also “Sample preparation with TW 7200 sample changer and TitriSoft”, page 52.

TitroLine® 7000: The professional step

With its performance spectrum, the TitroLine® 7000 is the ideal starting device for potentiometric titration with potential for expansion and automation. Thanks to the high-resolution and precise pH/mV and "dead-stop" measuring interface, it is possible to determine a wide range of parameters quickly, reliable and accurate.

Besides the specifications of the instrument series from the general part already mentioned in the introduction and the features of the TITRONIC® 500 and TitroLine® 5000, the TitroLine® 7000 provides more:

As a rule, 10 to15 user methods are usually sufficient for the most requirements. But sometimes you need a little bit more capacity. The TitroLine® 7000 offers storages up to 50 user methods.

Measurement and calibration with the highest accuracy: The wireless sensor recognition automatically recognizes SI Analytics® ID electrodes and instantly stores dedicated sensor data eliminating measurement and calibration errors.

Features of the TitroLine® 7000 include

- High resolution pH/mV-electrode and temperature inputs for pH, ISE, redox (ORP) or photometric titrations.
- Polarizable electrode input for set endpoint titrations („Dead-stop")
- Linear (fixed incement) and dynamic equivalence point titration mode
- Titrationen to pH/mV and µA-Endpoint
- Manual titration mode and routine dosing tasks are also available.

pH/mV interface for ID electrodes

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Typical applications of water/wastewater and environmental analysis:

- pH-value, alkalinity ("p+m-value")
- Permanganate index
- COD
- Volatile fatty acids/Total anorganic carbon (FOS/TAC)
- Total nitrogen according to Kjeldahl
- Chloride in waste and drinking water
- Free and total chlorine in drinking and bathing water
- Ca/Mg-and total hardness
- Oxygen according to Winkler method

Titration application „chemical oxygen demand" COD

Food analysis application expample: "Determination of free and total sulphurous acid (SO_2) in wine"

Since ancient times the wine is being preserved through the addition of "sulfur" (sulphurous acid).

The addition of sulphurous acid inhibits the oxidation processes and prevents the growth of unwanted microorganisms. The content of free and total sulphur (exact: sulphur dioxide) is determined through the titration of 10-50 ml sample after the addition of sulphuric acid and potassium iodide with a iodine solution (e.g., 0.025 mol/l) and using a double platinum electrode as indication electrode. The free SO_2 is titrated directly. The total SO_2 is titrated after the hydrolysis with sodium hydroxide which converts the bounded SO_2 into the free form.

The method with all parameters and calculation formula is already stored as standard method in the TitroLine® 7000 and can be used directly.

Typical applications of food analysis:

- Salt content (chloride, sodium chloride).
- pH-value, total acidity in wine, beverages, and food products such as condiments.
- Formol number in fruit and vegetable juices.
- Ascorbic acid (vitamin C).
- Calcium in milk and dairy products.
- Protein determination (Kjeldahl-nitrogen) in milk and dairy products.
- Reducing sugar in wine and juices.
- Iodine number, peroxide number, free fatty acids and saponification number.
- Determination of free and total sulphurous acid (H_2SO_3) in wine and must. Further detail is available in the application example.

TitroLine® 7000 – Versatile Applications

Perfect for non-aqueous titrations

Eliminate the need for special electrodes (e.g., separate indicator, reference and auxiliary electrodes) with the built-in amplifier–perfect for titrations in non-aqueous solvents such as:

- Acid and base numbers in oils (TAN and TBN)
- Titrations in glacial acetic acid with perchloric acid
- Hydroxyl, NCO (Isocyanate) number and further specific value

pH Stat Titration

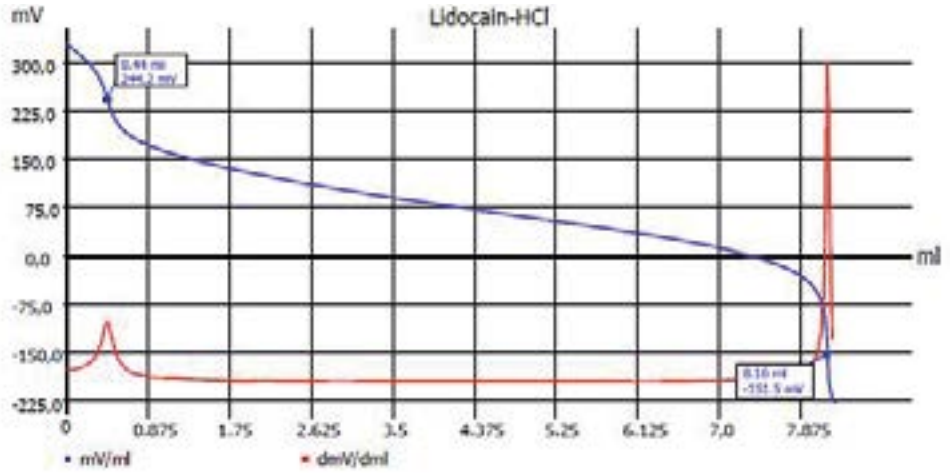
With a pH stat application a given pH is first adjusted and then kept constant at the certain time with an acid or a base. The pH stat titration is applied to e.g.:

- the determination of the enzyme activity (ex. lipase)
- the pH stat elution of soil sample at pH 4
- the monitoring of the pH value during chemical synthesis

Typical Pharma application example: Titration of amino hydrochlorides (method according to Ph. EUR).

Up to now the amino hydrochlorides were dissolved in glacial acetic acid, the amines released through the addition of mercuric acetate and titrated with perchloric acid in glacial acetic acid.

According to the environment friendly method of the European Pharmacopeia the amino hydrochlorides are dissolved in ethanol and being dosed with exact 5.00 ml of a 0.01 mol/l HCl. This mixture is then titrated with NaOH 0.1 mol/l. Most titration curves show two equivalence points. The result is calculated from the difference between the first and second equivalence point. The method with all parameters and calculation formulae is already stored as standard method in the TitroLine® 7000 and can be used directly after the input of the equivalent substance weight.



Titration curve: Titration of Hydro chloride (Lidocain-HCl)

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

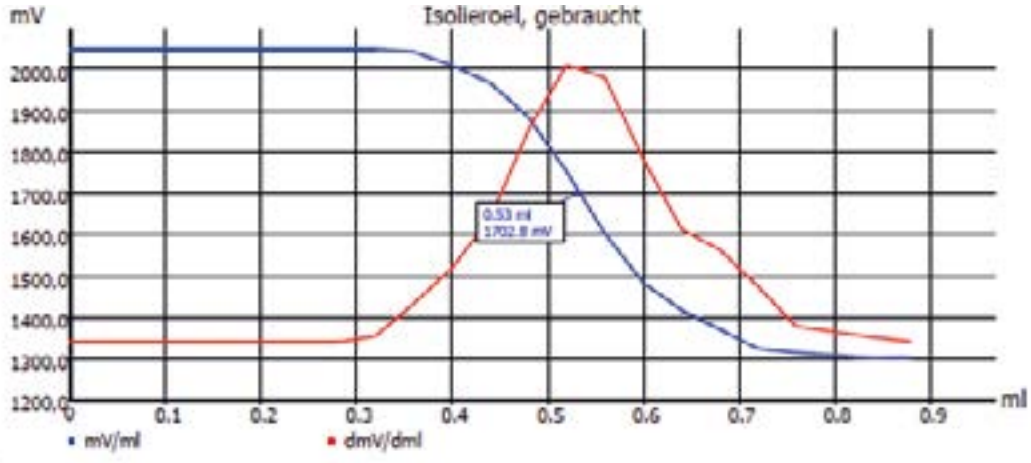
Titrations with the photometric sensor OptiLine 6

The TitroLine ® 7000 allows the connection via USB of the new OptiLine 6 photometric sensor (see page 96). The TitroLine® 7000 uses the digital USB input to set the wavelength and other parameters of the photometric sensor.

TitroLine® 7800 with OptiLine 6

With OptiLine 6, e.g., the following applications are possible:

- All complexometric titrations of metals such as calcium, magnesium (total hardness), zinc, copper etc.
- All titrations with color indicator, which are prescribed in the Ph.Eur, USP, and further pharmacopeials. These titrations can now be performed automatically.
- Turbidity titration of Chondroitin sulphate according to Ph.Eur and USP
- Titration of Total Acid or Bases Number (TAN and TBN) using the color indicator method.
- Determination of carboxyl end groups in polyethylene terephthalate (PET)



Titration curve: TAN acc. to ASTM D974

4. Universal Titrators for Volumetric and for Karl Fischer Titration

TitroLine® 7750 – One for all

The Titroline® 7750 is the all-rounder for both potentiometric titration and volumetric KF titration.

The TitroLine® 7750 combines the features of the potentiometric titrator TitroLine® 7000 and the volumetric Karl Fischer titrator TitroLine® 7500.

TitroLine® 7750 with accessories for potentiometric titration

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

The TitroLine® 7750 is characterized as follows:

- Highly visible full color display, that can be easily viewed from a distance and extreme angles
- With interchangeable modules which can store all relevant reagent and unit data
- Expandable thanks to the 2 x USB-host, 1 x USB-PC, 1 x LAN and 2 x RS232 ports. Connectable are e.g., USB keyboard, USB printer, bar-code reader, USB flash drives, balances, PC and further SI Analytics devices such as piston burettes and sample changers
- Storage of results via USB or LAN connection, including method transfer.
- Storage of results using USB port (PDF – and CSV -format) including method transfer
- With standard methods for potentiometric and KF titration

→ Please refer to page 22 (TitroLine® 7000) and page 34 (TitroLine® 7500 KF) for more basic details of TitroLine® 7750.

TitroLine® 7750 with accessories for KF titration

TitroLine® 7800 - The universal titrator with IDS technology

The TitroLine® 7800 enhanced the universal features of the TitroLine® 7750 with an additional IDS measurement input.

Hence the TitroLine® 7800 is able to perform potentiometric titrations with analogue or IDS electrodes up to volumetric Karl Fischer titrations. The IDS measuring input is multifunctional. Digital sensors for the determination of pH and ORP value, the conductivity up to the dissolved oxygen can be connected.

IDS stands for „intelligent, digital sensors" and means that the analog measuring signal is converted into a digital measuring value in the sensor. This protects the signal from external interferences, such as moisture, electromagnetic fields or pulses. The higher measuring accuracy raises confidence in your readings to a whole new level.

TitroLine® 7800 with accessories

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

TitroLine® 7800 Benefits

* Highly visible full color display, that can be easily viewed from a distance and extreme angles
* With new interchangeable modules which all relevant reagent and unit data can be stored
* Expandable thanks to the 2 x USB-host, 1 x USB-PC, 1 LAN and 2 x RS232 ports. Connectable are e.g., USB keyboard, USB printer, barcode reader, USB flash drives, balances, PC and further SI Analytics devices such as piston burettes and sample changers
* Storage of results using via USB port (PDF – and CSV -format) including method transfer
* With standard methods for potentiometric and KF titration
* Second digital measuring port for Intelligent Digital Sensors (IDS)

TitroLine® 7800 – Featuring enhanced automation and additional methods

Besides the high specification of the overall series, the TitroLine® 7750 and 7800 models provide even more functions.

Measurement and calibration with the highest accuracy

The wireless sensor recognition automatically recognizes ID and IDS electrodes which instantly send the specific data to the titrator. Therefore TitroLine® 7800 always uses correct calibration data. Erroneous measurements are eliminated.

Rear panel

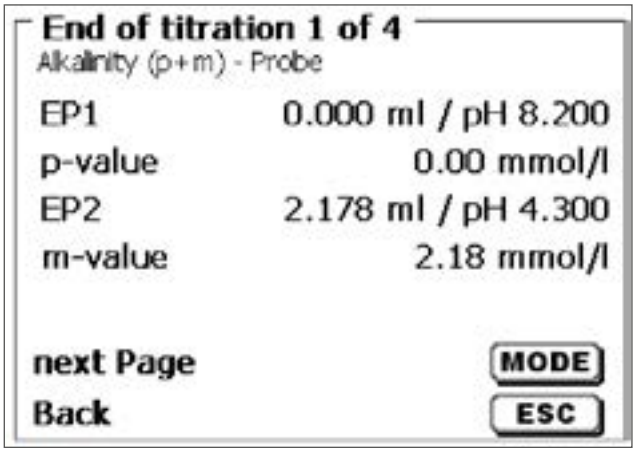
SI Analytics
a xylem brand

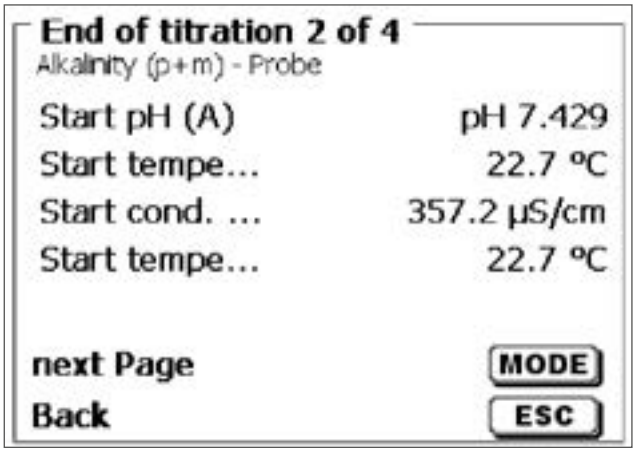
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Ideal for measurements and titration tasks with pH and Conductivity

The TitroLine® 7800 is ideally suited for use in water analysis. A typical example is the measuring of the pH and conductivity. Subsequently, as a rule the Alkalinity or Carbonate/Hydrogen carbonate hardness is determined.

Conductivity and temperature are measured immediately after the two measuring electrodes are immersed in the sample. This will take a few seconds. Then the pH value is determined by drift control. This can take more than a minute for low-ion water samples. There is no mutual influence on the pH and the LF value due to the use of the digital conductivity electrode. The acid capacity $KS_{8.2}$ and $KS_{4.3}$ are then titrated with hydrochloric acid 0.02–0.1 mol / l. The titration is carried out to a pH of 4.3 (4.5) and the consumption is determined at pH 8.2 and 4.3 (or 4.5).





This application is very easy to automate with a sample changer. If many samples have to be measured per day, the TW 7200 and TW 7450 are used. It is also possible to calibrate the pH electrode in the sample changer at startup.

5. Karl Fischer Titration – the water determining method

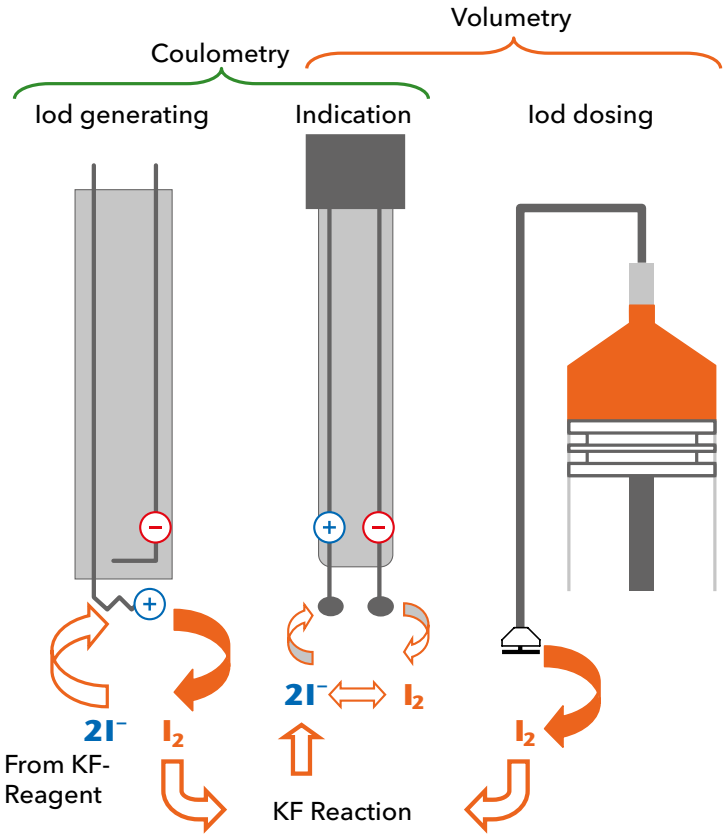
Experienced analyst may be unpleasantly reminded by the pyridine smell, when hearing the name Karl Fischer. However, modern reagents and most user-friendly analyzing instruments have eliminated the problem. Nowadays all applications can be handled and processed very easily by using the **coulometric** and **volumetric** Karl Fischer titration instruments. Thanks to its selectivity and precision, the Karl Fischer titration very easily and accurately established as the most important method for determining water and humidity.

The basic principle of the water determination according to Karl Fischer (short: KF) is a reaction of iodine with water in an alcoholic solution with presence of sulfurous acid and a base.

With the volumetric method, the iodine can be accurately added through a piston burette, while the coulometric method works with iodine produced directly in the reaction vessel.

The difference between the volumetry and coulometry mainly exists in the manner of dosing the iodine for the titration. The illustration shows the different ways of dosing:

The different ways of dosing



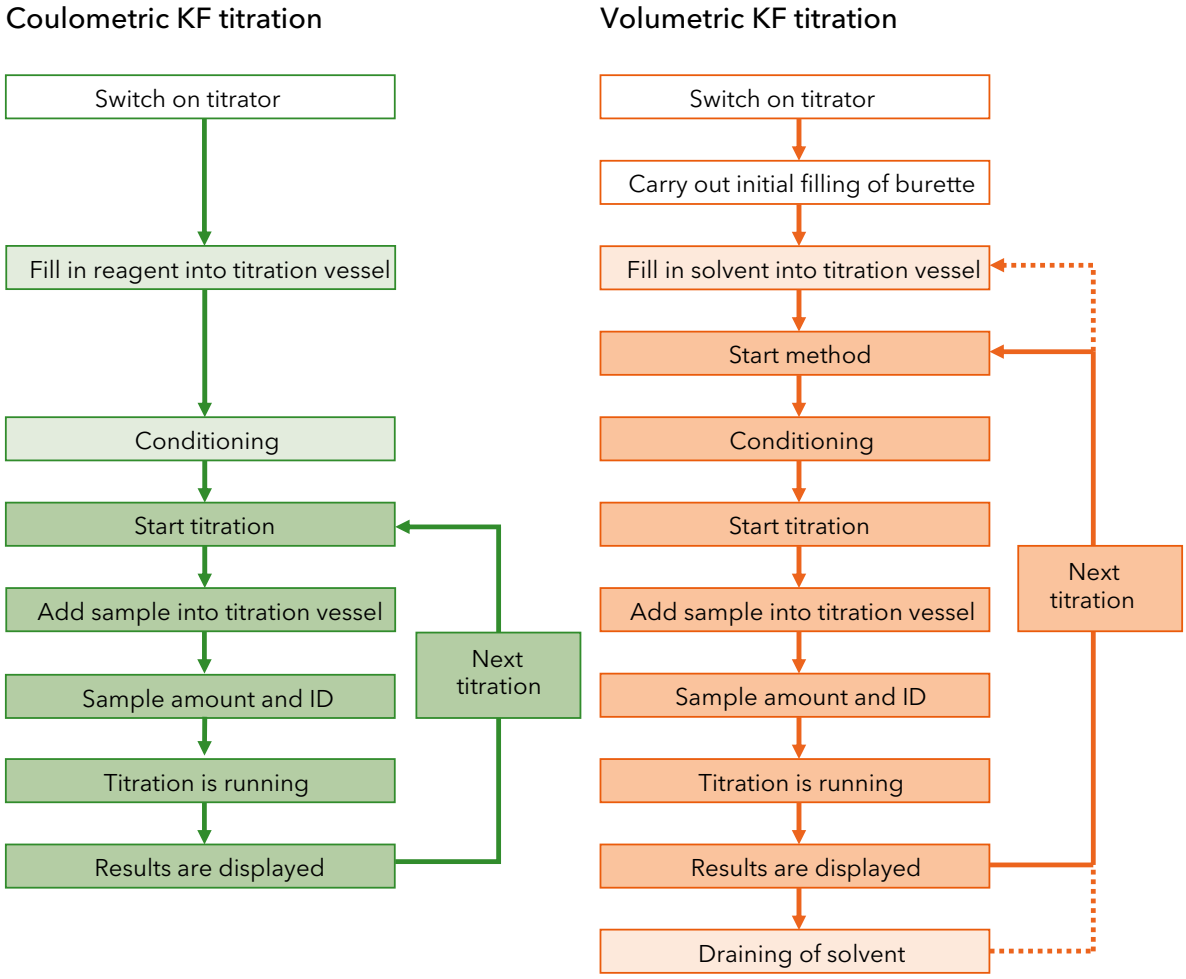
TitroLine® 7500 KF

TitroLine® 7500 KF *trace*

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

In practice small differences occur between the two methods which are displayed in the table. The advantages of the volumetry lie in the different types of sample addition and solvent variations, offering more flexible operation potentials. On the other hand, the coulometry can handle lower detection limits, and the handling is even simpler. The compared work flow with coulometry and volumetry are shown with the following illustration. The clearly shorter and easier sequence is noticeable with the coulometry.



