

TITRATION CATALOG

The new titrators and burettes

SI Analytics

a xylem brand



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Selection table titration – piston burettes TITRONIC®

The most important features of titrators TitroLine® and piston burettes TITRONIC® at-a-glance

Application	TITRONIC® 500	TitroLine® 6000
Intelligent interchangable units (5, 10, 20 and 50 ml)	■	■
Manual titration	■	■
Dosing	■	■
Solutions preparation (manually or automatically with connected balance)	■	■
Automatic titration (independent with external software)	1)	■
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	–	■
pH-stat-applications (enzyme kinetics, soil samples, biotechnology)	–	–
Water analysis according to KF Volumetric method (10 ppm – 100 %)	–	–
Water analysis according to KF Coulometric method (1 ppm – 5 %)	–	–
Applications with sample changer	–	–
Applications with TitriSoft	■	–

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

and automatic titrators TitroLine®

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

New from SI Analytics:
Simplicity without sacrificing accuracy

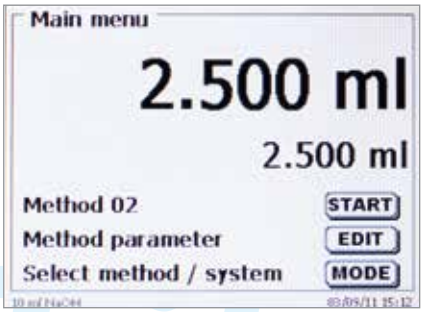
Introducing the new titrators

TitroLine® 6000, 7000, 7750, 7500 KF, 7500 KF *trace* and the new TITRONIC® 500 piston burette with innovative features for simple and easy operation – without sacrificing accuracy:

- High visibility, full color display that can be easily viewed from a distance and at extreme angles.
- Reagent data is securely stored in the intelligent and interchangeable modules.
- Automatic wireless recognition of SI Analytics ID electrodes guarantees accurate calibration and measurements (TitroLine® 7000).
- Touch keypad interface for error free operation.
- Includes three USB and two RS232 ports for expansion and connection of devices such as USB storage of methods and data, stirrer, laboratory balance, PC and additional SI Analytics peripheral devices.
- Export the results as PDF or CSV.
- Transfer of methods via USB device.
- Versatile and flexible for a variety of applications.

Advantages
TitroLine® /TITRONIC®

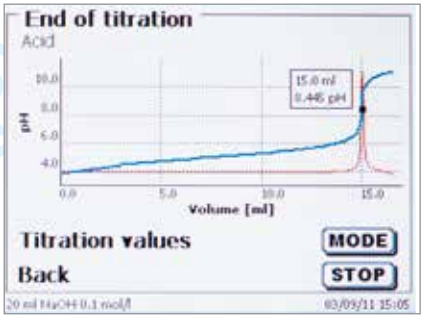
TITRONIC® 500
piston burette

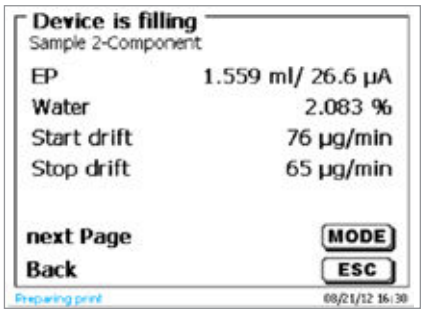






TitroLine® 6000/
TitroLine® 7000/
TitroLine® 7750
titrators





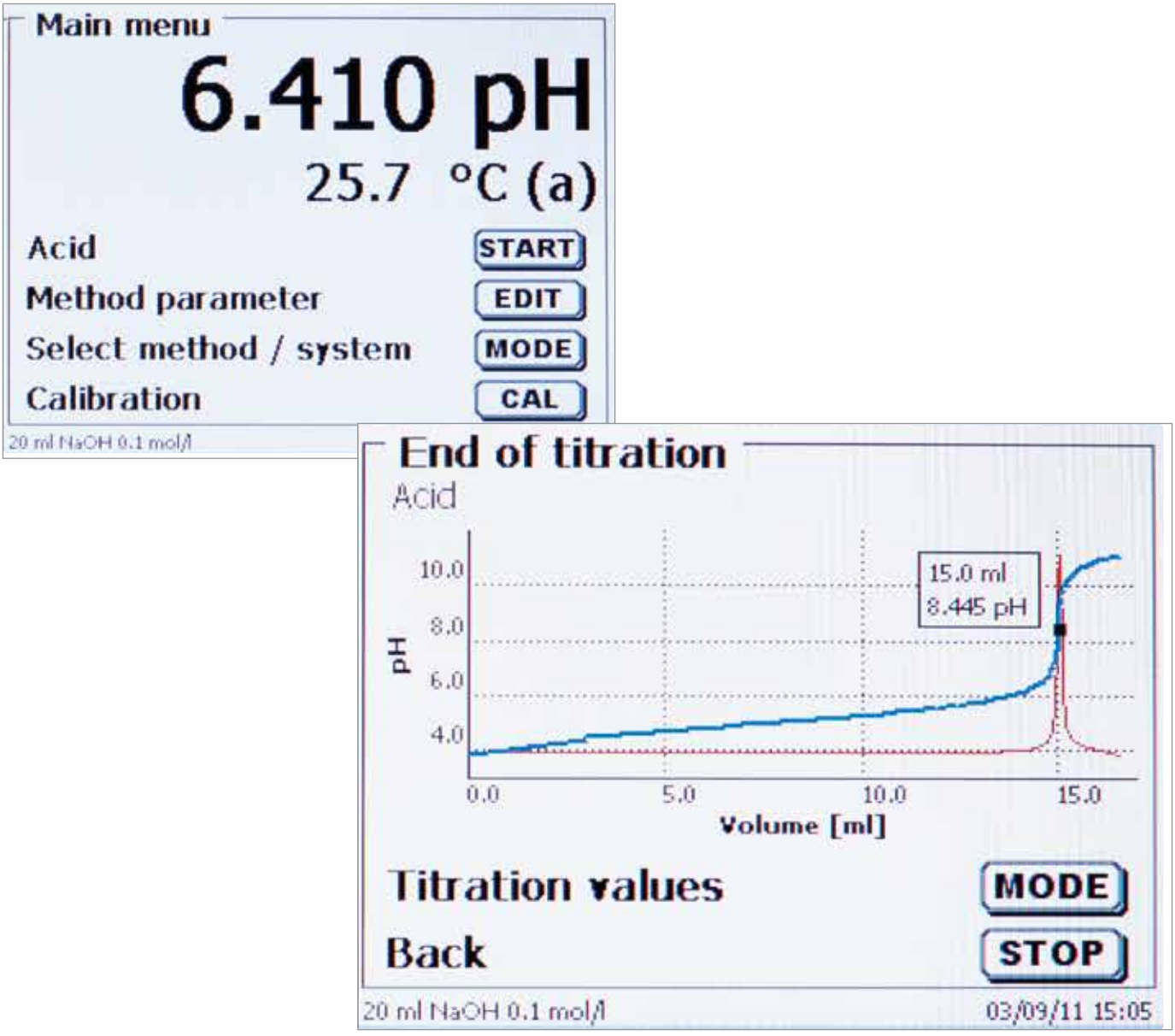
TitroLine® 7500 KF/
TitroLine® 7500 KF trace titrators