Comparison: Coulometric and volumetric Karl Fischer titration

Property	Coulometry	Volumetry
Water amount and sample amount	Small water amount Small sample amounts	Medium and large water amounts Adapted sample amount
Sample types	Liquid Gaseous Solid samples (with KF oven)	Solid Liquid
Sample addition and preparation	Direct with syringe Gas inlet with oven External extraction Solid samples are evaporated with an oven	Solid samples are added directly Sample preparation with homogenizer Working at higher temperature Direct with syringe
Working method	Very fast Very simple	Fast Simple
Working range (recommended)	µg range 10 µg up to 5 mg water	mg range 200 µg up to 50 mg water

TitroLine® 7500 KF and TitroLine® 7500 KF *trace* – Karl Fischer Titration made easy

You can't go wrong with the TitroLine® KF titrators

The TitroLine® 7500 KF is the volumetric generalist for a wide range of use and the TitroLine® 7500 KF *trace* is the specialist for low water contents. Both new titrators are to be characterized by the following features:

Benefits TitroLine® 7500 KF/KF *trace*

- **Fast, easy and precise**
- **With standard methods for different applications (titer, blank value, one or two component reagents)**
- **The addition of solvent and the extraction of the titrated sample are managed by the titration stand TM 235 KF (optional for TitroLine® 7500 KF *trace*)**
- **Online display of curve and measurement drift during titration**

TitroLine® 7500 KF *trace*

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Live Titration curve

The online display of the measurement curve, measurement drift and titration solvent consumption (TitroLine® 7500 KF only) make accurate monitoring of the titration possible and one can determine any unwanted side reactions immediately.

TitroLine® 7500 KF

Automated KF Titration of all Samples with a Headspace Oven and Sample Changer

The headspace oven technique allows the separation of the water to be titrated from liquid, solid and pasty samples.

The sample is weighed in a small glass vessel with lid and septum (vial) and heated in the oven to a defined temperature. A dry air or nitrogen stream flows over a needle through the sample and takes the water with it in a gaseous state. The air or nitrogen together with the water vapor is passed into the titration vessel and the water is immediately titrated coulometrically with the TitroLine® 7500 KF trace.

The advantage of this method is the avoidance of direct contact of the sample with the solvent/anolyte. The anolyte is not contaminated and therefore more samples can be analysed than with direct analysis. As a rule, side reactions do not occur.

The complete system consists of the TO 7280 headspace oven, the coulometric titrator TitroLine® 7500 KF trace and the TW 7650 sample changer. The headspace oven can also be operated without the sample changer with the TitroLine® 7500 KF trace (with or without TitriSoft software, see next page).

Benefits of the headspace oven and the sample changer:

- **Semi automatic or fully automatic water determination**
- **No contamination of the anolyte, generator, and indicator electrodes**
- **Application range from 35 to 280 °C**

The headspace oven technique is suitable for the following samples:

- Pharmaceutical products
- Natural products
- Plastics
- Hygroscopic substances
- Freeze-dried products, e.g. lyophilisates
- Oils and lubricants, creams, pastes
- Viscous materials (bitumen, tar, sewage sludge)
- Powder and pellets
- Food
- Petrochemicals

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

The TO 7280 headspace oven for semi-automatic measuring

If you only have a few samples to measure per day, the semi-automatic headspace oven TO 7280 is the right choice.

Why semi-automatic? The user places the sample in the oven with the crimper and starts the method on the titrator or (optionally) on the TitriSoft software. Apart from entering the sample name and, if necessary, the initial weight, this is all that needs to be done in the next few minutes.

The needle head lowers automatically and the addition of air or nitrogen starts automatically as well. The desired bake-out temperature is stored in the method and is quickly reached.

Once the final criteria of the method are achieved, the result is displayed and documented and the next sample can be measured.

Benefits of the headspace oven:

- **Automatic lowering and raising of the needle head**
- **Automatic switching on and off of the air/gas supply**
- **Can be upgraded by the TW 7650 to a fully automatic system with sample changer**

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

The TW 7650 sampler for fully automatic measuring

Advantages of the sample changer:

- **Can be upgraded to the TO 7280 oven at any time**
- **Up to 49 samples can be measured. One position is reserved for the zero-vial to determine the start drift**
- **The start drift can be determined before each sample**
- **Each sample can be measured at a different temperature**

If the number of samples exceeds 15–20/day, it is recommended to use the sample changer TW 7650.

The assembly of the sample changer and oven is within a minute done and immediately ready for use. There is no additional power supply unit or cable required. Power is supplied via the TO 7280.

The user places the sample vials in the changer and starts the method/work list with the TitriSoft software. The software TitriSoft is required when using the sample changer.

The sample plate rotates to the correct position; the changer head lowers onto the sample vial and sucks the lid tight with a pump. The changer arm moves to the headspace oven and places the sample vial in the corresponding opening.

The needle head lowers and the measurement begins as described on page 4. When the measurement is finished, the needle head lifts and the measured sample is transported back into the sample rack. Then the measurement continues with the next sample.

Technical Data TITRONIC® 500 and TitroLine® 7xxx

Features	TITRONIC® 500	TitroLine® 7000
Display	Color online graphic	Color online graphic
Measuring input 1 pH/mV with reference input	—	■
Measuring input 2 digital (IDS)	—	—
Wireless electrode recognition	—	■
Measuring input Dead stop (2 x 4 mm connector)	—	■
Measuring input generator electrode (2 x 4 mm connector)	—	—
Measuring input temperature (2 x 4 mm connector)	—	■
Interfaces	1 x LAN, 2 x USB-A, 1 x USB-B 2 x RS 232	1 x LAN, 2 x USB-A, 1 x USB-B 2 x RS 232
Balance connection	RS232	RS232
Printer (USB-A)	HP PCL, Seiko DPU S445, PDF	HP PCL, Seiko DPU S445, PDF
Intelligent interchangeable modules (5, 10, 20 and 50 ml)	■	■
Burette solution (steps)	20,000	20,000
Manual titration	■	■
Dosing applications	■	■
Solution preparation (manual or automatic when connected to balance)	■	■
Automatic titration (Independent without external software)	1)	■
Titration to mV and pH end points	—	2 EP
Dynamic and linear titration to inflection points (EQ) mV and pH	—	2 EQ
Particularly suitable for non aqueous titrations	—	■
Dead-stop-titration	—	■
pH-stat-titration	—	■
Water determination according to KF volumetry (10 ppm – 100 %, recommended)	—	—
Accuracy volumetric Measurements	—	—
Water determination according to KF coulometry (1 ppm – 5 %, recommended)	—	—
Accuracy coulometric Measurements	—	—
Standard methods	■	■
Number of user methods	15	50
Controllable via TitriSoft 3.3 and higher	■	■

1) Can be used as titration and dosing burette in automatic titration systems

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Technical Data TitroLine® 7500 KF/KF trace

TitroLine® 7750	TitroLine® 7800	TitroLine® 7500 KF	TitroLine® 7500 KF trace
Color online graphic	Color online graphic	Color online graphic	Color online graphic
■	■	—	—
—	■	—	—
■	■	—	—
■	■	■	■
—	—	—	■
■	■	—	—
1 x LAN, 2 x USB-A, 1 x USB-B 2 x RS 232	1 x LAN, 2 x USB-A, 1 x USB-B 2 x RS 232	1 x LAN, 2 x USB-A, 1 x USB-B 2 x RS 232	1 x LAN, 2 x USB-A, 1 x USB-B 2 x RS 232
RS232	RS232	RS232	RS232
HP PCL, Seiko DPU S445, PDF	HP PCL, Seiko DPU S445, PDF	HP PCL, Seiko DPU S445, PDF	HP PCL, Seiko DPU S445, PDF
■	■	■	—
20,000	20,000	20,000	—
■	■	—	—
■	■	■	—
■	■	■	—
■	■	■	■
2 EP	2 EP	—	—
2 EQ	2 EQ	—	—
■	■	—	—
■	■	■	—
■	■	—	—
■	■	■	—
< 0.3% at ≥ 10 mg H_2O	< 0.3% at ≥ 10 mg H_2O	< 0.3% at ≥ 10 mg H_2O	—
—	—	—	■
—	—	—	< 0.3% at ≥ 1 mg H_2O
■	■	■	■
50	50	50	50
■	■	■	■

Features	TITRONIC® 500	TitroLine® 7000
Analogue measuring inputs		
Measuring input 1 (analog) pH/mV with reference electrode input	—	pH/mV-input with 24 bit transducer Electrode socket according to DIN 19 262 or additional with BNC socket insert RFID receiver for SI Analytics ID electrodes
Measuring range pH	—	–3.0 to 18.00
Display resolution pH / Accuracy pH (without sensor probe)	—	0.001 / 0.002 ± 1 Digit
Measuring range mV	—	–2000 to 2000
Display resolution mV / Accuracy mV (without sensor probe)	—	0.1 / 0.1 ± 1 Digit
Analogue measuring inputs - Dead Stop		
Measuring input Dead stop (2 x 4 mm socket)	—	Connector (µA) for double platinum electrodes Polarization voltage adjustable from 40 to 220 mV
Display resolution µA / Accuracy µA (without sensor probe)	—	0.1 / 0.2 ± 1 Digit
Measuring input temperature (2 x 4 mm socket)	—	Connector for Pt 1000 / NTC 30kΩ
Measuring range temperature °C	—	Pt 1000: –75 to 195 °C NTC 30kΩ: – 40...125 °C
Display resolution °C / Accuracy °C (without sensor probe)	—	Pt 1000: 0.1/0.2 K ± 1 Digit NTC 30kΩ: 0.1/1.0 K (–40...0 °C) resp. 0.3 K (0...125 °C) ± 1 Digit
Digital measuring inputs		
Measuring input 2 (IDS)	—	—
Measuring range pH	—	—
Measuring range mV	—	—
Measuring range temperature °C	—	—
Measuring range conductivity	—	—
Display	3.5 inches -1/4 VGA TFT display with 320 x 240 pixels	3.5 inches -1/4 VGA TFT display with 320 x 240 pixels
Housing material	Polypropylene	Polypropylene
Front keyboard	Polyester coated	Polyester coated
Housing dimensions	15.3 x 45 x 29.6 cm (W x H x D), height with interchangeable unit	15.3 x 45 x 29.6 cm (W x H x D), height with interchangeable unit
Weight	2.2 kg for basic unit 3.5 kg for complete device incl. interchangeable unit (with empty reagent bottle, without magnetic stirrer)	2.3 kg for basic unit 3.5 kg for complete device incl. interchangeable unit (with empty reagent bottle, without magnetic stirrer)
Ambient conditions	Ambient temperature: +10 to +40 °C for operation and storage	Ambient temperature: +10 to +40 °C for operation and storage
Material: intelligent interchangeable units (5, 10, 20 and 50 ml)	Valve: PTFE/ETFE Cylinder: borosilicate glass 3.3 (DURAN®) Hoses: FEP, blue	Valve: PTFE/ETFE Cylinder: borosilicate glass 3.3 (DURAN®) Hoses: FEP, blue
Dosing accuracy according to DIN EN ISO 8655, part 3	Accuracy : 0.15 % Precision: 0.05 – 0.07 % (Depending on the used interchangeable unit)	Accuracy : 0.15 % Precision: 0.05 – 0.07 % (Depending on the used interchangeable unit)

SI Analytics a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

TitroLine® 7750	TitroLine® 7800	TitroLine® 7500 KF	TitroLine® 7500 KF trace
pH/mV-input with 24 bit transducer Electrode socket according to DIN 19262 or additional with BNC socket insert RFID receiver for SI Analytics ID electrodes	pH/mV-input with 24 bit transducer Electrode socket according to DIN 19262 or additional with BNC socket insert RFID receiver for SI Analytics ID electrodes	—	—
-3.0 to 18.00	-3.0 to 18.00	—	—
0.001 / 0.002 ± 1 Digit	0.001 / 0.002 ± 1 Digit	—	—
-2000 to 2000	-2000 to 2000	—	—
0.1 / 0.1 ± 1 Digit	0.1 / 0.1 ± 1 Digit	—	—
Connector (µA) for double platinum electrodes Polarization voltage adjustable from 40 to 220 mV	Connector (µA) for double platinum electrodes Polarization voltage adjustable from 40 to 220 mV	Connector (µA) for double platinum electrodes Polarization voltage adjustable from 40 to 220 mV	Connector (µA) for double platinum electrodes
0.1 / 0.2 ± 1 Digit	0.1 / 0.2 ± 1 Digit	0.1 / 0.2 ± 1 Digit	—
Connector for Pt 1000 / NTC 30kΩ	Connector for Pt 1000 / NTC 30kΩ	—	—
Pt 1000: -75 to 195 °C NTC 30kΩ: - 40...125 °C	Pt 1000: -75 to 195 °C NTC 30kΩ: - 40...125 °C	—	—
Pt 1000: 0.1/0.2 K ± 1 Digit NTC 30kΩ: 0.1/1.0 K (-40...0 °C) resp. 0.3 K (0...125 °C) ± 1 Digit	Pt 1000: 0.1/0.2 K ± 1 Digit NTC 30kΩ: 0.1/1.0 K (-40...0 °C) resp. 0.3 K (0...125 °C) ± 1 Digit	—	—
—	Accuracy ± 1 Digit depending on the used IDS electrode	—	—
	0.000 to14.000 ± 0.004 pH	—	—
	± 1200.0 mV ± 0.2 mV	—	—
	-5.0 ... 105.0 °C ± 0.2 mV	—	—
	0.00 ... 2000 mS/cm ± 0.5% v. Mw.	—	—
3.5 inches -1/4 VGA TFT display with 320 x 240 pixels	3.5 inches -1/4 VGA TFT display with 320 x 240 pixels	3.5 inches -1/4 VGA TFT display with 320 x 240 pixels	3.5 inches -1/4 VGA TFT display with 320 x 240 pixels
Polypropylene	Polypropylene	Polypropylene	Polypropylene
Polyester coated	Polyester coated	Polyester coated	Polyester coated
15.3 x 45 x 29.6 cm (W x H x D), height with interchangeable unit	15.3 x 45 x 29.6 cm (W x H x D), height with interchangeable unit	15.3 x 45 x 29.6 cm (W x H x D), height with interchangeable unit	15,3 x XX x 29,6 cm (W x H x D)
2.3 kg for basic unit 3.5 kg for complete device incl. interchangeable unit (with empty reagent bottle, without magnetic stirrer or TM 235 KF)	2.3 kg for basic unit 3.5 kg for complete device incl. interchangeable unit (with empty reagent bottle, without magnetic stirrer)	2.3 kg for basic unit 3.5 kg for complete device incl. interchangeable unit (with empty reagent bottle, without magnetic stirrer or TM 235 KF)	2.3 kg for basic unit without magnetic stirrer TM 235 or TM 235 KF
Ambient temperature: +10 to +40 °C for operation and storage	Ambient temperature: +10 to +40 °C for operation and storage	Ambient temperature: +10 to +40 °C for operation and storage	Ambient temperature: +10 to +40 °C for operation and storage
Valve: PTFE/ETFE Cylinder: borosilicate glass 3.3 (DURAN®) Hoses: FEP, blue	Valve: PTFE/ETFE Cylinder: borosilicate glass 3.3 (DURAN®) Hoses: FEP, blue	Valve: PTFE/ETFE Cylinder: borosilicate glass 3.3 (DURAN®) Hoses: FEP, blue	—
Accuracy : 0.15 % Precision: 0.05 - 0.07 % (Depending on the used interchangeable unit)	Accuracy : 0.15 % Precision: 0.05 - 0.07 % (Depending on the used interchangeable unit)	Accuracy : 0.15 % Precision: 0.05 - 0.07 % (Depending on the used interchangeable unit)	—

Ordering information TITRONIC® 500, TitroLine® 7xxx

Type No.	Order No.	Description
T 500	285220200	TITRONIC® 500 basic unit without magnetic stirrer, with stand rod and titration clamp Z 305, controller TZ 3880, power supply 100-240 V
T 500-M1	285220210	TITRONIC® 500 basic unit with magnetic stirrer TM 235, with stand rod TZ 1510, electrode clamp Z 305, hand controller TZ 3880, power supply 100-240 V
T 500-M2/20	285220220	TITRONIC® 500 basic unit with magnetic stirrer TM 235 and 20 ml exchange unit WA 20, with stand rod TZ 1510, electrode clamp Z 305, hand controller TZ 3880, power supply 100-240 V
TL 7000	285220100	TitroLine® 7000 basic unit without magnetic stirrer, with stand rod and titration clamp Z 305, power supply 100-240 V
TL 7000-M1/10	285220140	TitroLine® 7000 basic unit with magnetic stirrer TM 235 and 10 ml exchangeable unit WA 10, with brown glass bottle for titrant, GL 45 and S 40-bottle adapter, tubes, drip tube and titration tip
TL 7000-M1/20	285220150	TitroLine® 7000 basic unit with magnetic stirrer TM 235 and 20 ml exchangeable unit WA 20, with brown glass bottle for titrant, GL 45 and S 40-bottle adapter, tubes, drip tube and titration tip
TL 7000-M1/50	285220160	TitroLine® 7000 basic unit with magnetic stirrer TM 235 and 50 ml exchangeable unit WA 50, with brown glass bottle for titrant, GL 45 and S 40-bottle adapter, tubes, drip tube and titration tip
TL 7000-M2/20	285220170	TitroLine® 7000 basic unit with magnetic stirrer TM 235 and 20 ml exchangeable unit WA 20, with brown glass bottle for titrant, GL 45 and S 40-bottle adapter, tubes, drip tube and titration tip. With pH-combination electrode and buffer set
TL 7000-TitriSoft	285220960	basic unit with magnetic stirrer TM 235, with stand rod and titration clamp Z 305, power supply 100-240 V, software TitriSoft 3.5 (TZ 3071)
TL 7500 KF 10	285220820	Volumetric KF-Titrator, scope of supply: basic titrator unit, exchange unit WA 10, TM 235 KF titration stand with integrated stirrer and pump, titration vessel TZ 1770, micro double platinum electrode KF 1100 and starter kit, power supply 100-240 V
TL 7500 KF 20	285220830	volumetric KF-Titrator, scope of supply: basic titrator unit, exchange unit WA 20, TM 235 KF titration stand with integrated stirrer and pump, titration vessel TZ 1770, micro double platinum electrode KF 1100 and starter kit, power supply 100-240 V
TL 7750	285220240	Basic unit without magnetic stirrer, with stand rod; TZ 1510, electrode clamp Z 305, hand controller TZ 3880, power supply 100-240 V
TL 7750-M1	285220250	Basic unit with magnetic stirrer TM 2325, with stand rod; TZ 1510, electrode clamp Z 305, hand controller TZ 3880, power supply 100-240 V
TL 7750 KF 05	285220930	TitroLine® 7750 with KF accessories, scope of supply: basic titrator unit, exchange unit WA 05, TM 235 KF titration stand with integrated stirrer and pump, titration vessel TZ 1770, micro double platinum electrode KF 1100 and starter kit, power supply 100-240 V
TL 7750 KF 10	285220940	TitroLine® 7750 with KF accessories, scope of supply: basic titrator unit, exchange unit WA 10, TM 235 KF titration stand with integrated stirrer and pump, titration vessel TZ 1770, micro double platinum electrode KF 1100 and starter kit, power supply 100-240 V
TL 7750 KF 20	285220950	TitroLine® 7750 with KF accessories, scope of supply: basic titrator unit, exchange unit WA 20, TM 235 KF titration stand with integrated stirrer and pump, titration vessel TZ 1770, micro double platinum electrode KF 1100 and starter kit, power supply 100-240 V
TL 7750-TitriSoft	285220970	basic unit with magnetic stirrer TM 235, with stand rod and titration clamp Z 305, power supply 100-240 V, software TitriSoft 3.5 (TZ 3071)
TL 7800	285220980	TitroLine® 7800 basic unit with two measuring inputs, one analogue and one digital (IDS) measuring input
TL 7800-M1	285220990	TitroLine® 7800 basic unit with two measuring inputs, one analogue and one digital (IDS) measuring input, with magnetic stirrer TM 235
TL 7800-TitriSoft	285221030	basic unit with two measuring inputs, one analogue and one digital (IDS) measuring input, with magnetic stirrer TM 235 and TitriSoft 3.2