Loaded with features: TITRONIC® 500, TitroLine® 6000 and 7000 for routine titrations

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® 6000/7000).
- Equivalence point values are displayed in the titration curve (TitroLine® 6000/7000).





New intelligent, interchangeable modules

- Size options of 5, 10, 20 and 50 ml.
- Compact, space saving footprint.
- All relevant reagent and unit data
  are stored in the integrated RFID-chip including:
  - Burette size (ml)
  - Titrant name
  - Titrant concentration or titer value of solution
  - Date of manufacture or expiration date of the reagent.

Flexible configuration features

Expand and customize your workstation using the three USB 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 (ESC POS)
- USB keyboard
- USB storage device and hub
- Balance and PC
- other devices from SI Analytics

printer



USB-manual controller



TITRONIC® 500:

The piston burette for simple and accurate dosing …

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 3.0, it acts as a titration burette or with the TitroLine®7000 and TitriSoft 3.0, it is an automatic dosing unit perfect to pre-dose a titrant.

Important features:

- 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).



… preparing solutions and manual titrations

Manual Titration

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

Important features:

- 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.

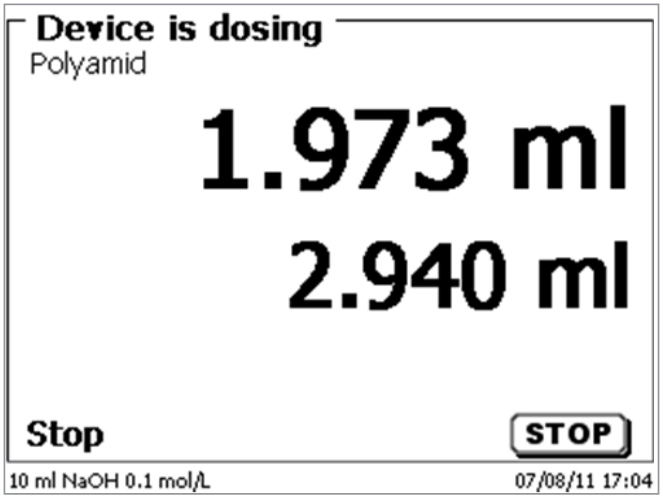


Dosing

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

Important features:

- 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.

Important features:

- 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.

Potentiometric titrator: TitroLine® 6000 – ideal for food, water, wastewater and environmental applications

The simple and easy-to-use TitroLine® 6000 does not sacrifice performance when doing potentiometric titrations. It is the perfect choice for analysis in food, water, wastewater and environmental applications. 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, reliably and accurately.



Application "Total acidity in drinks"

Features of the TitroLine® 6000 include:

- High resolution pH/mV electrode and temperature inputs for pH, ISE, redox or photometric titrations.
- Polarizable electrode input for set endpoint applications.
- Available standard methods such as FOS/TAC, alkalinity, total acidity in soft drinks.
- Linear (fixed increment) and dynamic equivalence point titration modes.
- Titrations to pH, mV and µA end-point.
- Manual titration mode and routine dosing tasks are also available.

Typical applications of the water/wastewater and environmental analysis:

- pH-value, alkalinity ("p+m-value")
- Permanganate index
- COD
- Total Kjeldahl nitrogen
- FOS/TAC (See application example)
- Chloride in wastewater
- Free and Total Chlorine in drinking water
- Total hardness (sum of Ca+ and Mg+)
- Dissolved oxygen according to "Winkler" method.

Application example for the water/wastewater and environmental analysis: FOS/TAC (Total volatile fatty acids/Total inorganic carbon, also total alkalinity)

An important parameter for monitoring the fermentation process of biogas plants is a titration method commonly known as FOS/TAC value. The TAC value is determined using 20 ml of a centrifuged sample from the fermenter titrated to pH 5.0 with 0.05 mol/l sulfuric acid. The FOS value is determined by a titration of the same sample to a pH of 4.4. Both titrated ml values are then used in the following calculation formula.

TAC – ml H_2SO_4 to pH 5.0 × 250

FOS – (ml H_2SO_4 from pH 5.0 to pH 4.4 × 1.66 – 0.15) × 500

A different sample volume could also be considered. The FOS/TAC value is the average calculated value. The method and all parameters and calculation formulas are stored as a standard method in the TitroLine® 6000 and 7000.

Accurate results without compromise

The TitroLine® 6000 is the ideal choice for food and beverage applications such as QA/QC, R&D, food science and nutritional evaluation.



Application:
Chemical Oxygen Demand (COD)

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[1)].
- Determination of free and total sulfurous acid (H_2SO_3) in wine and must. Further detail is available in the application example.

[1)] The use of Free fatty acids and saponification number has to be tested in each individual case.

Application example for food analysis: Determination of free and total sulphurous acid (SO_2) in wine.

Since ancient time, "sulfur" (sulfurous acid) has been added to wine as a preservative. Sulfurous acid inhibits the oxidation process and prevents the growth of unwanted microorganisms, extending the life and preserving the quality of wine.

Free and total sulfur (sulfur dioxide) content is determined by the titration of a 10–50 ml sample after the addition of sulfuric acid and potassium iodide with an iodine solution as titrant (0.025 mol/l) and using a double platinum electrode as indicator electrode. The free SO_2 is titrated directly. Total SO_2 is titrated after the hydrolysis with sodium hydroxide which converts the bound SO_2 into the free form.

The method with all parameters and calculation formulas is a standard method in the TitroLine® 6000 and 7000.

TitroLine® 7000:
Featuring enhanced automation and additional methods

Besides the specifications of the series and the TitroLine® 6000 already mentioned in the introduction, the TitroLine® 7000 provides more functions.

More methods

Do you require simple and easy titration but need more features? The TitroLine® 7000 offers storage of up to 50 user methods.







Interfaces

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.

Perfect for non-aqueous titrations

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

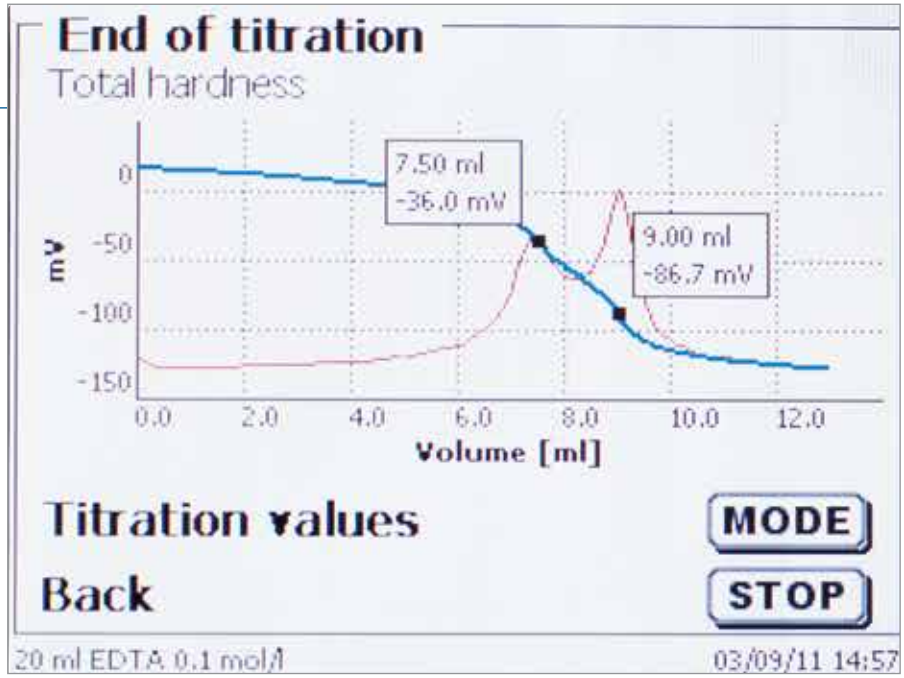
- Acid and base numbers in oils.
- Titrations in glacial acetic acid with perchloric acid.
- Hydroxyl, NCO (Isocyanate) number and further specific values.

pH Stat Titrations

With a pH stat application, a given pH is first adjusted and then kept constant during the analysis with an acid or a base. The pH stat titration is often applied to:

- Determination of the enzyme activity (ex. Lipase).
- pH stat elution of soil sample at pH 4.
- Monitoring of the pH value during chemical syntheses.

Titration curve:
Total hardness (Calcium and Magnesium hardness)



Typical application example for two equivalence points: Titration of amino hydrochlorides (method according 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.

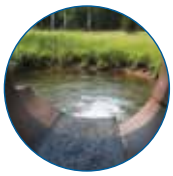
According to the environmentally friendly method of the European Pharmacopeia the amino hydrochlorides are dissolved in ethanol and being dosed with exact 5.00 ml of a 0.01 mol/l HCl. This mixture is then titrated with NaOH 0.1 mol/l. Most titration curves show two equivalence points. The result is calculated from the difference between the first and second equivalence point.

This method, with all parameters and calculation formulas, comes standard in the TitroLine® 7000 and can be used after the input of equivalent substance weight.

More equivalence points to expand application possibilities

Yes, it is now possible to detect and calculate up to two equivalence points during one titration with the TitroLine® 7000. It is possible to determine both the calcium and magnesium hardness individually in a single step, instead of the total hardness combined.

Applications Overview


Water and Wastewater Analysis

Application	TITRONIC® 500 (manual)	TitroLine® 6000 (manual or automated)	TitroLine® 7000 (manual or automated)
Alkalinity (p+m-value)	■	■	■
COD	■	■	■
Permanganate index	■	■	■
FOS/TAC	■	■	■
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)	■	■	■



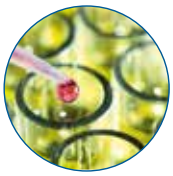


Food

Application	TITRONIC® 500 (manual)	TitroLine® 6000 (manual or automated)	TitroLine® 7000 (manual or automated)
Total acidity in wine and soft drinks	■	■	■
Total acidity in food (ketchup, salad dressing)	■	■	■
Acidity in bread and sourdough	■	■	■
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	■	■	■

Industrial Products





Application	TITRONIC® 500 (manual)	TitroLine® 6000 (manual or automated)	TitroLine® 7000 (manual or automated)
Titration of strong acids and bases (1 equvalence point)	■	■	■
Phosphoric acid (2 equivalence points)	■	■	■
Hydroxyl number	■	■	■
NCO (Isocyanate) number	■	■	■
Epoxy number	■	■	■
Acid number in resins and other industrial products	■	■	■
Acidity in oils (TAN, max. 2 equivalence points)	■	–	■
Total base number (TBN) in oils	■	–	■

Miscellaneous Applications





Application	TITRONIC® 500 (manual)	TitroLine® 6000 (manual or automated)	TitroLine® 7000 (manual or automated)
Surfactants	■	■	■
Metals (redox)	■	■	■
Metals (zinc, copper…, complexometric)	■	■	■
Titrations with perchloric acid (non aqueous titrations)	■	■	■
Potentiometric titration to 1 equivalence point (general)	■	■	■
Potentiometric titration to 2 equivalence points (general)	■	–	■