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Ordering information accessories for TITRONIC® 500 TitroLine® 7xxx

Type No.	Order No.	Description
WA 05	285220300	5 ml exchangeable unit with integrated chip for reagent data, with brown glass bottle for titrant, GL 45 and S 40-bottle adapter, tubes, drip tube and titration tip
WA 10	285220310	10 ml exchangeable unit with integrated chip for reagent data, with brown glass bottle for titrant, GL 45 and S 40-bottle adapter, tubes, drip tube and titration tip
WA 20	285220320	20 ml exchangeable unit with integrated chip for reagent data, with brown glass bottle for titrant, GL 45 and S 40-bottle adapter, tubes, drip tube and titration tip
WA 50	285220350	50 ml exchangeable unit with integrated chip for reagent data, with brown glass bottle for titrant, GL 45 and S 40-bottle adapter, tubes, drip tube and titration tip
TM 235, 115-230 V	285220400	Magnetic stirrer for vessels up to 500 ml, agitator speed infinitely adjustable from 500 - 2000 rpm, for the connection to TitroLine® 6000/7000 and TITRONIC® 500
TM 235 KF, 115-230 V	285220900	Titriation stand with pump; Scope of delivery: Basic unit with 1 l DURAN ®-reagent bottle TZ 1791, 1 l DURAN®-waste bottle TZ 1792, moisture bottle, tubes and screw threads, power supply TZ 1855 (110 to 240 V)
TZ 1052	285214721	KF-drying stove, 230 V
TZ 1055	285215183	KF-drying stove, 115 V
TZ 1060	285218115	Accessories set for KF drying stove TZ 1052/TZ1055
TZ 1065	285201973	Flowmeter with valve and hose connectors for gas volumes (air, nitrogen) from 50 - 500 ml/min
KF 1100	285102030	Micro double platinum electrode for Karl Fischer titrations, with fixed cable, double platinum pin and tapper NS 7.5 for TZ 1770 and TZ 1772
TZ 1748	285216560	Stand rod stainless steel Ø 10 mm
TZ 1770	285216677	Karl Fischer titration vessel. DURAN® glass vessel TZ 1775 (approx. 30...150 ml), removable head made of polypropylene/PTFE, 1 drilling NS 19, NS 14,5, NS 7,5 and 3 drillings with screw threads, titration tip, moisture trap and weighing funnel
TZ 1789	285221120	Starter kit KF consisting of molecular sieve, needles with syringes and glass wool
TZ 3863	285220480	USB-thermo printer, 112 mm for TitroLine® 6000/7000/7500 KF/7500 KF trace/7750 and TITRONIC® 500
TZ 3864	285220710	Thermal paper for TZ 3863 with very high durability (5 rolls)
TZ 3865	285220440	DIN A4 standard printer, HP PCL-compatible, with USB-connection cable, 230 V

Technical Data TO 7280

Sample dosing:	Headspace vials (5 ml…)
Measuring range:	1 µg…100 mg absolute
Resolution:	0.1 µg
Reproducibility:	± 3 µg for 10…1000 µg, 0.3 % for > 1 mg
Temperature range:	35 °C … 280 °C (isothermal)
Resolution:	1 °K
Power supply:	115 … 230 V, 50/60 Hz
Power input:	250 W
Dimensions:	300 x 450 x 240 mm (W x H x D)
Weight:	7 kg
Ambient conditions:	Ambient temperature + 10 … + 40 °C for operation and storage

Technical Data TM 235 TO

Housing material:	Polypropylene, plastic coated
Dimensions:	80 x 130 x 250 mm (W x H x D), height without stand rod, bottles, and titration vessel
Weight:	1.9 kg
Ambient conditions:	Ambient temperature + 10 … + 40 °C for operation and storage
Power supply:	Via low-voltage connection (12 V) from TitroLine® 7500 KF trace titrator or power supply
Control:	Via USB port by TitroLine® 7500 KF trace titrator
Pump:	Integrated, for supplying the TO 7280 with air from the environment
Valve:	Automatically switching valve for air/nitrogen supply
Gas flow meter:	Adjustable between 50 - 500 ml/min

Technical Data TW 7650

Number of positions:	49 samples + 1 zero vial
Power supply:	Supply via TO 7280
Power input:	Supply via TO 7280
Dimensions:	420 x 450 x 460 mm (W x H x D) incl. TO 7280
Weight:	10 kg without/17 kg with TO 7280
Ambient conditions:	Ambient temperature + 10 … + 40 °C for operation and storage

Ordering information accessories and spares

Tye No.	Order No.	Description
TZ 3988	285227870	Vials, 5 ml with crimp caps and septa, 100 pcs
TZ 3989	285227880	Vials 5 ml, 100 pcs.

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Ordering information TitroLine® 7500 KF/KF trace

Tye No.	Order No.	Description
TL 7500 KF trace M1	285220860	Module 1, coulometric KF titrator, scope of supply: basic titrator unit, generator electrode TZ 1752 without diaphragm + cable, magnetic stirrer TM 235, stand rod, titration vessel TZ 1751, Mikro-Doppelplatinelektrode KF 1150
TL 7500 KF trace M2	285220870	Module 2, coulometric KF titrator, scope of supply: basic titrator unit, generator electrode TZ 1752 without diaphragm + cable, TM 235 KF titration stand with built-in stirrer and pump, stand rod, titration vessel TZ 1754, micro double platin electrode KF
TL 7500 KF trace M3	285220880	Module 3, coulometric KF titrator, scope of supply: basic titrator unit, generator electrode TZ 1753 with diaphragm + cable, magnetic stirrer TM 235, stand rod, titration vessel TZ 1751, micro double platin electrode KF 1150
TL 7500 KF trace M4	285220890	Module 4, coulometric KF titrator, scope of supply: basic titrator unit, generator electrode TZ 1753 with diaphragm + connection cable, TM 235 KF titration stand with built-in stirrer and pump, stand rod, titration vessel TZ 1754, micro double platinum electrode KF 1150
TL 7500 KF trace M5	285221000	Module 5, coulometric KF titrator, scope of supply: basic titrator unit, generator electrode TZ 1752 without junction, connection cable, magnetic stirrer TM 235, stand rod, titration vessel TZ 1754, micro double platinum electrode KF 1150
TL 7500 KF trace M6	285227800	Module 6, coulometric KF titrator, scope of supply: basic titrator unit, generator electrode TZ 1752 without junction, connection cable LB 04 NN, TM 235 TO titration stand, stand rod, titration vessel TZ 1754, micro double platinum electrode KF 1150, connection cable TZ 3094
TL 7500 KF trace M6-TitriSoft Pharma	285227810	Module 6, coulometric KF titrator, scope of supply: basic titrator unit, generator electrode TZ 1752 without junction, connection cable LB 04 NN, TM 235 TO titration stand, stand rod, titration vessel TZ 1754, micro double platinum electrode KF 1150, connection cable TZ 3094 and TitriSoft 3.5 P

Ordering info TO 7280, TM 235 TO, TW 7650

Tye No.	Order No.	Description
TO 7280	285227820	For water determination according to Karl Fischer method. Maximum temperature 280 °C. Including power supply for 100 - 240 V
TW 7650	285227830	For the use with headspace oven TO 7280. Up to 50 vials (1 zero vial + 49 samples) with 5 ml size
TW 7650-TitriSoft	285227840	For the use with headspace oven TO 7280. Up to 50 vials (1 zero vial + 49 sample vials) with 5 ml size. With TitriSoft 3.5 P
TO 7280 - TW 7650 set	285227850	Set includes KF headspace oven TO 7280 and the autosampler TW 7650. With TitriSoft 3.5 P
TM 235 TO	285227860	For TO 7280. Scope of supply: basic unit with two 100 ml DURAN ®-bottles including threads, holder TZ 3992 for the bottles, PTFE tubes including screw connections, gas flow meter and holder, 100 vials and grimper, molecular sieve, power supply (110 ... 240 V)

Ordering information accessories and spares

Tye No.	Order No.	Description
TZ 3990	285227890	Crimp caps made of aluminum with opening, 10 mm diameter, septa made of silicone/PTFE, 100 pcs
TZ 3993	285227920	Connection tube including screw connections for connection headspace oven TO 7280 - titration vessel TZ 1754/gas flow meter
TZ 3994	285227930	Fittings set drying bottle for TM 235 TO, 2 x fittings and 2 x O-ring
TZ 3997	285227960	Tube set complete for connection headspace oven TO 7280 - TM 235 TO
TZ 1632	285227990	Dosing tip made out of glass for titration vessel TZ 1754

6. Automated titration with flexible sample changers

The number of samples to be processed is growing constantly, while at the same time the demands on reliability are increasing in accordance with GLP and ISO 900X standards. The TW 7200 and the TW 7450 sample changers help you meet these increased requirements and relieve qualified employees from routine work.

Exchangeable sample trays for more flexibility

With sample trays or racks for up to 72 samples (TW 7450) and titration head fittings for a variety of beaker and titrator vessels, you get the flexibility your lab needs.

The sample trays and titrator heads are very quick and simple to change. You can conveniently set the respective tray size in the TitriSoft software's worklist without any need for configuration of the sample changer itself.

Rinsing of electrode and titration tip

To ensure the accuracy of the results, electrodes, and titration tips are rinsed after each titration. This can be done by immersing the electrodes and titration tips in a rinsing solution. How many rinsing positions are to be used and how long rinsing is to be carried out is defined in the worklist. A direct and fast rinsing of the electrodes and titration tips can be carried out by connecting the MP 25 rinsing pump. This involves rinsing directly after the titration either into the titrated sample (TW 7200-16-MP, TW 7450-42-MP) or into a special rinsing vessel at position one (TW 7450-48-MP and TW 7450-72-MP). Finally, a waiting position can be approached to immerse pH electrodes in a KCl solution and prevent them from drying out.

By using an optional second pump, the titrated solution as well as the rinsing solution can be aspirated.

Photo on the left hand side: The connection of a rinsing nozzle in the TZ 3974 titration head now also enables rinsing on the first position into a special rinsing vessel. The rinsing liquid drains from the rinsing vessel into a waste vessel by gravity.

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Stirring “from above“ or “from below“

Two magnetic stirrers allowing the samples to be stirred “from below“ are installed in the TW 7200 as a standard. Alternatively, you can use a rod stirrer which allows stirring “from above“.

With the TW 7450 sample changer stirring is generally “from above“.

Automatic COD titration

For the direct titration of the chemical oxygen demand (COD) in the digestion vessels, a special sample tray with twenty-four positions and a matching titration head are available for the TW 7200.

The Flexible TW 7200

At first glance, the new TW 7200 sample changer looks quite similar to its predecessor TW alpha plus. But do not be deceived by its appearance: It is a completely newly developed sample changer with higher flexibility due to more sample trays and further new features.

TW 7200 benefits:

- **Titration heads and sample trays can be changed in one easy step**
- **Sample trays from 12 to 48 positions for sample vessels from 28 to 82 mm diameter**
- **Special designs for special vessels with other diameters available on request**
- **Increased safety due to automatic recognition of the sample tray**
- **Built-in motor for positioning the head in another sample row**
- **Two built-in magnetic stirrers**
- **Connection of two pumps (diaphragm and peristaltic)**
- **Software controlled setting of the limit switch**

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Titration heads and sample trays

Due to the built-in head motor of the TW 7200, double-row sample trays can be used in place of single-row versions simply by switching them over. No need for any special adaptations or modifications.

Examples, from left to right:
TZ 4016, single-row,16 sample positions
TZ 4025, double-row, 25 sample positions
TZ 4038, double-row, 38 sample positions
TZ 4050, double-row, 48 sample positions

Titration head TZ 1464

Suitable for the TZ 4018 and TZ 4018 sample trays with 18 and 28 positions for 100 ml beakers. Four openings are available for electrodes, titration tips and the rod stirrer.

Titration head TZ 1467 with splash shield and rinsing nozzle

Suitable for the TZ 4012, TZ 4016 and TZ 4025 sample trays from 12 to 25 positions for 150 ml to 400 ml beakers. Six openings are then still available for electrodes, titration tips and the rod stirrer.

Titration head TZ 1463

Suitable for TZ 4012, TZ 4016, TZ 4025 and TZ 4053 sample trays from 12 to 25 positions for 150 ml to 600 ml beakers.

The titration head is also used for the TZ 4030, TZ 4050 and TZ 4058 sample trays for special dosing tasks such as sample preparation. A total of seven openings are available for electrodes, titration tips and the rod stirrer.

New: Titration head TZ 1469 for 24 and 38 position sample trays

The TZ 1469 micro-titration head now also allows the simultaneous use of a conductivity and a pH electrode (micro version such as SCPpHT-MIC-AMF-3M-DIN-N, 285101335) and rod stirrer.

Without a rod stirrer, a standard pH electrode with 12 mm diameter can also be used. Titration tips can be accommodated in the head too.

Sample preparation with the TITRONIC® 500, TW 7200 and TitriSoft

A good example of automation is sample preparation for viscometry. For viscometry of polymer solutions, the sample solution must first be prepared with a specified concentration before measurement.

As an alternative to volumetric flasks and very accurate weighing, the TITRONIC® 500 piston burette (with WA 50 V exchange unit for highly aggressive and viscous solutions) together with the TW 7200 sample changer can be used for further automation and simplification.

TW 7200 with TZ 4058 for VZ 7081 100 ml laboratory bottles

TZ 4050 sample tray for VZ 7088 laboratory bottles

Beenfits of sample preparation with TITRONIC® 500 over working with volumetric flasks:

- **No manual work with aggressive solvents**
- **When working with TITRONIC® 500, the solvent volume is dosed exactly in accordance with the sample's initial weight. This means that it is no longer necessary to achieve an exact target initial weight**
- **In addition to the sample's initial weight, the content of impurities such as glass fibers can also be entered in TitriSoft. This means that the quantity of solvent to be dosed is calculated only in relation to the pure polymer quantity, in accordance with the viscometry standards such as ISO 1628 or ISO 307**
- **Different sample trays are available for 16 100 ml laboratory bottles and 40 ml ND 24 (EPA) vials with 30 and 48 positions**

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Selection table: Sample trays and titration heads for TW 7200

Type	Order No.	Description	Comment	Sample vessels	Titration heads
TZ 4012	285228080	Sample tray for TW 7200, for 12 sample vessels, incl. 20 beakers, 250 ml, low form	Vessels are included	250 ml tall form TZ 1785, as well as 400 ml tall (not available from Xylem Analytics)	TZ 1463 and TZ 1467
TZ 4016	285228090	Sample tray for TW 7200,for 16 sample vessels without beakers. Suitable beakers are 150 ml TZ 1784, TZ 1788 or 250 ml TZ 1787, TZ 1780.	Vessels are not included	150 ml low form TZ 1784, 150 ml low form "super duty" TZ 1788, 250 ml tall form 1787, 250 ml tall form "super duty" TZ 1780	TZ 1463 and TZ 1467
TZ 4018	285228100	Sample tray for TW 7200, for 18 sample vessels without beakers. Suitable beakers are TZ 1765 (100 ml tall form without spout)	Vessels are not included	100 ml tall form TZ 1765 as well as 100 ml low form and various plastic vessels (not available from Xylem Analytics)	TZ 1464 and TZ 1469
TZ 4024	285228110	Sample tray for TW 7200, for 24 sample vessels without beakers. Suitable beakers are 50 ml TZ 1783 / 75 ml TZ 1786	Vessels are not included	50 ml tall form TZ 1783, 75 ml glass beaker TZ 1786, 50 ml beaker (PP) TZ 3973	TZ 1469
TZ 4025	285228120	Sample tray for TW 7200, double-row for 25 sample vessels, without beakers. Suitable beakers are 150 ml TZ 1784, TZ 1788 or 250 ml TZ 1787, TZ 1780	Vessels are not included	150 ml low form TZ 1784, 150 ml low form "super duty" TZ 1788, 250 ml tall form 1787, 250 ml tall form "super duty" TZ 1780	TZ 1463 and TZ 1467
TZ 4028	285228130	Sample tray for TW 7200, double-row for 28 sample vessels, without beakers. Suitable beakers are TZ 1765 (100 ml tall form without spout)	Vessels are not included	100 ml tall form TZ 1765 as well as 100 ml low form and various plastic vessels (not available from Xylem Analytics)	TZ 1464 and TZ 1469
TZ 4030	285228140	Sample tray for TW 7200, for 24 sample vessels, without beakers. Suitable for 40 ml sample vials with ND 24 VZ 7088	Vessels are not included	Sample vessels VZ 7088	TZ 1463
TZ 4038	285228150	Sample tray for TW 7200, double-row for 38 sample vessels, without beakers. Suitable beakers are 50 ml TZ 1783 / 75 ml TZ 1786	Vessels are not included	50 ml tall form TZ 1783, 75 ml glass beaker TZ 1786, 50 ml beaker (PP) TZ 3973	TZ 1469
TZ 4040	285228160	Sample tray for TW 7200, for 24 COD vessels according to DIN 38 409, without beakers	Vessels are not included	not available from Xylem Analytics	TZ 1461
TZ 4050	285228170	Sample tray for TW 7200, double-row for 48 sample vessels, without beakers. Suitable for 40 ml sample vials with ND 24 VZ 7088	Vessels are not included	Sample vessels VZ 7088	TZ 1463
TZ 4053	285228180	Sample tray for TW 7200, for 12 sample vessels, incl. 20 beakers 600 ml, tall form	Vessels are included	600 ml tall form TZ 1766	TZ 1463
TZ 4058	285228190	Sample tray for TW 7200, for 16 sample vessels, without beakers. Suitable for 100 ml laboratory bottles VZ 7081	Vessels are not included	100 ml laboratory bottles VZ 7081	TZ 1463

The Powerful TW 7450

The new x/y/z sample changer TW7450 has been developed for high sample throughput. There are three different sample rack sizes of 42, 48 and 72 positions, and three different titration heads available. The sample racks and titration heads can be exchanged in just a few steps.

TW 7450-72 and TW 7450-72 MP

The sample rack with 72 positions can be used with 50 ml beakers and with special sample vessels for a sample volume of up to approx. 75 ml. Areas of application include wine and beverage analysis, pH measurement in soil samples as well as for the determination of alkalinity in seawater. The new TZ 3974 titration head also facilitates the simultaneous use of conductivity and micro pH electrode such as the ScienceLine PLUS.

The TW 7450-72-MP comes with the MP 25 membrane pump, TZ 3971 rinsing nozzle and TZ 3970 rinsing vessel. Titration head is the TZ 3974.