■ Excellent application suitability

■ Manual titration must be evaluated for this application

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

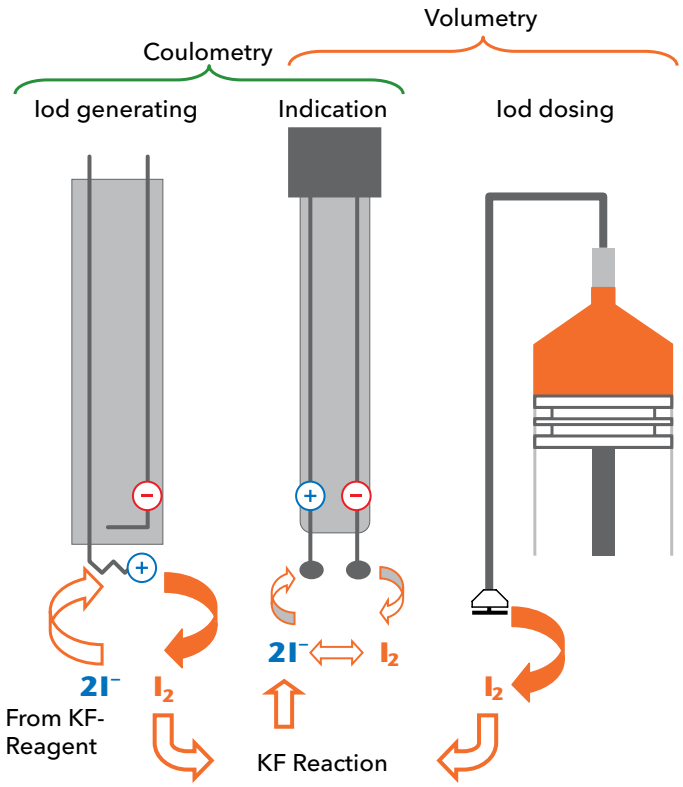
Karl Fischer Titration – the method for determining water

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.

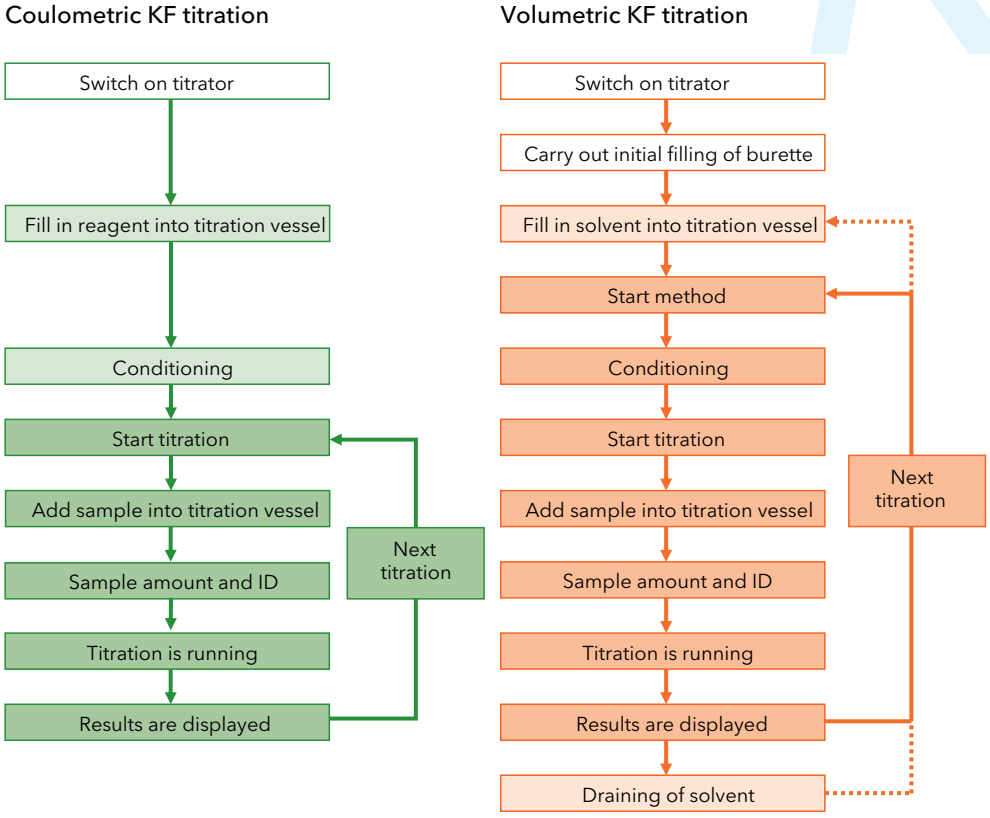
The basic principle of the water determination according to Karl Fischer (short: **KF**) is a reaction of iodine with water in an alcoholic solution with presence of sulfurous acid and a base.

With the **volumetric** method the iodine can be accurately added through a piston burette or **coulometric** directly produced 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 types of dosing:



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. Where on the other hand the coulometry can handle lower detection limits and the even simpler handling. The compared work flow with coulometry and volumetry are shown with the following illustration. The clearly shorter and easer sequence is noticable 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 (i.e. KF oven) Solid samples with 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 homogenisator Working at higher temperature Direct with syringe
Working method	Very fast Very simple	Fast Simple
Working range	µg range 10 µg up to 5 mg water	mg range 200 µg up to 50 mg water
Trueness	Pretty good for small water amounts > 400 µg Wasser (± 0,5 %)	Pretty good for water amounts > 5 mg water (± 0,5 %, standardization required!)
Reproducibility	Typical RSD of appr. 1 % for water > 400 µg	Typical RSD of appr. 1 % for water > 5 mg

TitroLine® 7500 KF and TitroLine® 7500 KF *trace* –

You can't go wrong with the new TitroLine® KF titrators from SI Analytics

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 following features:

- Fast, easy and precise
- With standard methods for different applications (titer, blank value, 1 or 2 component reagent)
- 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