TW 7450 benefits:

- **Very fast and quiet**
- **Titration heads and sample racks can be changed in just a few practical steps and a software switch in TitriSoft**
- **Single pump (diaphragm or peristaltic) with additional pumps connected via optional I/O interface**
- **Custom design trays for special vessels available on request**

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

TW 7450-48 and TW 7450-48 MP

The 48 position sample rack is suitable for 100 ml beakers and is ideal for use in wine, water, beverage, and other applications.

TW 7450-42 and TW 7450-42 MP

The 42 position sample rack can be operated with either 150 or 250 ml beakers, sizes that are commonly used for water and environmental analysis amongst other applications. The matching titration heads are TZ 3963 and TZ 3967.

Selection table: Trays and titration heads for TW 7450

Type.	Order No.	Description	Comment	Sample vessels	Titration heads
TZ 3942	285217790	Sample rack with 42 positions for 150 ml beakers low form or 250 ml beakers tall form	Vessels are included	150 ml low form TZ 1784, 150 ml low form "super duty" TZ 1788, 250 ml tall form 1787, 250 ml tall form "super duty" TZ 1780	TZ 3963 and TZ 3967
TZ 3948	285217800	Sample rack with 48 positions for 100 ml beakers low form	Vessels are included	100 ml tall form TZ 1765 as well as 100 ml low form and various plastic vessels (not available from Xylem Analytics)	TZ 3964 and TZ 3965
TZ 3972	285217810	Sample rack with 72 positions for 50 ml beakers tall form	Vessels are included	50 ml tall form TZ 1783, 75 ml glass beaker TZ 1786, 50 ml beaker (PP) TZ 3973	

Ordering information: TW 7200 and TW 7450 sample changers (basic units)

Type	Order no.	Description
TW 7200	285228000	Basic unit TW 7200 with two integrated magnetic stirrers, connection cable for rod stirrer, USB connection cable TZ 3887, power supply 100–240 V
TW 7200-16	285228010	Basic unit TW 7200 with sample rack TZ 4016 for 16 samples, without beakers, incl. titration head TZ 1463 and power supply 100–240 V
TW 7200-18	285228020	Basic unit TW 7200 with sample rack TZ 4018 for 18 samples, without beakers, incl. titration head TZ 1464 and power supply 100–240 V
TW 7200-24	285228030	Basic unit TW 7200 with sample rack TZ 4024 for 24 samples, without beakers, incl. titration head TZ 1469, power supply 100–240 V
TW 7200-COD	285228040	Basic unit TW 7200 with sample rack TZ 4040 for 24 CSB-samples according to DIN 38 409, without vessels, incl. Titration head TZ 1461, redox electrode Pt 5901, rod stirrer TZ 1846, titration tip TZ 1648, power supply 100–240 V
TW 7200-16-MP	285228050	Basic unit TW 7200 with sample rack TZ 4016 for 16 samples, without beakers, incl. titration head TZ 1467, rinsing pump MP 25, power supply 100–240 V
TW 7200-25	285228200	Basic unit TW 7200 with sample rack TZ 4025 for 25 samples, without beakers, incl. titration head TZ 1463 and power supply 100–240 V
TW 7200-25-MP	285228210	Basic unit TW 7200 with sample rack TZ 4025 for 25 samples, without beakers, incl. titration head TZ 1467, rinsing pump MP 25, power supply 100–240
TW 7450	285221400	Basic TW 7450 unit without titration head and sample rack. With USB connection cable for PC connection, power supply 100–240 V
TW 7450-42	285221440	Basic unit TW 7450 with sample rack TZ 3942 for 42 samples, titration head TZ 3963, rod stirrer TZ 1847 and FEP-hose (5 m), 100–240 V
TW 7450-42-MP	285221450	Basic unit TW 7450 with sample rack TZ 3942 for 42 samples, titration head TZ 3967, rod stirrer TZ 1847, rinsing pump MP 25 and FEP-hose (5 m), 100–240 V
TW 7450-48	285221460	Basic unit TW 7450 with sample rack TZ 3948 for 48 samples, titration head TZ 3964, rod stirrer TZ 1847 and FEP-hose (5 m), 100–240 V
TW 7450-48-MP	285221470	Basic unit TW 7450 with sample rack TZ 3948 for 48 samples, titration head TZ 3964, rod stirrer TZ 1847 and FEP hose (5 m), 100–240 V
TW 7450-72	285221480	Basic unit TW 7450 with sample rack TZ 3972 for 72 samples, titration head TZ 3974, rod stirrer TZ 1847 and FEP hose (5 m), 100–240 V
TW 7450-72-MP	285221490	Basic unit TW 7450 with sample rack TZ 3972 for 72 samples, titration head TZ 3974, rod stirrer TZ 1847, rinsing vessel TZ 3970, rinsing pump MP 25, and FEP hose (5 m), 100–240 V
TL 7000 TW 7200-16 Set	285228060	Complete sample change set consists of TL 7000-M2-20, sampler changer TW 7200-24 and 3 x beaker sets TZ 1783, titration tip TZ 1646 and titration tube TZ 3415; incl. Software TitriSoft
TL 7000 TW 7200-24 Set	285228070	Complete sample change set consists of TL 7000-M2-20, sampler changer TW 7200-24 and 3 x beaker sets TZ 1783, titration tip TZ 1646 and titration tube TZ 3415; incl. software TitriSoft
TL 7000 TW 7450-42 Set	285221410	Complete sample changer set consists of TL 7000-M2-20, sample changer TW 7450, titration head TZ 3963, titration rack TZ 3942, rod stirrer TZ 1847, adapter TZ 1520, titration tube TZ 3425; with software TitriSoft
TL 7000 TW 7450-42-MP Set	285221420	Complete sample changer set consists of TL 7000-M2-20, sample changer TW 7450, titration head TZ 3967, titration rack TZ 3942, pump MP 25, rod stirrer TZ 1847, adapter TZ 1520, titration tube TZ 3425; with software TitriSoft
TL 7000 TW 7450-72 Set	285221430	Complete sample changer set consists of TL 7000-M2-20, sample changer TW 7450, titration head TZ 3974, titration rack TZ 3972, rod stirrer TZ 1847, titration tip TZ 1646 titration tube TZ 3425; with software TitriSoft

Ordering information: TW 7200 and TW 7450 trays/racks and titration heads

Type	Order no.	Description
TZ 4012	285228080	Sample tray for TW 7200, for 12 sample vessels, incl. 20 beakers, 250 ml, low form
TZ 4016	285228090	Sample tray for TW 7200 for 16 sample vessels without beakers. Suitable beakers are 150 ml TZ 1784, TZ 1788 or 250 ml TZ 1787, TZ 1780
TZ 4018	285228100	Sample tray for TW 7200, for 18 sample vessels without beakers. Suitable beakers are TZ 1765 (100 ml tall form without spout)
TZ 4024	285228110	Sample tray for TW 7200, for 24 sample vessels without beakers. Suitable beakers are 50 ml TZ 1783 / 75 ml TZ 1786

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

TZ 4025	285228120	Sample tray for TW 7200, double-row for 25 sample vessels, without beakers. Suitable beakers are 150 ml TZ 1784, TZ 1788 or 250 ml TZ 1787, TZ 1780
TZ 4028	285228130	Sample tray for TW 7200, double-row for 28 sample vessels, without beakers. Suitable beakers are TZ 1765 (100 ml tall form without spout)
TZ 4030	285228140	Sample tray for TW 7200, for 24 sample vessels, without vessel. Suitable for 40 ml sample vials with ND 24 VZ 7088
TZ 4038	285228150	Sample tray for TW 7200, double-row for 38 sample vessels, without beakers. Suitable beakers are 50 ml TZ 1783 / 75 ml TZ 1786
TZ 4040	285228160	Sample tray for TW 7200, for 24 COD vessels according to DIN 38 409, without vessels
TZ 4042	285217900	Sample rack for TW 7450, for 42 sample vessels, without beakers. Suitable beakers are 150 ml TZ 1784, TZ 1788 or 250 ml TZ 1787, TZ 1780
TZ 4048	285217910	Sample rack for TW 7450, for 48 sample vessels, without beakers. Suitable beakers are TZ 1765 (100 ml tall form without spout)
TZ 4050	285228170	Sample tray for TW 7200, double-row for 48 sample vessels, without vessels. Suitable for 40 ml sample vials with ND 24 VZ 7088
TZ 4053	285228180	Sample tray for TW 7200, for 12 sample vessels, incl. 20 beakers 600 ml, tall form
TZ 4058	285228190	Sample tray for TW 7200, for 16 sample vessels, without bottles. Suitable for 100 ml laboratory bottles VZ 7081
TZ 4072	285217920	Sample rack for TW 7450, for 72 sample vessels, without beakers. Suitable beakers are 50 ml TZ 1783 / 75 ml TZ 1786
TZ 1461	285213622	Titration head for COD sample tray for TW 7200
TZ 1462	285213639	Titration head for KF titration for sample tray TZ 4024 or TZ 4038 for TW 7200
TZ 1463	285213647	Titration head for sample tray TZ 4012 and sample tray TZ 4016/TZ 4025, as well as TZ 4030, TZ 4050, TZ 4053 and TZ 4058 with 7 openings NS 14
TZ 1464	285213654	Titration head for sample tray TZ 4018/TZ4028 with four openings with different diameters
TZ 1467	285213671	Titration head for sample tray TZ 4012/TZ 4016/TZ 4025 with 7 openings NS 14 incl. splash shield and rinsing tube
TZ 1469	285213884	Titration head for sample tray TZ 4024 and TZ 4038 with 5 x openings (1 x NS 14, 1 x 15.3 mm and 2 x NS 7 + 1 x 3 mm for FEP-tubes). With adapter TZ 1526 for 12 mm standard electrodes
TZ 3963	285217820	Titration head for sample rack TZ 3942 (42 positions) with 7 openings NS 14,5. For TW 7450
TZ 3967	285217830	Titration head for sample rack TZ 3942 (42 positions) with 7 openings NS 14,5, incl. splash shield. For TW 7450
TZ 3964	285217890	Titration head for sample rack 3948 (48 positions) with 4 openings different sizes. For TW 7450
TZ 3965	285227450	Titration head for sample rack TZ 3948 (48 positions) with 3 openings NS 14 for electrodes and rod stirrer and 2 openings for rinsing nozzle and titration tips, including rinsing nozzle. For TW 7450
TZ 3949	285227440	Rinsing vessel for sample rack TZ 3948, including PVC tube, 3 m
TZ 3970	285227470	Rinsing vessel for sample rack TZ 3972, including PVC-tube, 3 m

Ordering information: Other accessories

Type	Order no.	Description
TZ 1465	285213980	Cap made out of plastic, with opening for titration vessel TZ 1786, 12 pcs.
TZ 1466	285213990	Aluminum foil for titration vessel TZ 1786, 500 pcs.
TZ 1785	1064589	Glass titration beaker, 250 ml low form (10 pcs.) for TZ 1452/TZ 4012
TZ 1783	1064720	Glass titration beaker, 50 ml tall form (10 pcs.) for TZ 1454/TZ 4024/TZ 4038 and TZ 3972
TZ 1787	285201994	Glass titration beaker, 250 ml tall form (10 pcs.) for TZ 1459/TZ 4016/TZ4025 and TZ 3942
TZ 1788	285202008	Glass titration beaker "super duty", 150 ml low form (10 pcs. for TZ 1459/TZ 4016/TZ4025 and TZ 3942
TZ 1765	285202030	Glass titration beaker, 100 ml tall form (10 pcs.) without spout
TZ 1784	285216747	Glass titration beaker, 150 ml low form (10 pcs.) for TZ 1459/TZ 4016/TZ4025 and TZ 3942
TZ 1786	285216756	Beaker made out of glass for max. 75 ml; diameter 40 mm, height 110 mm (10 pcs) for TZ 1454/ TZ 4024/TZ 4038 and TZ 3972
TZ 1780	285226140	Glass titration beaker "super duty", 250 ml tall form (10 pcs. For TZ 1459/TZ 4016/TZ4025 and TZ 3942
TZ 1766	285226160	Glass titration beaker, 600 ml tall form (10 pcs.) without spout
TZ 1844	285213199	Rod stirrer mid size model (120 mm) with NS 14.5
TZ 1846	285215134	Rod stirrer long model (200 mm) with NS 14.5 for COD reaction vessels according to DIN 38 409 section 41 for sample changer TW 7200
TZ 1847	285215175	Rod stirrer short model (103 mm) with NS 14.5
TZ 1863	285216530	Propeller blade three-fold made of PTFE

7. TitriSoft – simple and with strong benefits

TitriSoft 3.5

The titration software TitriSoft 3.5 is the optimal solution for your titration tasks. The software works under Windows version 10 or higher and supports your daily workflow in sample preparation, titration, and evaluation of the results. The software has been developed to be clear, logical and user-friendly.

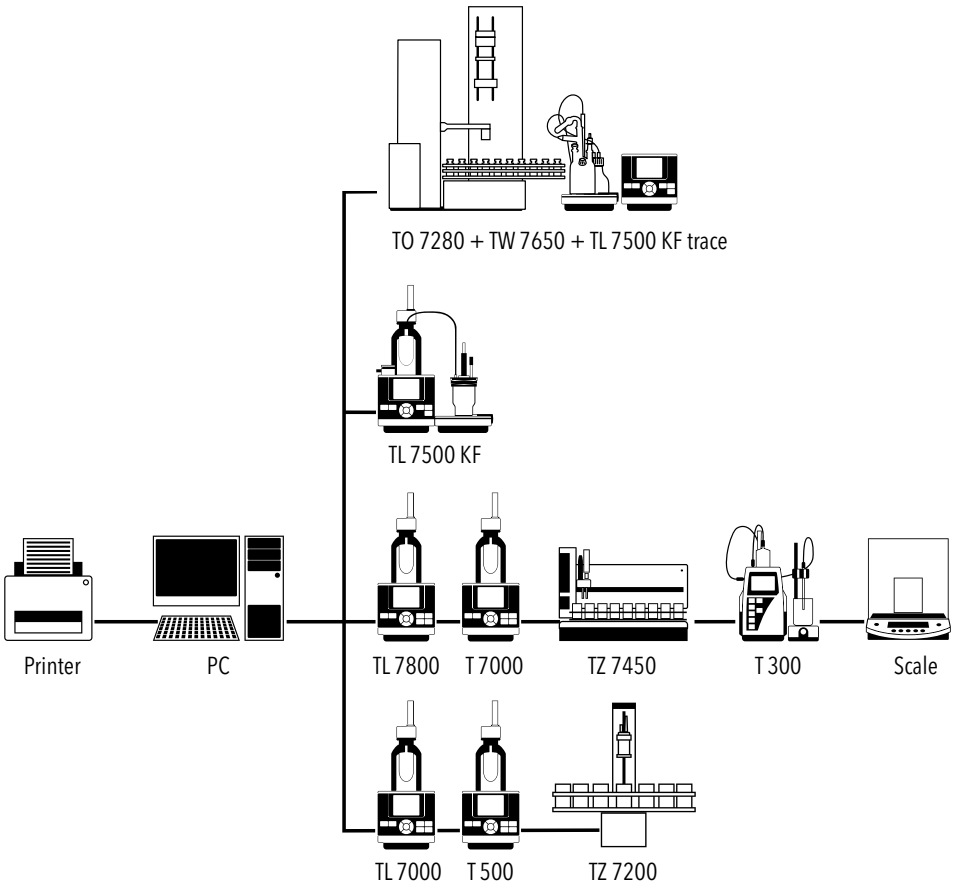
TitriSoft 3.5 allows to control the following devices with your PC:

- Titrators: TitroLine® 7000, 7750, 7800, 7500 KF, 7500 KF trace and alpha plus
- Sample changers: TW 7200 and TW 7450, TW alpha plus, TW 7400
- Piston burettes: TITRONIC® 300, universal, 500 and 110 plus
- Headspace Oven TO 7280 and sampler TW 7650
- Balances

You can connect the titration hardware to any free USB or serial interface of your PC. Each of these interfaces allows different device combinations (configurations). All devices connected to the PC can be used in all configurations. For the automation of titrations, e.g., the TitroLine® 7800 with our sample changer TW 7200 is controlled by the software. For more complex titration tasks with sample preparation you can first dose with piston burettes. Then carry out the titration with a TitroLine® 7000, 7750 or 7800.

Of course, you can also use the software exclusively for dosing tasks with piston burettes.

The image below shows possible device configurations.



SI Analytics
a xylem brand

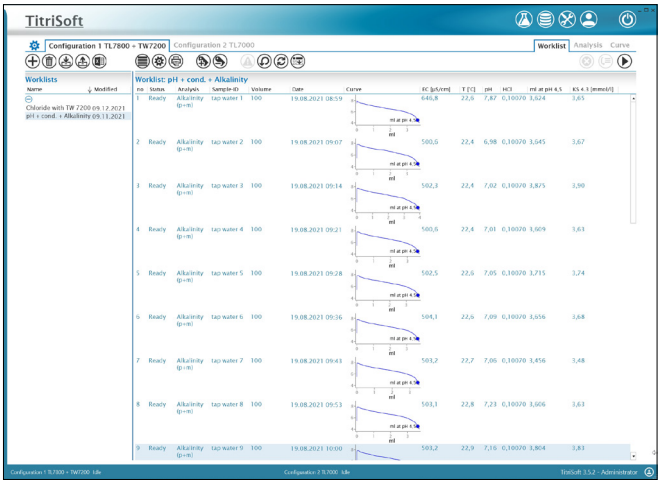
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

“Titrations Center”, the main menu

The different software tasks are assigned to five different centers:

- Settings
- Database
- Analysis
- Worklists
- Curve

Each of these centers can be chosen at the menu bar.

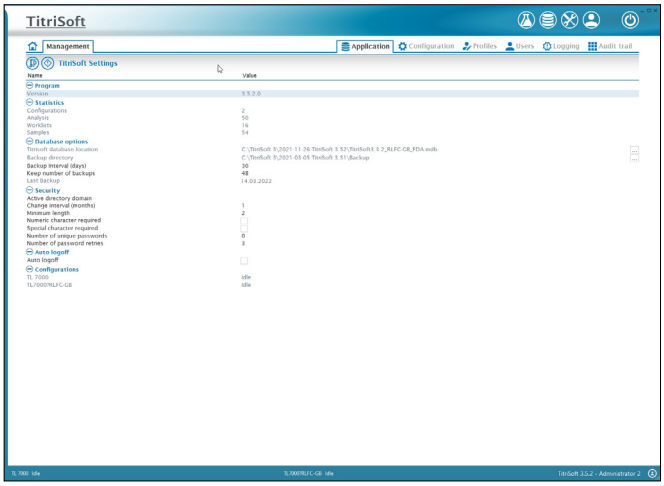


Titration Center

“Settings”, the system configuration

In the system configuration, the basic settings are made in “Application”. For example, the database is selected here, the backup directory is set, the password length is set, etc.

The devices, reagents, electrodes, and variables are managed in “Configuration”.



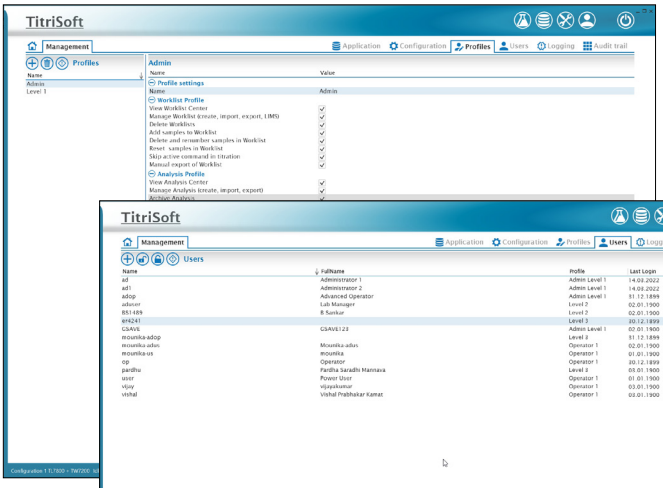
Settings

User profiles

Individual user profiles can be created in “Profiles”. The number of profiles is unlimited and each profile can allow different permission. See page 63, “Controlled access”.

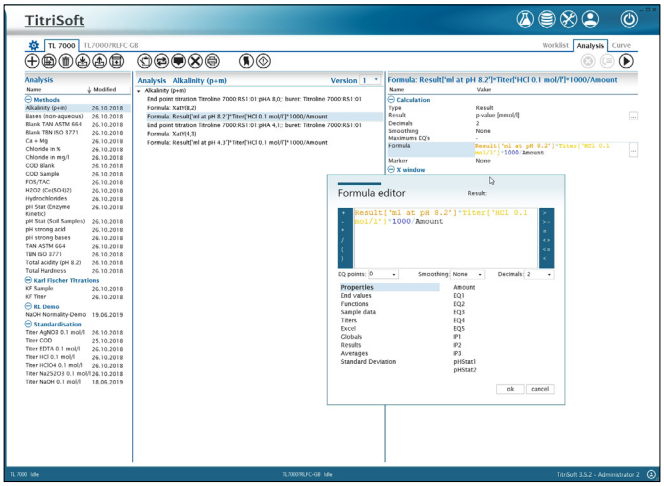
User

Under “User”, each user is assigned a profile. The number of users is unlimited.



Profiles

Users

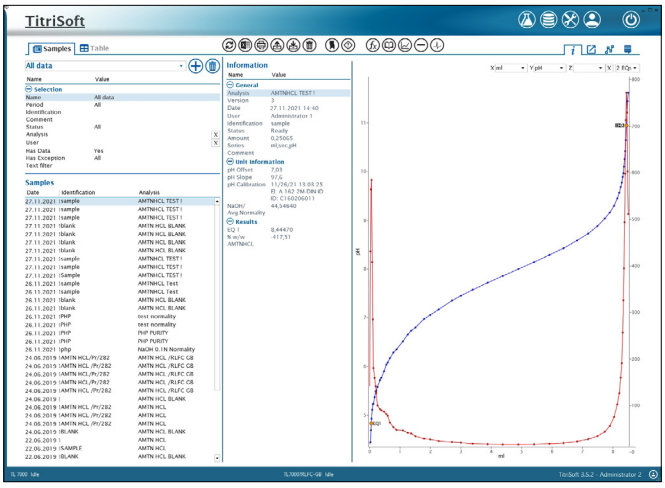


Analysis

“Analysis”, your methods center

This is where you set up and save your titration methods. Even complex methods can be installed with a few mouse clicks. Adjustment of the titration parameters is facilitated by the use of symbolic slide controls. Functions such as waiting time, IF loops, repetition, dosings and measurements in addition to the titration parameters and calculation formulas provide virtually unlimited options for method procedures.

These results lists can also be exported in Excel format, printed or saved as a PDF file.



Database

“Database”, your data storage

Titration curves, results, measured values and used methods of all titrations are stored in the database. These data can be selected by sample name, date, user, and method and loaded in a few seconds.

You can display the information of the performed titrations as a graphic, result or measured value listing. Each stored titration can be subsequently optimized according to your needs, For example, you can add, save, and print subsequent calculations with the curve. A subsequent data export in ASCII or Excel format is possible at any time. In the TitriSoft 3.5 new filter functions have been added. Individual filters can be set by date, user, method, and the selected records are then listed as table form. These results lists can also be exported in Excel format, printed or saved as a PDF file.

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

“Worklists”, your clearly structured workplace

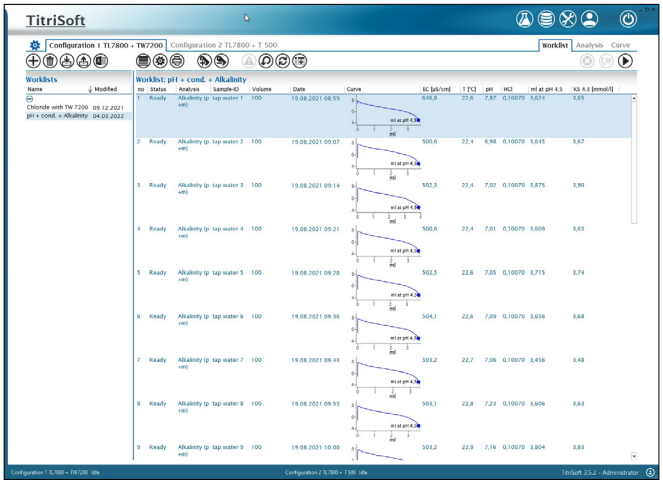
“Worklists” is the place where you carry out your daily jobs, i.e. select methods, enter sample names and origin weighed-in quantities, start the work list and display (and print out if desired) the results at the end of a titration. The worklist shows the individual samples with the associated methods and their characteristics such as sample name, number, status, date, time, results, and events and other freely configurable sample data, e.g., density.

During the process you can follow the titration under “Curve” or directly via the worklist. You can, however, simply allow the samples to be processed in the background and use the PC for other tasks or start an additional titration with another configuration in parallel.

When working with the TW 7200, TW 7450 and TW 7650 sample changer, you can adjust various settings such as skip empty items, rinse and waiting options.

From version 3.5, the headspace oven TO 7280/ sampler, as well as the control of the TL 7500 KF trace are also directly supported.

Documentation, which is in accordance with GLP and ISO 9000 directives, can be produced in a number of different forms; tables, lists, curves or individual printouts with curves. In addition, results can be saved in ASCII or CSV format, external documentation programs may be accessed and results transferred directly, e.g., into a LIMS.



Worklists

TitriSoft 3.5-System requirements

For optimal and fast working with the TitriSoft 3.5 software your system should be equipped as shown below:

- Interface: a free USB- o RS232-interface per configuration
- Computer: Pentium (Dual-Core) 2
- GHz or higher (I3 or higher recommended)
- Operating system: Windows 10 (32/64 bit) or higher
- RAM: minimum 4 GB (8 GB or more recommended)
- Hard disk: minimum free storage volume 200 MB
- Graphics card: minimum resolution 1280 x 1024, 1920 x 1200 recommended

TitriSoft 3.5 P requirements are identical

TitriSoft 3.5 P – simply reliable …

In this case, the "P" stands for "pharmaceutical".

The TitriSoft 3.5 P fully meets all requirements of the FDA 21 CFR Part 11 regulation regarding „Electronic Records", „Electronic Signature" and „Audit Trail".

The FDA (Food and Drug Administration of the USA) 21 CFR Part 11 regulations describe how to deal with electronically stored data ("Electronic Records") and how to prepare electronic signatures ("Electronic Signature").

These regulations are binding for all companies offering medical, pharmaceutical, or food products and services in the USA.

The regulations are relating to:

- the handling of electronically stored data: Electronic Records.
- the creation of electronic signatures: Electronic Signatures
- the traceability of all steps and settings carried out on the instrument ("Audit Trail")

Comparison between TitriSoft 3.5 and 3.5 P

Functions	TitriSoft 3.5	TitriSoft 3.5 P
Electronic records	■	■
Electronic Signatures	—	■
Audit Trail	—	■
Controlled Access	■	■
Copies of Records	■	■
Straightforward procedure	■	■
All types of titrations	■	■
Comfortable worklists	■	■
Online titration curves	■	■
Clear documentation	■	■
Perfect titration control by PC	■	■
Parallel titration (with multiple configurations, also with a TL 7800 and a piston burette; see page 65)	■	■

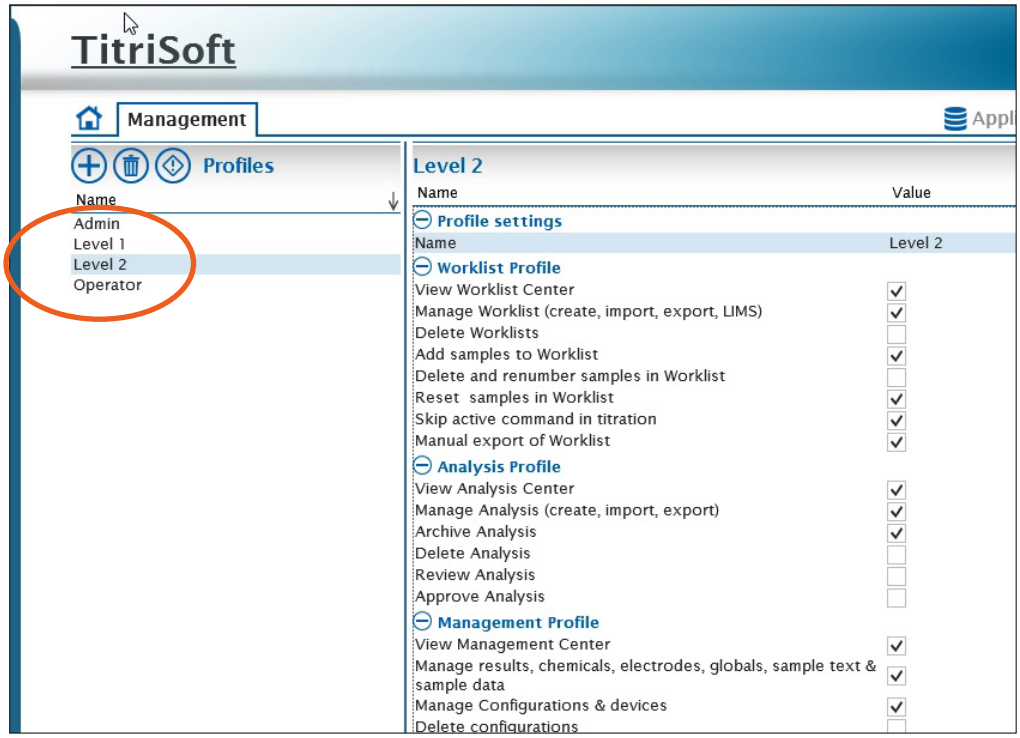
SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Controlled Access

The controlled access guarantees that only authorized individuals have access to the software functions, according to your company's security policy and the FDA requirements.

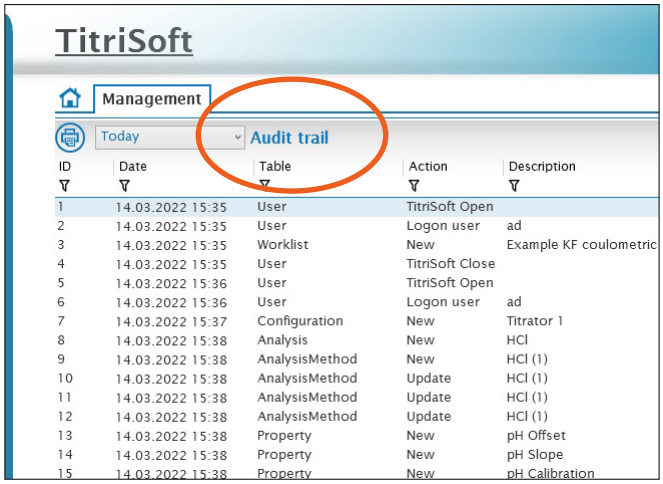
By creating individual profiles, each user can be assigned appropriate access to the software.



User Profiles

Ordering Information TitriSoft 3.5 /3.5 P

Type No.	Order No.	Description
TZ 3571	285217950	Titration software TitriSoft 3.5 for all TitroLine® 7XXX titrators and piston burettes TITRONIC® 300/500, and for all sample changers
TZ 3572	285217960	Titration software TitriSoft 3.5 P. Same as TitriSoft 3.5, but 21 CFR, part 11 compliant
TZ 3573	285217970	Update older TitriSoft versions to version 3.5
TZ 3574	285217980	Update older TitriSoft P versions to version 3.5 P
TZ 3575	285217990	Upgrade TitriSoft 3.5 to TitriSoft 3.5 P



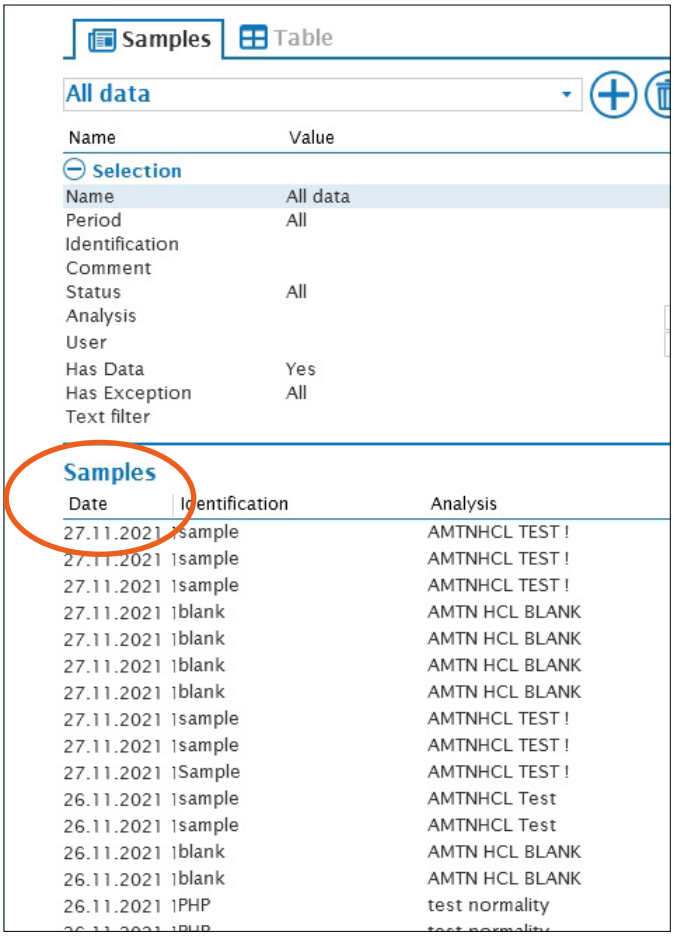
Audit Trail

Audit Trail

The 21 CFR Part 11 prescribes that, creating methods, modifying passwords or saving results, has to generate an entry in the udit Trail.

TitriSoft 3.5 P automatically generates an entry in the Audit Trail table, as soon as an access to the database has taken place. The local time and the GMT are automatically stored together with this entry in the Audit Trail. Each entry also asks for a comment.

The Audit Trail or parts of it can be printed out, or a human-readable digital copy of it, e.g. a PDF file can be generated.



Electronic records

Electronic Records

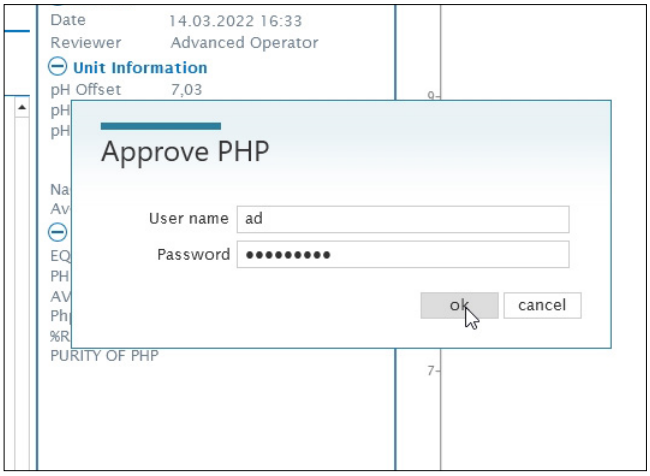
The 21 CFR Part 11 prescribes how to safeguard and store the generated results over time.

Besides regularly making backup copies of the complete database, is it possible to generate readable digital copies of the results, methods, worklists, the Audit Trail, the user administration and the configuration(s). For that purpose, a PDF writer is integrated in the software. The purchase of expensive third-party software for generating PDF files is not necessary. Of course, the database is password protected against unauthorized access.

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Electronic Signature

Digital analysis results have to be as reliable as classical, manually checked results with a handwritten signature. A digital signature, which is as safe as a handwritten one, can be placed to approve all electronic records. The approver has to enter the name and an additional password. The electronic signature is stored together with the signer's function, the reason of signing and the date and time.

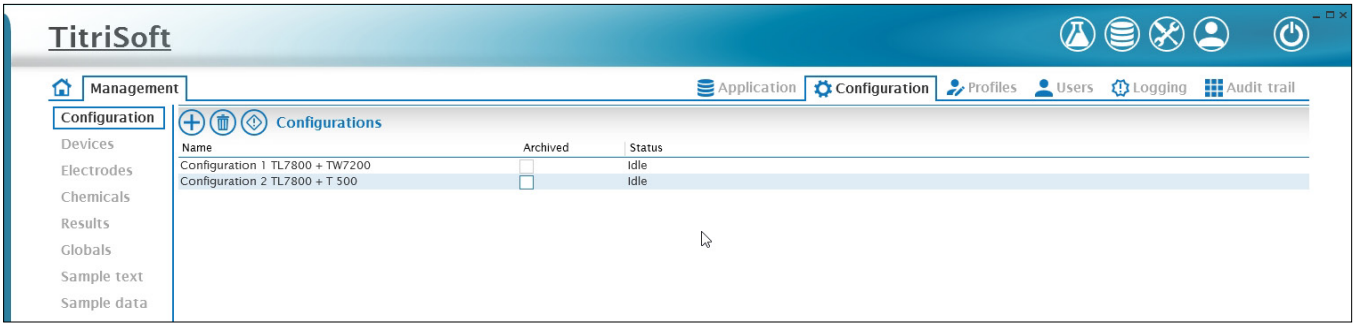


Electronic Signature

Parallel titration with TitroLine® 7800 and TitriSoft 3.5/3.5 P

In combination with the new TitriSoft 3.5/3.5 P it is possible to carry out a so-called „parallel" titration, e.g., with a TitroLine ® 7800 and a TITRONIC®300/500 piston burette. This means that you only need one titrator and one piston burette to carry out two titrations simultaneously, in parallel.

Typical example: With a TitroLine ® 7800 and a sample changer, acid-base titrations are carried out in one configuration. The pH electrode is connected to measuring input A. At the same time, a titration of chloride is carried out with a second configuration. The silver electrode is connected to measuring input B. The titration is carried out with a TITRONIC® 500 piston burette.



8. Titration electrodes and accessories

No two titrations are alike. Different compositions, temperatures, conductivities, and viscosities of samples and different measurement conditions make for a million of different applications. The correct electrode for the titration application is of crucial importance for the correctness and reproducibility of the results. To help you choose the right electrode, we have put together the appropriate electrodes for the most important applications.

The pH electrode is a very important part of the system as it comes in direct contact with the sample and provides the measurement signal.

For more than 85 years, the brand SI Analytics is dedicated to the development and manufacturing of glass electrodes.

It all started with a patent on pH electrodes in the thirties – today it is a range of several hundred different sensors for all imaginable applications.

Our first instruction booklet appeared in 1938. In those days, the electrochemical pH measuring and the potentiometric titration still needed to be explained.