Advantages TitroLine®/TITRONIC®

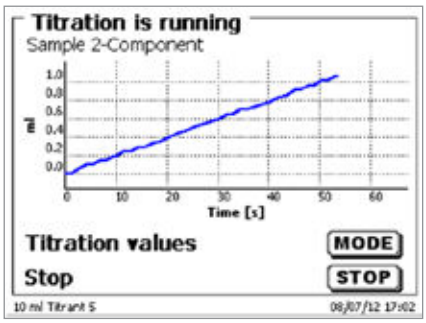


TitroLine® 7500 KF *trace*

Karl Fischer Titration made easy

Titration curve live

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

Accessories



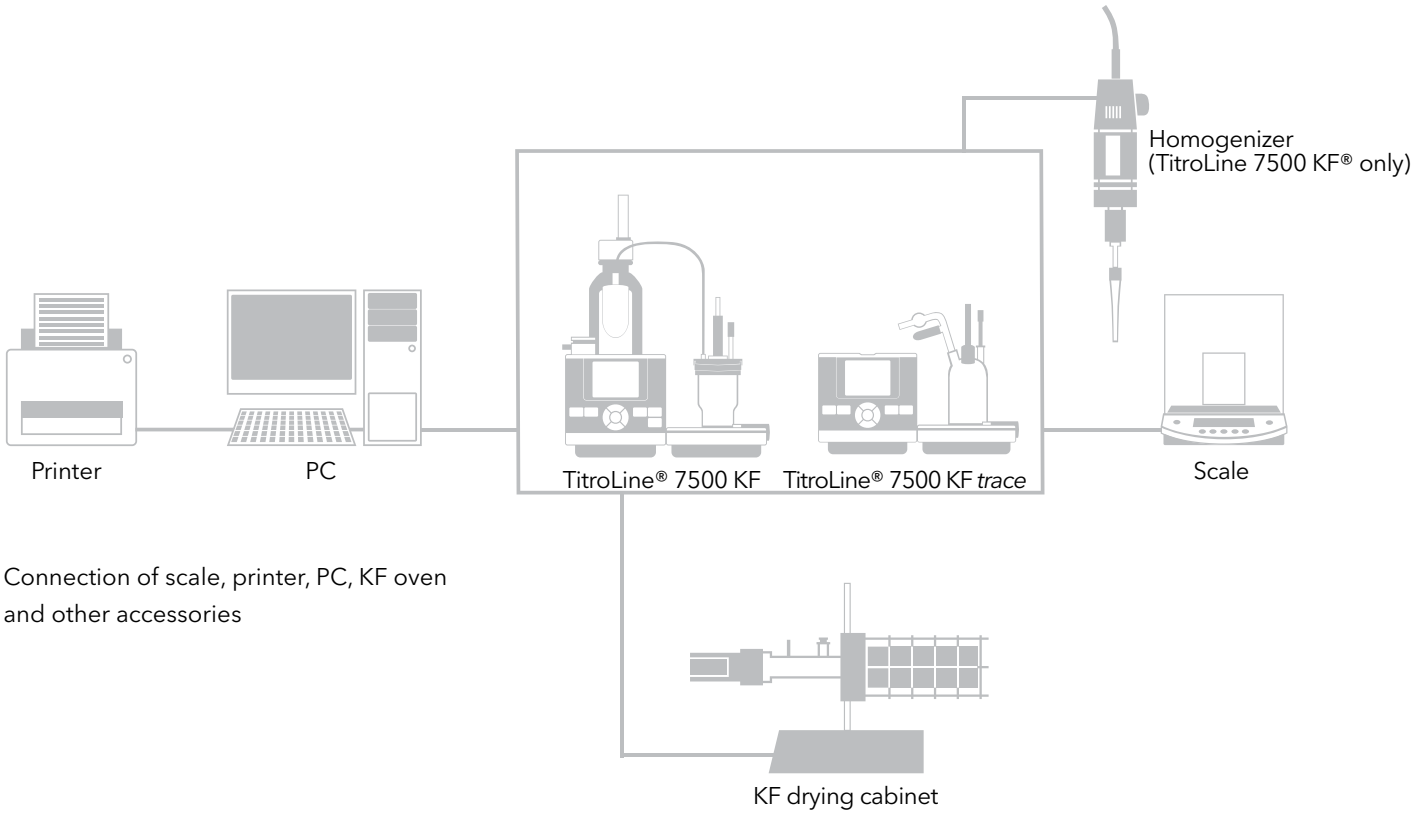
Titration stand TM 235 KF

Titrated samples are simply extracted by pressing a button on the KF titration stand TM 235 (standard on TitroLine® 7500 and KF and part of the modules 2 + 4 TitroLine® 7500 KF *trace*). With another push on a button you add fresh solvent or anolyte. A built-in magnetic stirrer ensures a consistent dilution of solution and sample.

The titration vessels are sealed to thus avoid the ingress of moisture (low drift!). The removable glass vessel on the TitroLine® 7500 KF comes in two sizes and is easy to clean. It is also available as thermostatable version.

For the TitroLine® 7500 KF *trace* you have the choice of two different vessels made of solid glass with three and five openings. They have a very low drift.





Connection of scale, printer, PC, KF oven and other accessories

Specifications –TitroLine® 7500 KF and TitroLine® 7500 KF *trace*

Specific Features	TitroLine® 7500 KF	TitroLine® 7500 KF *trace*
Measuring range	10 ppm–100%	1 ppm–5% (10 µg–200 mg)
Accuracy	Dosing accuracy <0.15%	<0.3% at 1 mg water
Applications	KF volumetry, Dead- stop-titrations (SO_2, bromine number …)	KF coulometry, bromine number
Titration stand with integrated pump and magnetic stirrer TM 235 KF	■	Module 2 and 4

You will find more general features on pages 6-9.

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.

The new TitroLine® 7750 is characterized as follows:



TitroLine® 7750 with accessories for potentiometric titration

- Storage of results using via USB port (PDF – and CSV -format) including method transfer
- With standard methods for potentiometric and KF titration

The new Titrator from SI Analytics - more options

- 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
- Thanks to the 2 x USB-host, 1 x USB-PC and 2 x RS232 ports very expandable. Connectable are e.g. USB keyboard, USB printer, barcode reader, USB flash drives, balances, PC und further SI Analytics devices such as piston burettes and sample changers



TitroLine® 7750 with accessories for KF titration

→ Please refer to pages 14 and 20 (TitroLine® 7000 and TitroLine® 7500 KF) for more basic details of TitroLine® 7750.

TW alpha *plus* and TW 7400 sample changer – automatic titration in series

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 *alpha* plus and the TW 7400 sample changers by SI Analytics helps you meet these increased requirements and relieve qualified employees from routine work.