Selection table titration electrodes

Titration	Details	Electrode type	Order no.
Aqueous acid base-titrations	General titration of acid and bases; total acid in beverages and foods; Kjeldahl (Only low-maintenance pH electrodes)	A 7780	285101260
		A 7780 NTC30 DIN N	285101290
		A 7780 1M-DIN-ID	285130200
		A 7780 IDS	285101080
	General, demanding samples, Acid and base capacity, Electroplating baths	N 62	285100034
		A 162 2M-DIN-ID	285130275
		A 162 IDS	285100120
		SCPpH-A120MF	285101300
		SCPpHT-A170MF-3M-DIN-N	285101320
		SCPpHT-A170MF-3M-IDS	285101310
	Low ionic media	N 64	285100059
	Small sample quantities	N 5900 A	285105135
		SCPpH-MIC-AMF	285101330
		SCPpHT-MIC-AMF-3M-DIN-N	285101335
		SCPpHT-MIC-AMF-3M-IDS	285101345

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Non-aqueous acid base-titrations	Acid and base numbers in oils (TAN/TBN) in general	N 6480 eth	285092329
	OH number, NCO number, FFA, saponification number	N 6480 eth	285092329
	Acid number in aviation fuels (ASTM D3242)	OptiLine 6	285221300
	Titrations in perchloric acid/glacial acetic acid, epoxy number	N 6480 eis	285092337
		N 6480 eth	285092329
	Acid number in insulating oils IEC 62021	N 64	285100059
Precipitation titrations	Chloride in general, chloride/NaCl („salt“) in food (titrations with silver nitrate)	AgCl 62	285102413
		AgCl 62 RG	285102100
		Ag 62 IDS	285102150
	Cyanide, bromide, iodide (titrations with silver nitrate)	Ag 6280	285102343
		Ag 62 RG	285102090
		Ag 62 IDS	285102150
	Mercaptans and hydrogen sulfide (titrations with silver nitrate)	AgS 62 RG	285102110
		Ag 1100 + A 1180	285103607 + 1057997
	Fluoride with lanthanum nitrate	F 1100 PLH + Referenzelektrode	285216295
	Surfactants (anionic, cationic and non-ionic surfactants)	TEN 1100 + Referenzelektrode	285096980
Redox titrations	General redox titrations, iodometry, permanganometry, cerimetry	Pt 62	285102019
		Pt 62 RG	285102070
		Pt 62 RG IDS	285102140
	Iodine value, peroxide value	Pt 62	285102019
		Pt 61	285102002
		Pt 62 RG	285102070
		Pt 62 RG IDS	285102140
	COD	Pt 61	285102002
	COD with sample changer	PT 5901	285105065
	Dead stop (SO_2, Bromine value…) general	Pt 1200	285103512
	Dead stop (SO_2, Bromine value…) with autosampler/titration vessels	Pt 1400	285103537
	Volumetric KF titration	KF 1100	285102030
	Volumetric KF titration with sample changer	KF 1150	285102060
	KF coulometry	KF 1150	285102060
Complexometric titrations	Total hardness (sum of alkaline earths Ca, Mg...)	Cu 1100 PLH + reference electrode	285216273
	Calcium and magnesium/calcium and magnesium hardness	Ca 1100 PLH + reference electrode	285216268
	Copper, aluminum, zinc, and other metals	Cu 1100 PLH + reference electrode	285216273
	All complexometric titrations	OptiLine 6	285221300
Photometic titrations (general)	All titrations for color change in aqueous and non-aqueous media	OptiLine 6	285221300
Reference electrodes		B 2920 B 3920	1070046 1070075

Care, maintenance, service, cleaning, and storage of ti

Electrode	pH combination electrodes with aqueous liquid electrolyte and platinum diaphragm	pH combination electrodes with gel electrolyte and ceramic diaphragm	pH combination electrodes with non-aqueous electrolytes and ground-joint diaphragm
Electrode type	N 62 A 162 2M-DIN-ID A 162 IDS SCPpH-A120MF SCPpHT-A170MF-3M-DIN-N SCPpHT-A170MF-3M-IDS N 5900 A SCPpH-MIC-AMF SCPpHT-MIC-AMF-3M-DIN-N SCPpHT-MIC-AMF-3M-IDS	A 7780 A 7780 NTC30 DIN N A 7780 1M-DIN-ID A 7780 IDS	N 6480 eth N 6480 ETH 2M-DIN-ID N 6480 eis
			
Electrolyte refilling solution	KCl 3 mol/l (L 3008, L 3004, L 300)	N/A	LiCl/Ethanol L 5034, LiCl/ acetic acid L 5014
Storage	In electrolyte or storage solution. Storage between 0 - 40 °C	In electrolyte or storage solution. Storage between 0 - 40 °C	In electrolyte solution. Storage between 0 - 40 °C
Storage solution	L 9114	L 9114 or electrolyte solution	Electrolyte solution
Cleaning instructions	Carefully wipe off deposits on the glass membrane with a damp cloth. Rinse fats/oils with alcohol or water containing detergent. Remove proteins with a hydrochloric acid pepsin solution. Then always rinse with distilled/deionized water.	Carefully wipe off deposits on the glass membrane with a damp cloth. Rinse fats/oils with alcohol or water containing detergent. Remove proteins with a hydrochloric acid pepsin solution. Then always rinse with distilled/deionized water.	Carefully wipe off deposits on the glass membrane with a damp cloth. Rinse fats/oils with alcohol, suitable >solvent or water containing dishwashing detergent. Remove proteins with a hydrochloric acid pepsin solution. Then always rinse with distilled/deionized water Carefully lift the ground joint and allow electrolyte to run out.
Miscellaneous	Carefully wipe off deposits on the glass membrane with a damp cloth.		Always remove silicone transport lock before use.

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

tration electrodes

Pt/Ag titration electrodes with pH glass electrode as reference system (RG)	Pt/Ag combination electrodes with aqueous liquid electrolyte and platinum diaphragm	Pt double platinum electrodes	ISE and other electrodes
Ag 62 RG AgCl 62 RG AgS 62 RG Ag 62 IDS	AgCl 62 Ag 62 IDS Ag 62 IDS Pt 62 Pt 61 Pt 5901	Pt 1200 Pt 1400 KF 1100 KF 1150	TEN 1100 Ca 1100 PLH Cu 1100 PLH F 1100 PLH
			
N/A	Pt electrodes: KCl 3 mol/l (L 3008, L 3004, L 300)	N/A	N/A
In water. Storage between 0 – 40 °C	Ag electrodes: KNO_3 2 mol/l + 10^{-3} mol/l KCl (L 2114). In electrolyte solution. Storage between 0 - 40 °C	Dry	Dry. Storage between 0 – 40 °C
Distilled or deionized water	Electrolyte solution	N/A	N/A
Carefully wipe off deposits on the glass membrane with a damp cloth. Rinse fats/oils with alcohol or water containing detergent. Remove proteins with a hydrochloric acid pepsin solution. Then always rinse with distilled/deionized water.	Wipe off deposits on the metal sensor with a damp cloth. Rinse fats/oils with alcohol, suitable >solvent or water containing dishwashing detergent. Remove proteins with a hydrochloric acid pepsin solution or strong acid. Blank Ag and Pt electrodes can also be cleaned with an abrasive agent. Afterwards, always rinse with distilled/deionized water.	Wipe off deposits on the metal sensor with a damp cloth. Rinse fats/oils with alcohol, suitable >solvent or water containing dishwashing detergent. Remove proteins with a hydrochloric acid pepsin solution or strong acid. The Pt pins can also be cleaned with an abrasive agent. Afterwards, always rinse with distilled/deionized water.	Clean the electrodes with PVC membrane (TEN, Ca 1100) with aqueous solution.
Never grind the metal sensor ring.			Never clean the TEN 1100 and Ca 1100 PLH with alcoholic solution.

IDS sensors

New features

SI Anayltics's IDS Intelligent, Digital Sensors technology for the standard parameters pH, conductivity and dissolved oxygen consists of two components, Digital sensors and matching field or benchtop meters. This new processing of the measured values no longer takes place in the device, exclusively in the sensor so that every sensor has its own data base when connected.

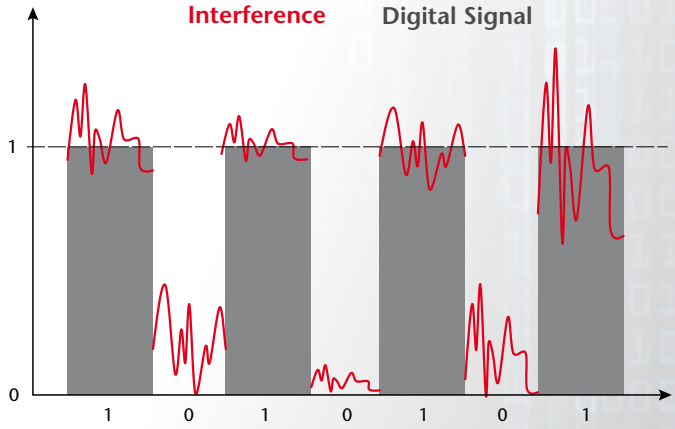
Built on the basic sensor of the BlueLine and ScienceLine series that have proven themselves tens of thousands of times over, the IDS sensors have added precision and reliability and cover almost any application.

I intelligent:

IDS sensors are intelligent. They log into the device automatically, submit their name, serial number, calibration status and history as well as all parameters.

D digital:

IDS sensors transform the sensitive measuring signals in the sensor head into digital signals and transmit them to the output device without interference and errors.



S sensor:

IDS sensors are based on proven and continuously developed sensors by SI Analytics. They cover almost any lab application, like pH, conductivity or dissolved oxygen measurements.

Xylem Analytics Germany
also offers
field meters with IDS

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Xylem Analytics Germany
also offers
laboratory meters with IDS

Cond
O_2
pH

O_2
pH
Cond

IDS Sensors

IDS („Intelligent and Digital Sensors“) combines proven measuring technology with new advantages. Based on established electrochemical SI Analytics sensors, but equipped with state-of-the-art measuring electronics. IDS save the serial number and calibration data in the sensor. However, IDS also process measuring signals directly and thus improve the data quality. This also allows a current evaluation of the sensor quality by means of the QSC (Quality Sensor Control) function.

IDS combine proven technology with new advantages.

- High-quality, highly developed sensor technology combined with state-of-the-art measuring electronics.
- IDS have saved the serial number and calibration history – error-free and therefore immediately ready for use.
- Current evaluation of the sensor quality for IDS pH electrodes thanks to QSC (Quality Sensor Control).
- IDS conductivity measurement: Two sensors to cover all applications.

Benefits of ID Sensors

- **Higher accuracy than traditional analog sensors**
- **Resistant against environmental influences**
- **QSC takes the guess work out of the determining the health of your sensor**
- **Effortless capture and storage of your sensors latest calibration data**
- **Highest possible operator comfort and measuring precision**

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

IDS sensors

INTELLIGENT I
DIGITAL D
SENSORS S

ScienceLine – The proven high-end laboratory electrodes

In research and development, manufacturing and quality control, our ScienceLine electrodes have become standard for the most demanding measurement tasks. Each electrode has an individual serial number and pH-metal combination electrodes are supplied with a quality certificate, better making documentation simple and better traceable.

We have kept on improving the glass membrane shapes and types to make the electrodes even more robust, durable and easier to clean. Furthermore, they achieve stable measurement values even faster.

Typical examples:

- pH electrodes with a length of up to 600 mm for measurements in very deep vessels
- The N 6003 electrodes allows pH measurements even in NMR tubes or other small sample vessels. The A 157 is a micro electrode with an integrated temperature sensor with a 5 mm in diameter.
- For more demanding media, choose among different junctions and membrane glasses. For measurements in samples of low ionic strength there is a choice between e.g., the N 64 and the types A 164. Those feature a ground joint junction, and the A 164 offers a temperature sensor.
- A wide selection of separate reference and glass electrodes completes the offering.
- Our ScienceLine electrodes ensure high measurement accuracy and stability and long service life, but are highly adaptable to your measurement tasks. We can offer you a range of electrodes with unmatched versatility and quality.

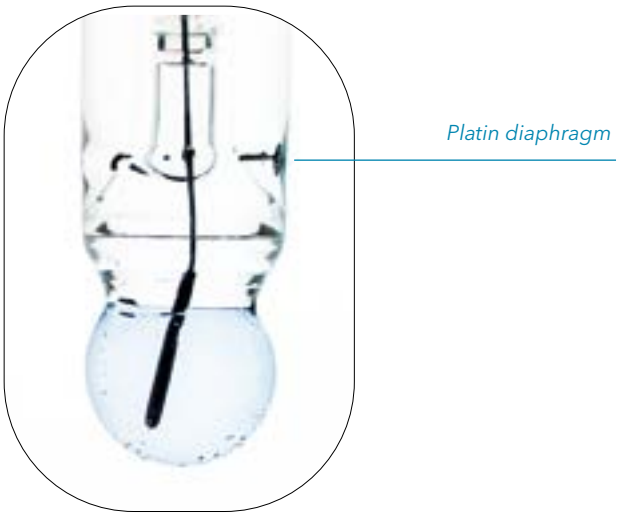
Benefits ScienceLine electrodes

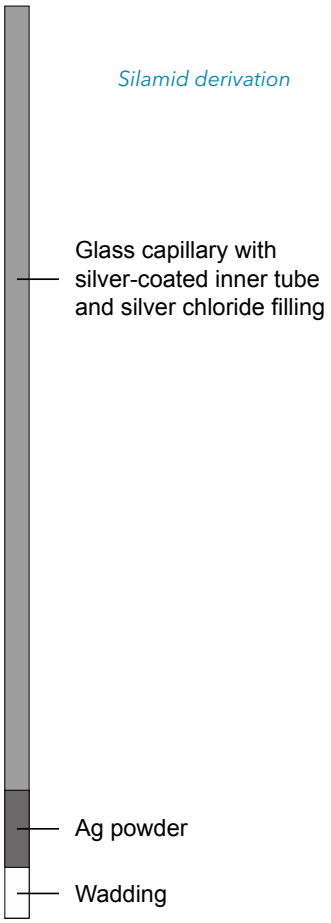
- **Proven high-end electrodes for demanding measurement tasks**
- **Double junction Silamid® reference system for fast and stable acquiring of measured values and for longer electrode life**
- **Utmost versatility of pH electrodes is achieved by a large selection of junctions, membrane glass types and shapes, shaft lengths and diameters, ground joints, plug connections and integrated temperature sensors**
- **Each pH and metal combination electrode comes with individual serial number and quality certificate**
- **Large selection of separate glass and reference electrodes, metal combination electrodes, conductivity sensors, ion selective electrodes and ammonia, sodium and oxygen sensors**

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Platin diaphragm

A perfect all-rounder for basically any application is the platinum diaphragm. A plurality of platinum wires are twisted and fused together. The outflow channels between the wires have constant dimensions. This provides, e.g., compared to the ceramic diaphragm, a pulsation-free discharge and therefore reliable measured values as well as even better self-cleaning.





Silamid reference system

The more stable display of the measured value with Science Line electrodes, as well as their longer life are due to their Silamid reference system.

In contrast to the silver/silver chloride reference system of the BlueLine series, the ScienceLine employs. The ScienceLine employs a double junction design where the inner tube is coated with silver which provides for a very stable electrode. Hence, the stability of the potential is much higher.

Benefits of Silamid reference system

- **The silamid reference is a closed dissipating element in which a glass tube is coated with silver and filled with silver**
- **Compared to a silver chlorinated silver wire, the potential setting area is significantly increased**
- **The watt plug is an inner second diaphragm**
- **Electrodes with a silamid reference therefore have an even longer lifetime compared to electrodes with Ag/AgCl wire as well as an even more stable and reliable measurement**

ScienceLine pH combination electrodes

pH combination electrodes with plug head and fixed cable

Reference system:	Silamid®
Shaft material:	glass
Zero point:	pH = 7.0 ± 0.3
Electrolyte:	KCl 3 mol/l (except N 6250: KCl 4.2 mol/l, A 7780 and L 7780: gel electrolyte, L 8280: Referid® electrolyte)
Membrane shape:	sphere
pH range:	0 to 14
Connection cable for plug head:	e.g., L 1 A (See also page with connection cables)
fixed cable:	1 m long, with plug A acc. to DIN 19262 or with BNC plug

N 61
N 52 A
N 52 BNC
N 61 eis
N 62
N 6180
N 6280

N 64
N 6480 eis
N 6480 eth
N 6480 eth
2 M DIN ID

N 65
H 65
N 6580

N 6980

A 7780

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Order No.	Type No.	Length L [mm]	Ø [mm]	Junction	pH glass	Temp. range [°C]	Connection	Remarks
285101260	A 7780	120	12	3 x ceramic	A	–5 to +80	plug head	gel electrolyte
285100494	N 52 A	120	12	platinum	A	–5 to +100	DIN plug2)	
285105451	N 52 BNC	120	12	platinum	A	–5 to +100	BNC plug2)	
285100001	N 61	170	12	platinum	A	–5 to +100	plug head	
285100018	N 6180	170	12	ceramic	A	–5 to +100	plug head	
285092661	N 61eis	170	12	3 x platinum	A	+10 to +40	plug head	electrolyte L 5014, Ag/AgCl ref.
285100034	N 62	120	12	platinum	A	–5 to +100	plug head	
285100042	N 6280	120	12	ceramic	A	–5 to +100	plug head	
285100059	N 64	170	12	ground joint	A	–5 to +100	plug head	
285092337	N 6480 eis	170	12	ground joint	A	+10 to +40	plug head	electrolyte L 5014, Ag/AgCl ref.
285092329	N 6480 eth	170	12	ground joint	A	0 to +40	plug head	electrolyte L 5014, Ag/AgCl ref.
285092340	N 6480 eth 2 M-DIN ID	170	12	ground joint	A	1 to +40	DIN plug	ID function
285100067	N 65	103[1)]	10	platinum	A	–5 to +100	plug head	standard taper NS 14.5
285102516	N 6580	103[1)]	10	ceramic	A	–5 to +100	plug head	standard taper NS 14.5
285101709	N 6980	103[1)]	10	ground joint	A	–5 to +100	plug head	standard taper NS 14.5

[1)] Length from upper end of standard taper
[2)] with 1 m fixed cable

ScienceLine pH combination electrodes with temperature sensor

pH combination electrodes with temperature sensor

Reference system:	Silamid®
Shaft material:	glass
Diameter:	12 mm
Zero point:	pH = 7.0 ± 0.3
Electrolyte:	KCl 3 mol/l
Temperature sensor:	Pt 1000
Membrane shape:	sphere
pH range:	0 to 14
Connection cable:	
for SMEK-plug head:	e.g., LS 1 ANN (See also page with connecti-on cables)
fixed cable:	1 m long, with plug A acc. to DIN 19262 or with BNC plug, as well as plug for tem-perature sen-sor

N 1051 A
N 1051 BNC
N 1052 A
N 1052 BNC

A 161 1M DIN ID
A 161 1M BNC ID
A 161 IDS
A 162 2M DIN ID
A 162 IDS

A 164 1M DIN ID
A 164 1M BNC ID

A7780 NTC30
A 7780 1M DIN ID
A 7780 1M BNC ID
A 7780 IDS

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Order No.	Type No.	Length L [mm]	Junction	pH glass	Temp. range [°C]	Connection	Remarks
285130250	A 161 1M-BNC-ID	170	platinum	A	–5 to +100	BNC[1]- + 4-mm plug	ID function
285130240	A 161 1M-DIN-ID	170	platinum	A	–5 to +100	DIN[1]- + 4-mm plug	ID function
285100090	A 161 IDS	170	platinum	A	–5 to +100	IDS plug	IDS function
285130275	A 162 2M-DIN-ID	120	platinum	A	–5 to +100	DIN[1]- + 4-mm plug	DS function
285100120	A 162 IDS	120	platinum	A	–5 to +100	IDS plug	IDS function
285130290	A 164 1M-BNC-ID	170	ground joint	A	–5 to +100	BNC[1]- + 4-mm plug	ID function
285130280	A 164 1M-DIN-ID	170	ground joint	A	–5 to +100	DIN[1]- + 4-mm plug	ID function
285130210	A 7780 1M-BNC-ID	120	3 x ceramic	A	–5 to +80	BNC[1] + 4-mm plug	ID function
285130200	A 7780 1M-DIN-ID	120	3 x ceramic	A	–5 to +80	DIN[1] + 4-mm plug	ID function
285101080	A 7780 IDS	120	3 x ceramic	A	–5 to +80	IDS plug	IDS function
285130290	A 7780 NTC30 DIN-N	120	3 x ceramic	A	–5 to +80	DIN[1] + 4-mm plug	for portable Knick pH Meter
285100510	N 1051 A	170	platinum	A	–5 to +100	IDS plug	IDS function
285100500	N 1051 BNC	170	platinum	A	–5 to +100	BNC[1] + 4-mm plug	
1054512	N 1052 A	120	platinum	A	–5 to +100	DIN[1] + 4-mm plug	
285100380	N 1052 BNC	120	platinum	A	–5 to +100	BNC[1] + 4-mm plug	

[1] with 1 m fixed cable

ScienceLine micro combination electrodes

pH combination electrodes with temperature sensor

Reference system:	Silamid®
Shaft material:	glass
Diameter:	12 mm
Zero point:	pH = 7.0 ± 0.3
Electrolyte:	KCl 3 mol/l
Temperature sensor:	Pt 1000
Membrane shape:	sphere
pH range:	0 to 14
Connection cable:	
for SMEK-plug head:	e.g., LS 1 ANN (See also page with connecti-on cables)
fixed cable:	1 m long, with plug A acc. to DIN 19262 or with BNC plug, as well as plug for tempe-rature sensor

A 157 1M BNC ID
A 157 1M DIN ID
A 157 IDS

N 5900 A
N 5901
N 5904

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Order No.	Type No.	Length L [mm]	Ø [mm]	Junction	pH glass	Membrane shape	Temp. range [°C]	Range [pH]	Connection	Remarks
285100080	A 157 IDS	70/130	12/5	platinum	A	cylindrical	–5 to +100	0 to 14	IDS plug	IDS function
285130160	A 157 1M-DIN-ID[1)]	70/130	12/5	platinum	A	cylindrical	–5 to +100	0 to 14	DIN plug[3)]	ID function
285130170	A 157 1M-BNC-ID[1)]	70/130	12/5	platinum	A	cylindrical	–5 to +100	0 to 14	BNC plug[3)]	ID function
285105135	N 5900 A	96[2)]	5	platinum	A	spherical	–5 to +100	0 to 14	DIN plug[3)]	Ag/AgCl ref.
285105846	N 5901	160[2)]	6	platinum	A	spherical	–5 to +100	0 to 14	plug head	Ag/AgCl ref.
285105879	N 5904	200[2)]	6	platinum	A	spherical	–5 to +100	0 to 14	plug head	Ag/AgCl ref.