Control by titrator or by PC

You can control the sample changer from the TitroLine® 7000 titrator or from a PC with the TitriSoft software.

Higher flexibility due to exchangeable sample racks

With four sample racks for up to 72 samples (TW 7400) and titration head fittings for a variety of beaker and titrator vessels you get the flexibility your lab needs. The sample racks and titrator heads are very quick and simple to change. The size of the rack can be selected in the TitroLine® 7000 or in the ›Titration Center‹ of the TitriSoft software.

Stirring from "above" or "below"

As standard, the TW *alpha* plus comes with an integrated magnetic stirrer to stir the samples from "below". Alternatively, you can use a rod stirrer which enables stirring from "above".



TW alpha plus with 16 sample dish and pump MP 25

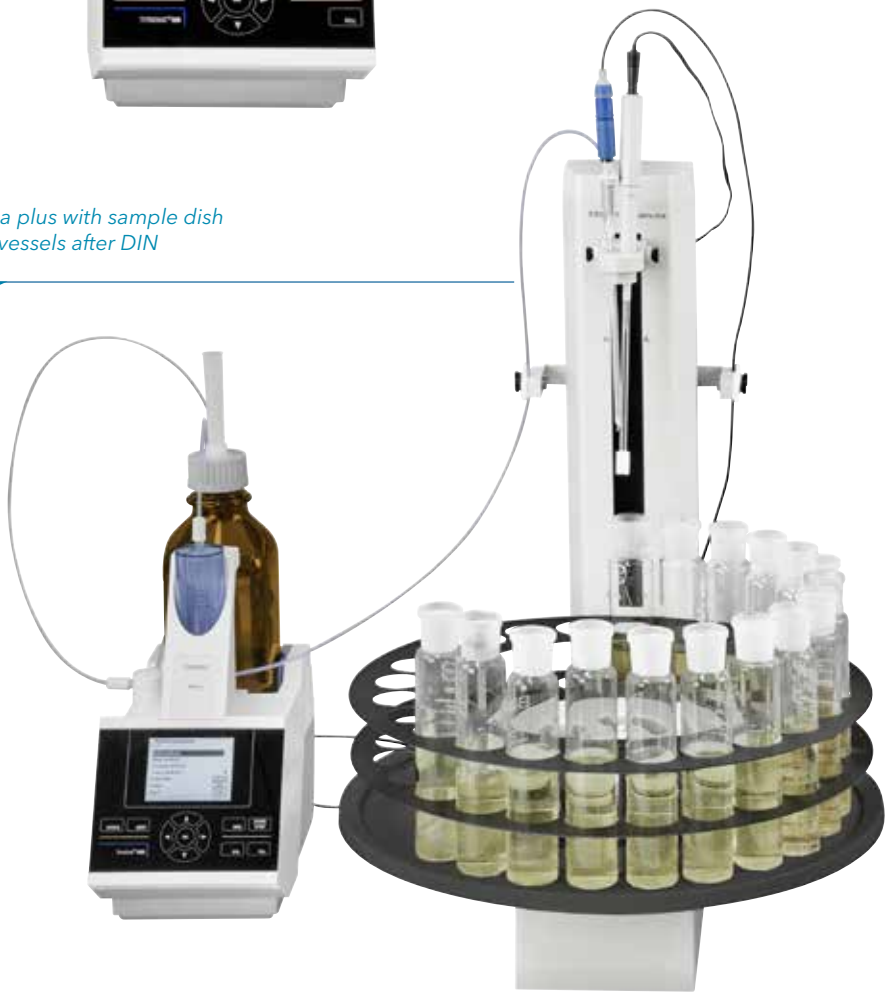
plus

Washing the electrode and the titration tip

To ensure accuracy of the results, the electrodes and the titration tips are rinsed after each titration. This can, for example, be done by immersing the electrodes and titration tips into a washing solution. The number of rinsing positions to be used (up to a maximum of three) and the rinsing time are set in the method. Direct and fast rinsing of the electrodes and titration tips can be ensured by using the MP 25 washing unit that rinses directly after the titration. In addition to this, a waiting position may also used for example to immerse the pH electrodes into a KCl solution.



TW alpha plus with sample dish for CSB vessels after DIN



Automatic CSB Titration

For the direct titration of the CSB there is a special sample tray for TW alpha plus with 24 positions available.

For the large sample throughput – TW 7400 sample changer

The new X / Y sample changer TW7400 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.

Both the sample racks and the titration heads are easily exchanged. The sample rack with the 42 positions can be operated with beakers of either 150 or 250ml volume. These are used in particular in the water and environmental analysis. With this sample rack the use of the irrigation pump MP 25 is recommend. The sample rack with 72 positions can be operated with beakers of 50ml and special sample containers for a sample volume up to approximately 75ml. Typical applications include e.g. the wine and beverage analysis, pH measurements in soil samples or the determination of the alkalinity in Seawater.

The sample with 48 positions is suitable for 100ml beakers especially used for wine analysis.



TW 7400 with 42 sample rack

TW 7400 with 72 sample rack



Selection table autosampler TW alpha plus and TW 7400

Feature/Accessory	TW *alpha* plus	TW 7400
Stirring from the bottom with built-in magnetic stirrer	■	–
Rod stirrer TZ 1847 Suitable for all sample racks besides COD	■	■
Rod stirrer TZ 1846 Suitable only for COD sample rack	■	–
Rinsing pump MP 25. Suitable for sample racks: TZ 1452, TZ 1459 und TZ 3942	■	■
Sample rack for 12 positions TZ 1452 Suitable for titration vessel 250 ml low form (scope of supply) and 400 ml tall form	■	–
Sample rack for 16 positions TZ 1459 Suitable for titration vessel 150 ml low form (scope of supply) and 250 ml tall form	■	–
Sample rack for 24 positions TZ 1454 Suitable for titration vessel 50 ml tall form (scope of supply) and titration vessel up to 75 ml sample volume (TZ 1786)	■	–
Sample rack for 24 positions TZ 1444 Suitable for COD sample vessel 100 ml according to DIN (not included in scope of supply!)	■	–
Titration head TZ 1463 with 7 openings NS 14 Suitable for sample rack TZ 1459 and TZ 1452	■	–
Titration head TZ 1467 with 7 openings NS 14, splash shield and rinsing spray Suitable for sample rack TZ 1459 and TZ 1452 in combination with rinsing pump MP 25	■	–
Micro-titration head TZ 1469 with 4 openings Suitable for sample rack TZ 1454	■	–
COD titration head TZ 1461 with 3 openings Suitable for COD sample rack TZ 1444.	■	–
Sample rack for 42 position TZ 3942 Suitable for titration vessel 150 ml low form (scope of supply) and 250 ml tall form	–	■
Sample rack for 48 positions TZ 3948 Suitable for titration vessel 100 ml tall form (scope of supply)	–	■
Sample rack for 72 positions TZ 3972 Suitable for titration vessel 50 ml tall form (scope of supply) and titration vessel for up to 75 ml sample volume (TZ 1786)	–	■
Titrierkopf TZ 3963 with 7 openings NS 14 Suitable for sample rack TZ 3942	–	■
Titration head TZ 3967 with 7 openings NS 14, splash shield and rinsing spray Suitable for sample rack TZ 3942 in combination with rinsing pump MP 25	–	■
Micro-titration head TZ 1469 with 4 openings Suitable for sample rack TZ 3948 and TZ 3972	–	■