[1)] with integrated temperature sensor Pt 1000
[2)] Length from upper end of standard taper (Standard taper NS 7.5)
[3)] with 1 m fixed cable

ScienceLine Metal combination electrodes

Metal combination electrodes with Silver/Silverchloride reference system, plug head and connection cable

Temp. range:	–5 to + 100 °C (except Pt 6140: + 10 to + 40 °C)
Ref. system:	Silamid®
Shaft material:	glass
Electrolyte:	KCl 3 mol/l (See also remarks)
Connection cable:	
for plug head:	e.g., L 1 A (See also page with connection cables)
fixed cable:	1 m long, with plug A acc. to DIN 19262 or with BNC plug

Metal Reference electrodes with pH glass membrane reference system and plug head for titrations

Temp. range:	-5 to + 100 °C
Reference system:	pH glass membrane Type A
Shaft material:	glass
Length:	120 mm
Diameter:	12 mm
Connection cable	
for plug head:	z.B. L 1 A

(please refer to the page "connection cables")

AgCl 62
AgCl 6280
AgCl 65
Ag 42 A
Ag 6180
Ag 62 IDS

Ag 6280
Ag 6580
Au 6280

Pt 61
Pt 6180
Pt 62
Pt 6280
Pt 6580

Pt 6880
Pt 6980

Pt 62 RG
Ag 62 RG
AgCl 62 RG
AgS 62 RG
Pt 62 RG
IDS

Pt 8280

Pt 5900 A
Pt 5900 BNC
Pt 5901

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Order No.	Type No.	Length L [mm]	Junction	Ø [mm]	Sensor Metal, shape	Connection	Remarks
285102208	Ag 6180	170	ceramic	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102150	Ag 62 IDS	120	platinum	12	Ag, cap, 5 mm Ø	plug head	IDS
285102090	Ag 62 RG	120	–	12	Pt bearing – silver coated,		
285102343	Ag 6280	120	ceramic	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102216	Ag 6580	1031)	ceramic	10	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102100	AgCl 62 RG	120	–	12	Pt bearing – silver coated, chlorinated, ring, 6 mm Ø	plug head	
285102413	AgCl 62[3)]	120	platinum	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102351	AgCl 6280[3)]	120	ceramic	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
1061051	AgCl 65[3)]	1031)	platinum	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102110	AgS 62 RG	120	–	12	Pt bearing – silver coated, sulfidized, ring, 6 mm Ø	plug head	
285102121	Au 6280	120	ceramic	12	Au, pole, 2 mm Ø	plug head	
285105192	Pt 5900 A	962)	platinum	5	Pt, pole, 1 mm Ø	DIN plug[4)]	Ag/AgCl ref.
285105702	Pt 5900 BNC	962)	platinum	5	Pt, pole, 1 mm Ø	BNC plug[4)]	Ag/AgCl ref.
285105065	Pt 5901	1602)	platinum	5	Pt, pole, 1 mm Ø	plug head	
285102002	Pt 61	170	platinum	12	Pt, pole, 1 mm Ø	plug head	
285102232	Pt 6180	170	ceramic	12	Pt, pole, 1 mm Ø	plug head	
285102019	Pt 62	120	platinum	12	Pt, pole, 1 mm Ø	plug head	
285102070	Pt 62 RG	120	–	12	Pt, ring, 6 mm Ø	plug head	
285102140	Pt 62 RG IDS	120	–	12	Pt, ring, 6 mm Ø	plug head	IDS
285102249	Pt 6280	120	ceramic	12	Pt, pole, 1 mm Ø	plug head	
285102257	Pt 6580	1031)	ceramic	10	Pt, pole, 1 mm Ø	plug head	
285100075	Pt 6880	120	ceramic	12	Pt, ring, 6 mm Ø	plug head	
285102265	Pt 6980	170	ceramic	12	Pt, ring, 6 mm Ø	plug head	
285102281	Pt 8280	120	KPG®	12	Pt, round, 6 mm Ø	plug head	electrolyte Referid®
285102110	AgS 62 RG	120	–	12	Pt bearing – silver coated, sulfidized, ring, 6 mm Ø	plug head	
285102070	Pt 62 RG	120	–	12	Pt, ring, 6 mm Ø	plug head	

[1)] Length from upper end of standard taper; standard taper NS 14.5
[2)] Length from upper end of standard taper; standard taper NS 7.5
[3)] Sensor coated with AgCl
[4)] with 1 m fixed cable

ScienceLine Single electrodes: pH glass and metal electrodes

ScienceLine single electrodes

pH glass electrodes

Reference system: Silamid®
Shaft material: glass, 12 mm Ø
Zero point: pH = 7.0 ± 0.3
Membrane shape: sphere
Connection cable: e.g., L 1 A

Metal electrodes

Shaft material: glass, 12 mm Ø
(See remarks)

A 1180
H 1180

Ag 1100

KF 1100
KF1150

Pt 1400
Pt 1200

Pt 1800

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Order No.	Type No.	Length L [mm]	pH glass	Range [pH]	Temp.-range [°C]	Remarks
1057997	A 1180)	120	H	0 to 14	0 to +80	plug head
285103212	H 1180	120	H	0 to 14	10 to +100	plug head

Order No.	Type No.	Length L [mm]	Sensor Metal	Sensor shape	Temp. range [°C]	Remarks
285103607	Ag 1100	120	Ag	cap, 4 mm Ø	–5 to +100	plug head, cable e.g., L 1 A
285102030	KF 1100	96[1)]	Pt[2)]	2 pole, 1 mm Ø	–30 to +135	shaft 5 mm Ø, standard taper NS 7.5, fixed cable, 2 x 4-mm plug
285102060	KF 1150	116[1)]	Pt[2)]	2 pole, 1 mm Ø	–30 to +135	shaft 5 mm Ø, standard taper NS 7.5, fixed cable, 2 x 4-mm plug
285103512	Pt 1200	120	Pt[2)]	2 pole, 1 mm Ø	–30 to +135	plug head, cable e.g., L 1 NN
285103537	Pt 1400	103[1)]	Pt[2)]	2 pole, 1 mm Ø	–30 to +135	shaft 10 mm Ø, standard taper NS 14.5, cable e.g., L 1 NN
285103553	Pt 1800	120	Pt	ring, 6 mm Ø	–30 to +135	plug head, cable e.g., L 1 A

[1)] Length from upper end of standard taper

[2)] Double platinum electrode

ScienceLine single electrodes: Reference electrodes

Reference electrodes

Shaft material:	glass
Electrolyte depending on reference system:	
Ag/AgCl:	KCl 3 mol/l, e.g., L 300
Calomel:	KCl 4.2 mol/l, e.g., L 420
Hg/Hg_2SO_4:	K_2SO_4 0.6 mol/l, e.g., L 1254
pH range:	0 to 14
Connection cable:	e.g., L 1N

B 2220+ | *B 2420+* | *B 2820+ B 2920+* | *B 3420+ B 3520+ B 3610+* | *B 3920+*

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

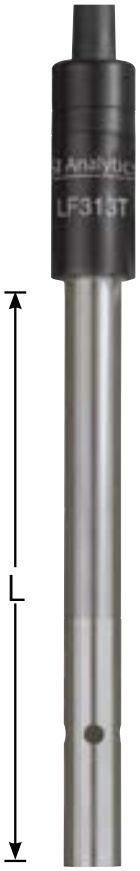
Order No.	Type No.	Length L [mm]	Ø [mm]	Temp. range [°C]	Junction	Reference system	Remarks
1069994	B 2220 +	120	12	–5 to + 100	platinum	Ag / AgCl	double electrolyte system
1070028	B 2420 +	120	12	–5 to + 100	ground joint	Ag / AgCl	
1070044	B 2820 +	120	12	–5 to + 100	ceramic	Ag / AgCl	
1070046	B 2920 +	120	12	–5 to + 100	platinum	Ag / AgCl	
1070070	B 3420 +	103[1)]	10	–5 to + 100	ceramic	Ag / AgCl	standard taper NS 14.5
1070073	B 3520 +	103[1)]	10	–5 to + 100	platinum	Ag / AgCl	standard taper NS 14.5
1070074	B 3610 +	103[1)]	10	+ 15 to + 40	ceramic	Hg/Hg_2SO_4	standard taper NS 14.5
1070075	B 3920 +	103[1)]	10	–5 to + 100	ground joint	Ag / AgCl	double electrolyte system, standard taper NS 14.5

[1)] Length from upper end of standard taper

ScienceLine conductivity cells with fixed cable

Conductivity measuring cells with fixed cable

Temperature sensor: NTC 30 kΩ



LF 313 T IDS

LF 413 T IDS
LF 413 T3M IDS

LF 413T 3M Fork IDS

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Order No.	Type No.	Length L [mm]	Ø [mm]	Sensor	Cell const. ~ [cm^{-1}]	Temp. range [°C]	Meas. range[1)] [µS/cm] . . . [mS/cm]	Remarks
285202430	LF 313 T IDS	120	12	Stainless steel	0.1	–5 to +100	0 to 0.2	Ultrapure water conductivity cell **with** flow-through vessel, stainless steel shaft, cable 1.5 m, IDS function
285202410	LF 413 T-IDS	120	15.3	4 x Graphite	0.475	–5 to +80	1 to 2,000	Plastic shaft, 1.5 m cable, IDS function
285202420	LF 435 T 3M IDS	120	15.3	4 x Graphite	0.475	–5 to +80	1 to 2000	Plastic shaft, 3 m cable, IDS function
285106290	LF 413 T 3M FORK IDS	120	15.3	4 x Graphite	0.47	–5 to +80	1 to 2000	Plastic shaft, 3 m cable, IDS function

1) Outside the recommended ranges measuring errors > 10 % can occur with these conductivity measuring cells.

ScienceLine sensors for ammonia, sodium, oxygen and ion-selective indicator electrodes

Ammonia combination electrode with plug head

Shaft material: plastic, 12 mm Ø
Connection cable: e.g., L 1 A

Sodium combination electrode with plug head

Reference system: Silamid®
Shaft material: glass, 12 mm Ø
Zero point: pNa = 2.0
Membrane shape: sphere
Connection cable: e.g., L 1 A

ISE measuring cells

Shaft material: plastic
Length: 120 mm
Fixed cable: 1 m long, with DIN plug

ISE combination electrodes with plug head

Shaft material: plastic
Length: 120 mm

NH 1100 *Na 61* *TEN 1100 PLH* *Cu 1100 PLH* *Ca 1100 PLH* *F 1100 PLH* *F 60* *Cl 60* *NO 60* *K 60* *CA 60* *CN 60* *AG-S 60* *I 60* *BR 60* *CU 60*

SI Analytics a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Order No.	Type No.	Length L [mm]	Temp. [°C]	Measuring range [mg/l]	Remarks
285102808	NH 1100	120	0 … +50	0,1 … 1.000	Membranmodul austauschbar

Order No.	Type No.	Length L [mm]	Junction	Membrane Glass	Temp. range [°C]	Meas. range [pNa]	Remarks
285100026	Na 61	170	platinum	Na	-10 to +80	0 to 6	electrolyte KCl 3 mol/l, aqueous solution NaCl 0.1 mol/l

Order No.	Type No.	Parameter	Temp. range [°C]	pH-range	Measuring range [mg/l]
285216268	Ca 1100 PLH	Calcium	0 to +40	2.5 to 11	0.02 to 40,000
285216273	Cu 1100 PLH	Copper	0 to +80	2 to 6	0.0006 to 6,400
285216295	F 1100 PLH	Fluoride	0 to +80	5 to 7	0.02 to saturated
285096980	TEN 1100 PLH	Lead	0 to +80	2 to 11	

Order No.	Type No.	Parameter	Temp. range [°C]	pH-range	Measuring range [mg/l]
285130400	AG-S 60	Sulfide / silver	0 to +80	2 to 12	0.003 to 32,000 / 0.1 to 108,000
285130420	BR 60	Bromide	0 to +80	1 to 12	0.4 to 79,000
285130380	CA 60	Calcium	0 to +40	2.5 to 11	0.02 to 40,000
285130350	Cl 60	Chloride	0 to +80	2 to 12	2 to 35,000
285130390	CN 60	Cyanide	0 to +80	0 to 14	0.2 to 260
285130430	CU 60	Copper	0 to +80	2 to 6	0.0006 to 6400
285130340	F 60	Fluoride	0 to +80	5 to 7	0.02 to saturated
285130410	I 60	Iodide	0 to +80	0 to 14	0.006 to 127,000
285130370	K 60	Potassium	0 to +40	2 to 12	0.04 to 39,000
285130360	NO 60	Nitrate	0 to +40	2.5 to 11	0.4 to 62,000

[1] Other cable lengths available on request

Resistance thermometers

Resistance thermometers with 1 m fixed cable

Resistance thermometer with coaxial plug head

W 5780 NN

W 5790 NN
W 5791 NN

W 5980 NN

W 2180-KOAX

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Resistance thermometers with mit 1 m fixed cable

Order No.	Type No.	Lenght L [mm]	Ø [mm]	Sensor	Temp. range [°C]	Shaft material	Connection plug
285105221	W 5780 NN	120	6	Pt 1.000	–30 … +135	glass	2 x 4 mm Ø
285105254	W 5790 NN	120	4	Pt 1.000	–30 … +135	stainless steel	2 x 4 mm Ø
285105262	W 5791 NN	170	4	Pt 1.000	–30 … +135	stainless steel	2 x 4 mm Ø
285105287	W 5980 NN	96[1)]	5 NS 7,5	Pt 1.000	–30 … +135	glass	2 x 4 mm Ø

[1)] length from upper end of standard taper

Resistance thermometers with coaxial plug heads

Order No.	Type No.	Length L [mm]	Ø [mm]	Sensor	Temp. range [°C]	Shaft material
285119030	W 2180-KOAX	120	12	Pt 1.000	–30 … +135	glass

ScienceLine plus Electrodes

This new line from SI-Analytics provides edge-cutting advantages for precision measurement in all kind of samples. All pH electrodes of the ScienceLine Plus series have a double reference with silver-ion trap. This allows universal use even in protein or sulfide containing samples. The inner reference is a maintenance free encapsulated gel system, the outer bridge electrolyte consists of the proven 3 mol/l KCl. This electrolyte can easily be replaced by other bridge electrolytes. Depending on the model ScienceLine Plus has ceramic or platinum wire junctions for the best contact to the sample.

Common characteristics:

- Silamid®-reference system with silver ion barrier and double electrolyte
- Temperature range: -5 to 100 °C
- 0 to 14 pH
- Glass shaft
- Electrolyte: KCl 3mol/l

SCPpH-A120MF *SCPpHT-MIC-AMF* *SCPpHT-A170MF*

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Type no.	Order no.	Length	Ø [mm]	Junction	pH glass	Membrane shape	Sensor function	Temperature sensor	Connection
SCPpH-A120MF	285101300	120 mm	12	Pt	A	Sphere	pH		Plug head
SCPpH-H170MF	285101305	170 mm	12	Pt	H	Sphere	pH		Plug Head
SCPpHT-A170MF-3M-IDS [1]	285101310	170 mm	12	Pt	A	Sphere	pH + temp.	NTC 30 kΩ	Digital plug
SCPpHT-A170MF-3M-DIN-N [1]	285101320	170 mm	12	Pt	A	Sphere	pH + temp.	Pt 1000	DIN + banana plug
SCPpHT-H170MF-3M-DIN-N [1]	285101325	170 mm	12	Pt	H	Sphere	pH + temp.	Pt 1000	DIN + banana plug
SCPpH-MIC-AMF [2]	285101330	70/130 mm	12/5	Pt	A	Cylindrical	pH		Plug head
SCPpHT-MIC-AMF-3M-DIN-N [1] [2]	285101335	70/130 mm	12/5	Pt	A	Cylindrical	pH + temp.	Pt 1000	DIN + banana plug
SCPpHT-MIC-AMF-3M-IDS [1] [2]	285101345	70/130 mm	12/5	Pt	A	Cylindrical	pH + temp.	NTC 30 kΩ	Digital plug

[1] With 3 m fixed cable
[2] Micro-electrode

SCPpH-A120MF

- With universal A glass for standard samples, or with H glass, also suitable for strongly basic media
- With plug head for connecting suitable cables
- 170 mm shaft length for the H glass version

SCPpHT-MIC-AMF

- It has an extra-long shaft (5 mm diameter) and built-in temperature sensor, available also as IDS model.
- Plug head variant for customized connections
- Models with DIN and IDS connectors

The SCPpHT family with automatic temperature compensation:

The SCPpHT electrodes are pH electrodes with 170 mm shaft length and built-in temperature sensor Pt1000 resp. NTC 30 kOhm (IDS). They have 3 m fixed cable with different connectors (DIN with 4 mm banana plug or IDS-connector). The last one allows the use of devices with IDS input for storing calibration data and automatic electrode data transfer.

- A glass model for universal application (DIN or IDS connector)
- H glass model also for strongly alkaline samples (DIN plug)

OptiLine 6 for photometric titrations

Many titration applications and methods, e.g., N Ph. Eur or USP prescribe the use of an indicator for the titration end point. There are also methods that explicitly require the use of a photometric sensor.

The OptiLine 6 is a photometric sensor that can be used like any other sensor. Thanks to the additional analog BNC / DIN connection, it can be connected to any titrator or even a pH meter with an appropriate measuring input. The power supply is included in the USB hub, which is in the scope of delivery.