Important note: The rinsing pump MP 25 can only be used in combination with the titration heads TZ 1467, TZ 3967 and the sample rack TZ 1452, TZ 1459 and TZ 3942.

TitriSoft 3.0 – convincingly simple …

The TitriSoft 3.0 titration software is the optimum solution for your titration tasks. The software can be used with Windows XP, Vista and 7 and supports your daily work procedures during sample preparation, titration and evaluation of the results. The software has been developed to be clear, logical and user-friendly.

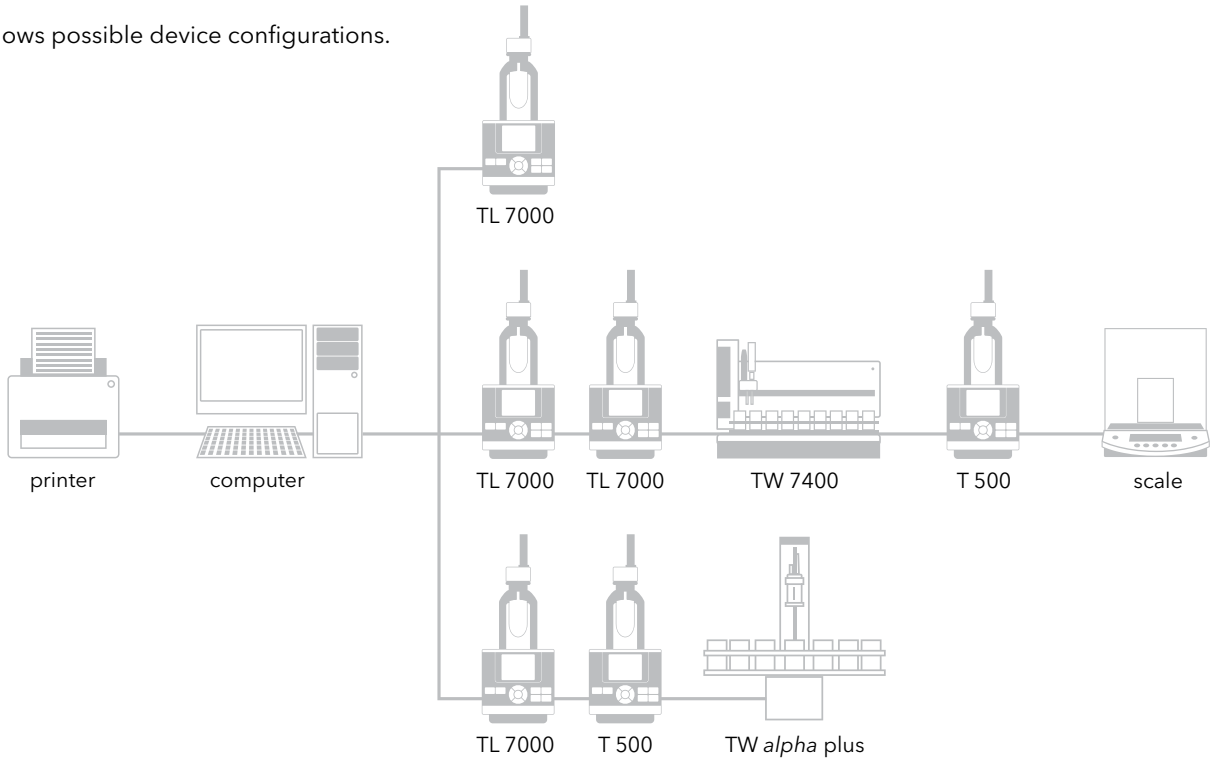
Connection possibilities

Using TitriSoft 3.0 you can control the following devices from a PC:

- **Titrators** (TitroLine® 7000, 7750, 7500 KF, 7500 KF *trace* and TitroLine® *alpha* plus)
- **Sample changers** (TW *alpha* plus, TW 7400, TW alpha und TW 280)
- **Piston burettes** (TITRONIC® 500 and TITRONIC® *universal*, TITRONIC® 110/200 and TITRONIC® 110 plus)
- **Balances**

You can connect the titration hardware to any of your PC's available USB-A or serial interfaces. Each of the interfaces allows different combinations of devices (configurations). To automate a titration procedure the software may be used to control the TitroLine® 7000 in connection with the TW *alpha* plus sample changer. For more complex titration tasks with sample preparation you can dose with piston burettes followed by titration with a TitroLine® 7000. Of course, you can also use the software for dosing only.

The image below shows possible device configurations.