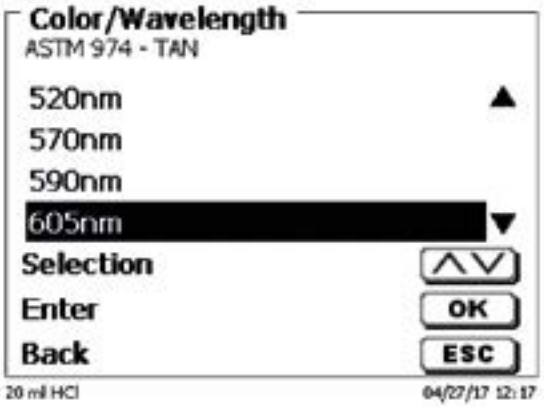
OptiLine 6

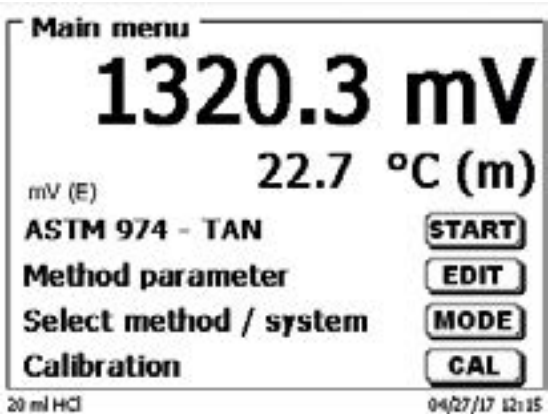
Benefits OptiLine

- **6 wavelengths over a wide range: 470, 520, 570, 590, 605 and 625**
- **The wavelengths are adjustable via TitroLine® 7XXX1)**
- **100% resistant against solvents due to shaft made out of titanium. This makes a very wide range of applications possible**
- **Very compact. Fits into each standard titration clamp/-head.**
- **Easy to clean. Simply rinse with solvent and / or water**

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com





The OptiLine 6 is connected to the titrator TitroLine® 7000, 7750 and 7800 via the USB connector. The sensor is supplied with current and detected as a digital sensor. This allows the setting of the wavelengths and other parameters such as the intensity via the titrator or the TitriSoft software within the titration method.

Typical applications for the OptiLine 6:

- Titrations according to PH.Eur. and USP, which require the use of an indicator
- Titration of Chondroitin sulfate-sodium according to Ph.Eur. and USP
- Determination of the carboxyl end groups in PET (non-aqueous titration)
- TAN/TBN according to ASTM D974 (non-aqueous titration)
- Titration of sulfate (indicator Thorin)
- Determination of Ca/Mg and total hardness. All other complexometric titrations can be carried out as well

Ordering information OptiLine 6

Order no.	Type no.	Length L [mm]	Measuring range [mV]	Other features
285221300	OptiLine 6	132	0 … 2.000	Selectable wavelengths

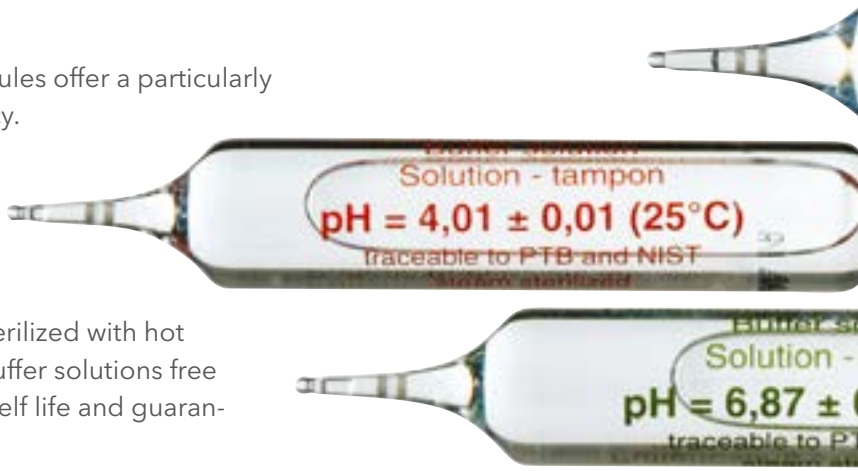
Technical Data OptiLine 6

Shaft diameter	12 mm
Shaft length:	132 mm
Minimum immersion depth:	25 mm
Shaft material:	Titanium
Cable:	fixed, 2 m
Connections:	USB-plug A, BNC-plug with BNC-DIN-adapter
Power supply:	via USB
Measuring range:	0 – 2000 mV
Temperature range:	0 – 50 °C
pH-range:	0 - 14
Adjustable wavelength (nm):	470, 520, 570, 590, 605 and 625

Buffer and electrolyte Solutions

Buffer solutions in the unique double-end ampoules offer a particularly high degree of reliability and measuring accuracy.

The exactness of the pH measurement is mainly dependent on the accuracy of calibration. This again highly depends on the reliability of the buffer.



Hermetically sealed in the glass ampoule and sterilized with hot steam, same as a pharmaceutical product, the buffer solutions free of preservation agent have an extremely long shelf life and guarantee continuously error-free characteristics.

The ampoules can be easily opened at the breaking point. Tools are not required. Since refilling is not possible, you are always ensured of maximum calibration reliability.

Standard buffer solutions according to DIN 19 266

Hot steam sterilized for longer stability, no preservation agents used.

Order No.	Type No.	pH value at 25 °C	Contents
285137977	L 4791	1.68	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138246	L 4794	4.01	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138254	L 4796	6.87	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138262	L 4799	9.18	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138402	L 4790	4.01 / 6.87	2 x 30 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285137985	L 4797	1.68 / 6.87 / 9.18	3 x 20 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138238	L 4798	4.01 / 6.87 / 9.18	3 x 20 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138279	L 4893 / Set	4.01 / 6.87	2 x 9 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate, with electrolyte solution L 3008
Order No.	Type No.	pH value at 25 °C	Contents
285137841	L 168	1.68	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285137677	L 1684	1.68	250 ml in DURAN® glass bottle, with manufacturer's certificate
285138098	L 401	4.01	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285138008	L 4014	4.01	250 ml in DURAN® glass bottle, with manufacturer's certificate
285138102	L 687	6.87	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285138016	L 6874	6.87	250 ml in DURAN® glass bottle, with manufacturer's certificate
285138119	L 918	9.18	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285138024	L 9184	9.18	250 ml in DURAN® glass bottle, with manufacturer's certificate

* 20 ml volume = ~17 ml content

SI Analytics
a xylem brand

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Benefits of Ampoules

- **Highest measurement reliability**
- **Extremely long storage times, thanks to hot-steam sterilization**
- **No preservative agents**
- **Maximize calibration reliability**

Technical buffer solutions

Hot steam sterilized for longer stability, no preservation agents used.

Order No.	Type No.	pH value at 25 °C	Contents
285138213	L 4694	4.00	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138221	L 4697	7.00	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138205	L 4691	10.01	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138398	L 4690	4.00/7.00	2 x 30 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138192	L 4698	4.00/7.00/10.01	3 x 20 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138632	L 4895/Set	4.00/7.00	2 x 9 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate, with electrolyte solution L 3008,

Order No.	Type No.	pH value at 25 °C	Contents
285138727	L 400	4.00	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285138032	L 4004	4.00	250 ml in DURAN® glass bottle, with manufacturer's certificate
285138735	L 700	7.00	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285138049	L 7004	7.00	250 ml in DURAN® glass bottle, with manufacturer's certificate
285138719	L 100	10.01	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285138057	L 1004	10.01	250 ml in DURAN® glass bottle, with manufacturer's certificate

* 20 ml volume = ~17 ml content

Buffer and electrolyte solutions

Technical buffer solutions

Color-coded, in plastic bottles

Order No.	Type No.	pH value at 25 °C	Contents
285139156	LC 4004 K	4.01	250 ml in PE bottle
285139189	LC 7004 K	7.00	250 ml in PE bottle
285139218	LC 1004 K	10.01	250 ml in PE bottle

Electrolyte solutions, aqueous

for reference electrodes, as electrolyte bridges and for storage

Order No.	Type No.	Description	Contents
285136956	L 101	potassium chloride solution 1 mol/l	1,000 ml in DURAN® glass bottle, sterilized
285138649	L 1254	potassium sulfate solution 0.6 mol/l	250 ml in DURAN® glass bottle
285138151	L 200	low temperature electrolyte (–30 °C)	1,000 ml in DURAN® glass bottle
285138365	L 2004	low temperature electrolyte (–30 °C)	250 ml in DURAN® glass bottle
285138349	L 2114	2 mol/l KNO_3 + 0.001 mol/l KCl for Ag combination electrodes	250 ml in DURAN® glass bottle
285136923	L 2214	2 mol/l KNO_3 + 0.001 mol/l KCl for Ag combination electrodes, thickened	250 ml in DURAN® glass bottle
285138332	L 2224	potassium chloride solution 2 mol/l	250 ml in DURAN® glass bottle
285138554	L 300	potassium chloride solution 3 mol/l	1,000 ml in DURAN® glass bottle, sterilized
285138427	L 3004	potassium chloride solution 3 mol/l	250 ml in DURAN® glass bottle, sterilized
285138505	L 3008	potassium chloride solution 3 mol/l	50 ml in PE bottle
285138419	L 3014	potassium chloride solution 3 mol/l, Ag/AgCl saturated	250 ml in DURAN® glass bottle
285138468	L 310	potassium chloride solution 2 mol/l, gel for sterilizable electrodes	1,000 ml in DURAN® glass bottle
285138484	L 3104	potassium chloride solution 2 mol/l, gel for sterilizable electrodes	250 ml in DURAN® glass bottle
285138702	L 320 K	potassium chloride solution 2 mol/l, gel for Ag_2S electrodes	1,000 ml in DURAN® glass bottle
285138143	L 350	potassium chloride solution 3.5 mol/l	1,000 ml in DURAN® glass bottle, sterilized
285138127	L 3504	potassium chloride solution 3.5 mol/l	250 ml in DURAN® glass bottle, sterilized
285138587	L 420	potassium chloride solution 4.2 mol/l	1,000 ml in DURAN® glass bottle
285138608	L 4204	potassium chloride solution 4.2 mol/l	250 ml in DURAN® glass bottle
285138590	L 911	storage electrolyte solution, sterilized	1,000 ml in DURAN® glass bottle
285138560	L 9114	storage electrolyte solution, sterilized	250 ml in DURAN® glass bottle

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Electrolyte solutions, organic

for measurements in organic solutions for reference electrodes and as electrolyte bridges

Order No.	Type No.	Description	Contents
285138324	L 5014	LiCl saturated in glacial acetic acid	250 ml in DURAN® glass bottle
285138308	L 5034	LiCl 1,5 mol/l in ethanol	250 ml in DURAN® glass bottle

Solutions for oxygen measurements

Order No.	Type No.	Description	Contents
285138513	L 6708	electrolyte for oxygen electrodes OX 1100 / OX 1100 + / OX 1101	50 ml in PE bottle
285126606	OX 920	electrolyte for oxygen electrodes 9009 / 61	50 ml in PE bottle
285126614	OX 921	cleaning solution for oxygen electrodes 9009 / 6130 ml in PE bottle	
285138287	OX 060	zero point solution for oxygen electrodes OX 1100 / OX 1100 +	60 FIOLAX® ampoules à 20 ml volume = ~17 ml content

Solutions for ammonia measurements

Order No.	Type No.	Description	Contents
285137344	L 6408	electrolyte for ammonia combination electrodes	50 ml in PE bottle

Buffer and electrolyte solutions

Solutions and accessories for conductivity measurements

Order No.	Type No.	Description	Contents
285126503	LF 990	test solution KCl 0.001 mol/l (147 µS/cm)	3 x 6 FIOLAX® ampoules à 20 ml*, with manufacturer certificate
285126511	LF 991	test solution KCl 0.01 mol/l (1.41 mS/cm)	3 x 6 FIOLAX® ampoules à 20 ml*, with manufacturer certificate
285126528	LF 992	test solution KCl 0.1 mol/l (12.9 mS/cm)	3 x 6 FIOLAX® ampoules à 20 ml*, with manufacturer certificate
285126293	LF 995	test solutions KCl 0.01 / 0.1 / 1 mol/l (1.41 / 12.9 / 112 mS/cm)	3 x 6 FIOLAX® ampoules à 20 ml*, with manufacturer certificate
285126166	LF 1000 / Set	same as LF 999 / set, in addition platinizing vessel and cable B 1 N	3 x 6 FIOLAX® ampoules à 20 ml*, with manufacturer certificate
285136907	LF 1024	test solution KCl 0.01 mol/l (1.41 mS/cm)	250 ml in PE bottle
285126530	LF CSKC13	test solution KCl 1.3 µS/cm (maximum shelf life: unopened three months, opened six hours)	250 ml in PE bottle
285126540	LF CSKC5	test solution KCl 5.0 µS/cm, (maximum shelf life: six months)	500 ml in PE bottle

* 20 ml volume = ~17 ml content

ORP electrode solutions

Order No.	Type No.	Redox voltage Pt/Calomel (KCl sat.)	Pt/Ag/AgCl (KCl 3 mol/l)	Contents
285138373	L 4619	180 mV	220 mV	60 FIOLAX® ampoules à 20 ml*, acc. to DIN 38 404-C6
285138357	L 4643	430 mV	470 mV	60 FIOLAX® ampoules à 20 ml*,
285138381	L 4660	600 mV	640 mV	60 FIOLAX® ampoules à 20 ml*
285138784	L 4648	180, 430, 600 mV	220, 470, 640 mV	3 x 20 FIOLAX® ampoules à 20 ml*
285138184	L 430	430 mV	470 mV	1,000 ml in DURAN® glass bottle
285138168	L 4304	430 mV	470 mV	250 ml in DURAN® glass bottle

* 20 ml volume = ~17 ml content

Cleaning solutions for combination electrodes and reference electrodes

Order No.	Type No.	Description	Contents
285138538	L 510	pepsin / hydrochloric acid solution	1,000 ml in DURAN® glass bottle
285138295	L 5104	pepsin / hydrochloric acid solution	250 ml in DURAN® glass bottle

SI Analytics
a xylem brand
Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10 · 55122 Mainz · Germany · Tel: +49 6131 665111 · Fax: +49 6131 665001 · info.si-analytics@xylem.com
www.xylemanalytics.com

Accessories for Electrodes

Order No.	Type No.	Description
285126482	NH 928	electrolyte for ammonia electrodes in 50 ml plastic bottle, 3 membrane modules
285126499	NH 995	membrane module set: 3 membrane modules, 3 caps
285215229	TZ 1520	taper adapter NS 14.5 of PTFE for electrodes with Ø 12 mm shaft
285123136	Z 451	measuring and storage vessel with sleeve NS 7.5/16
285123170	Z 453	electrode vessel for storing electrodes with Ø 12 mm shaft
285123152	Z 461	measuring and storage vessel with sleeve NS 14.5/23
285123185	Z 472	watering cap for electrodes with Ø 12 mm shaft

Z 453

Connection cables

1) Electrode socket/plug

Coaxial plug for pH, redox, ammonia and sodium combination electrodes, pH and redox single electrodes as well as reference electrodes in Plus series.

L Socket

2) Instrument connector/plug

A (DIN 19 262)

BNC

N - Banana

Order No.	Type No.	1) Electrode socket/plug	2) Instrument connector/plug	Cable length and type
285121916	B 1 N	reference electrode plug (B)	Banana plug (N)	1 m single conductor cable
285122456	L 1 A	electrode plug (L)	DIN instrument plug (A)	1 m coax. cable
285122497	L 1 BNC	electrode plug (L)	BNC instrument plug	1 m coax. cable
285122550	L 2 N	electrode plug (L)	Banana plug (N)	2 m coax. cable
285122457	L 1 N	electrode plug (L)	Banana plug (N)	1 m coax. cable
285122489	L 1 NN	electrode plug (L)	2 x banana plug (N)	1 m coax. cable
285122464	L 2 A	electrode plug (L)	DIN instrument plug (A)	2 m coax. cable
285122448	L 2 NN	electrode plug (L)	2 x 4 mm banana plug (N)	2 m coax. cable

Please ask for more plug and cable combinations.

Meters

Electrodes and meters: Complete solutions

Our laboratory meters **Lab** and **ProLab** as well as our handheld meters **Handylab** combined with our electrodes and the unique buffer solutions in ampoules deliver reliable results. They enable and secure the daily routine measurements of pH, ORP, ISE, conductivity and oxygen, from processing the measurement until documentation.

Meter Lab 745

Meter ProLab 5000

Laboratory Electrodes

Our electrodes – as diverse as your applications

The right sensor for every application

No pH measurement is comparable with another. The demands for pH measurements can therefore only be fulfilled by a perfectly harmonizing system of electrodes, meters and buffer solutions targeted towards the application, such as delivered by us.

A critical element within this system is the pH electrode being in direct contact with the sample and delivering the measuring signal. We have been involved in the development and production of glass electrodes **for more than 80 years** – a know-how that you as a customer can benefit from. Ultrapure water, marmalade, wine, cremes, or drinking water – we offer the matching electrode for any possible application.

The compact BlueLine is a basic series comprising electrodes for common laboratory applications.

The ScienceLine electrodes offer you not only highest measuring accuracy with ideal endurance of sensors but also a maximized adaptability for your measuring duty. An electrode series with utmost versatility and high quality standard. ScienceLine Plus electrodes offer a double junction reference and the possibility to use the sample adapted bridge electrolytes.

TopLine electrodes combine reliable measuring results with a maximum dwell time. They were developed for a wide range of applications in the lab, field, and processing of wastewater via emulsions, solutions with proteins, suspensions all the way to purely aqueous samples.

Viscometry

AVS® | ViscoSystem® | Viscometer

ViscoClock plus

Precise capillary viscometry – Innovation from the outset

The **ViscoSystem® AVS® 370** (PC controlled) and the **ViscoSystem® AVS® 470** (as stand-alone solution) offer the extraordinary combination of both "pressure" or "suction" in operation. This gives you more flexibility and better adjustment to the liquids to be examined. It enables the operation of a Visco Pump III module for optical detection of transparent samples, or the TC version for opaque and black fluids.

Measuring perfection

The ViscoClock *plus* is an electronic timing unit for glass capillary viscometers used to determine kinematic and relative viscosity. Succeeding the well proven ViscoClock, the new instrument features data storage and simpler handling. The ViscoClock *plus* is especially designed for Ubbelohde type viscometers which are well-known for highest precision.

Improved measuring viscosity automatically

The sampling machine AVS Pro III is a fully automatic viscometry measuring station. Even with the high throughput of samples, this station convinces with excellent accuracy and reproducibility – whether operating during the day or unattended during the night.

AVS® Pro III

Process Technology

Process Technology

Process electrodes, armatures, and accessories

The reliable measuring of pH, ORP, conductivity and D.O. values up to temperature within the process requires individual solutions. Our extensive range of process electrodes includes all applications for measurements in aqueous solutions in the temperature range from –30 °C to 140 °C at a pressure up to 12 bar. Process electrodes with Memosens technology for up-to-date measuring and maintenance complete our program. Furthermore, many of our electrodes are certified according to the ATEX Directive 2014/34/EU and Pressure Equipment Directive 2014/68/EU. The retractable holders enable flexible measurements with an ideal positioning of the electrode in the medium.

Process Electrodes

CHEMtrac 810

Xylem |ˈzīləm|

1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

Xylem Lab Solutions' global brands have been leaders in the laboratory instrumentation market for decades, and are relied upon every day across more than 150 countries. Working in true partnership with our clients, we listen, learn and adapt to individual needs, offering deep application expertise built upon our long history of innovation in instruments and services. Our solutions for analysis, measurement and monitoring help enable many of today's modern laboratories and industrial processes, and provide our customers the trusted and high performing solutions they need to succeed.

Xylem Lab Solutions is part of Xylem Inc., a global company focused on solving the world's most challenging and fundamental water issues. As accurate analysis is crucial to the water industry, Xylem Lab Solutions taps its diverse product brands for leadership in that field and beyond, providing the best laboratory and field monitoring instrumentation across a wide variety of industries.

For more information on how Xylem can help you, go to **www.xylem.com**

SI Analytics® Bellingham + Stanley® -ebro- O·I Analytical WTW YSI

Visit our website for more contact info

Connect with us: SIAnalytics

xylem
Lab Solutions

Xylem Analytics Germany Sales GmbH & Co. KG, SI Analytics
Hattenbergstr. 10
55122 Mainz, Germany
Tel +49 6131 66 5111
Fax +49 6131 66 5001
si-analytics@xylem.com
www.si-analytics.com

 980097US July 2022