System requirements

For optimal and fast working with the TitriSoft 3.0 software your system should be equipped as shown below:

Interface: a free USB or RS232-interface per configuration

Computer: Pentium D (Dual-Core) 2 GHz or higher

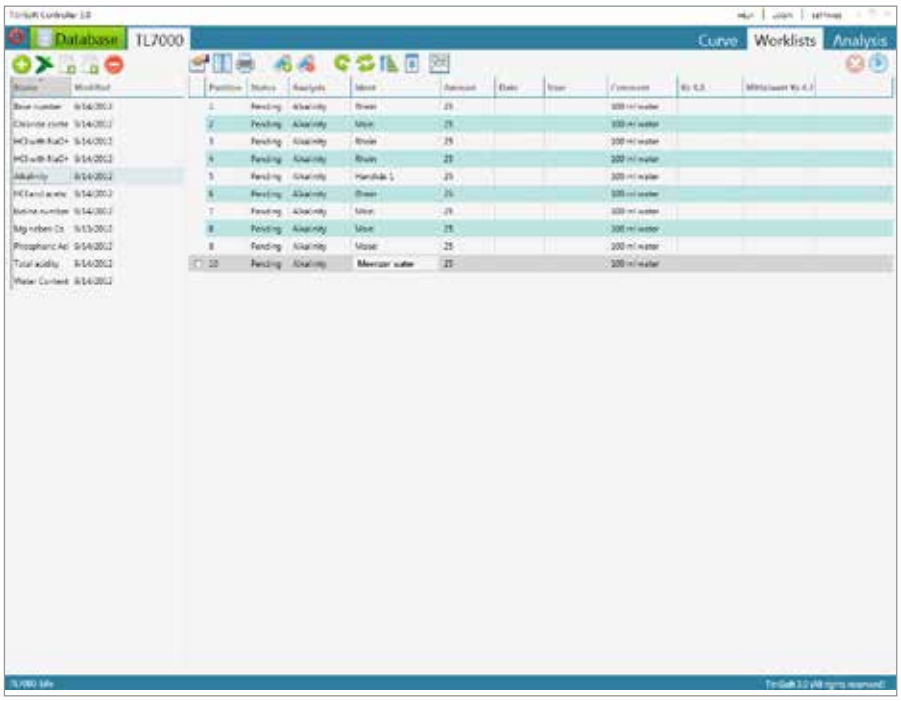
Operating system: Windows XP, Vista or 7

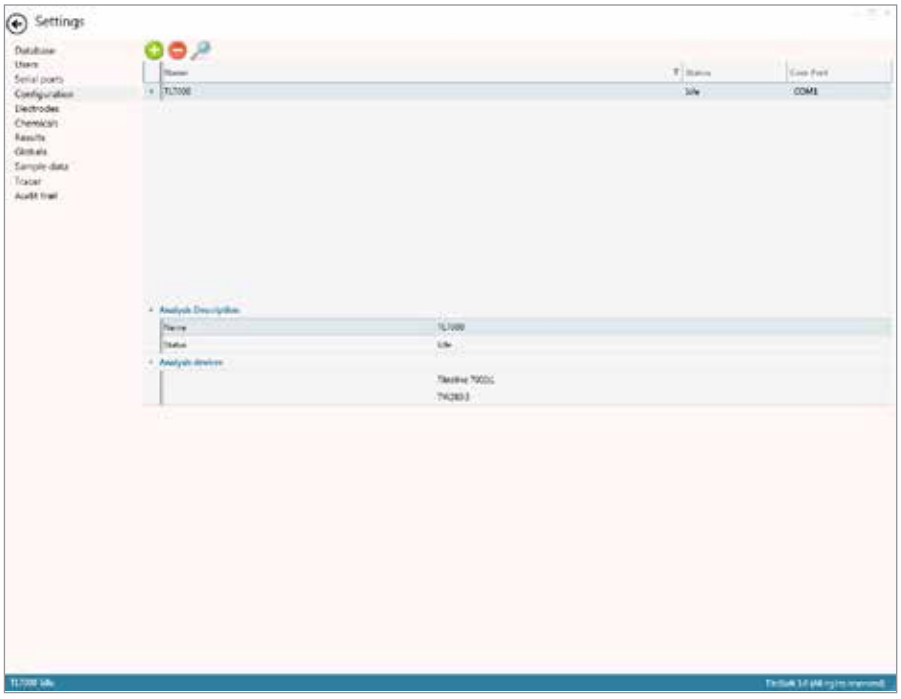
RAM: minimum 2 GB

Hard disk:
minimum free storage volume 200 MB

Graphics card:
minimum resolution 1280 x 1024

… strong benefits …





›Navigator‹, the main menu

The different software tasks are assigned to five different centers:

- Settings,
- Database,
- Analysis,
- Worklists
- Curve

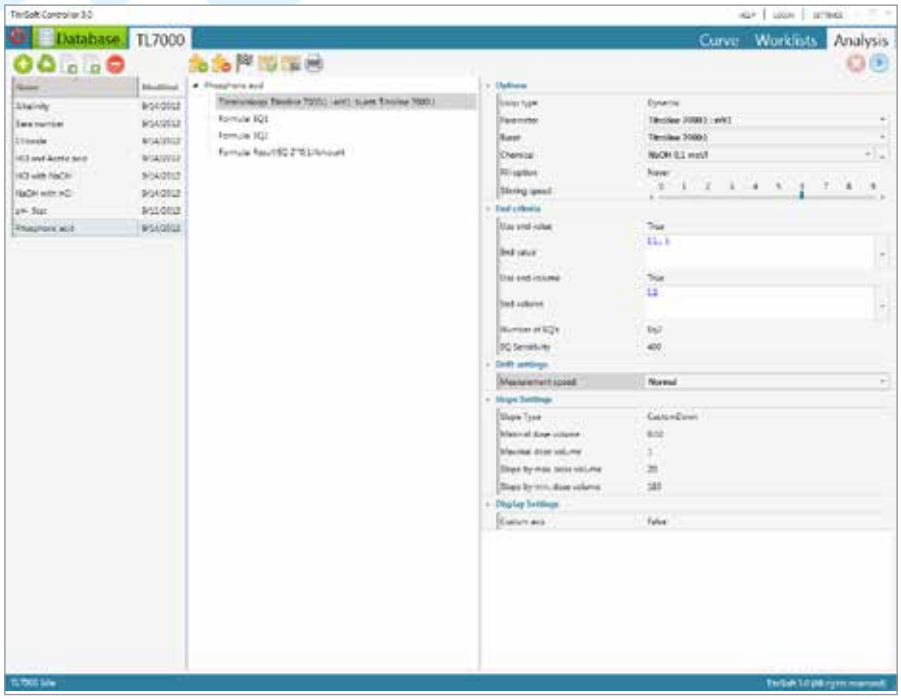
Each of these centers can be chosen at the menu bar.

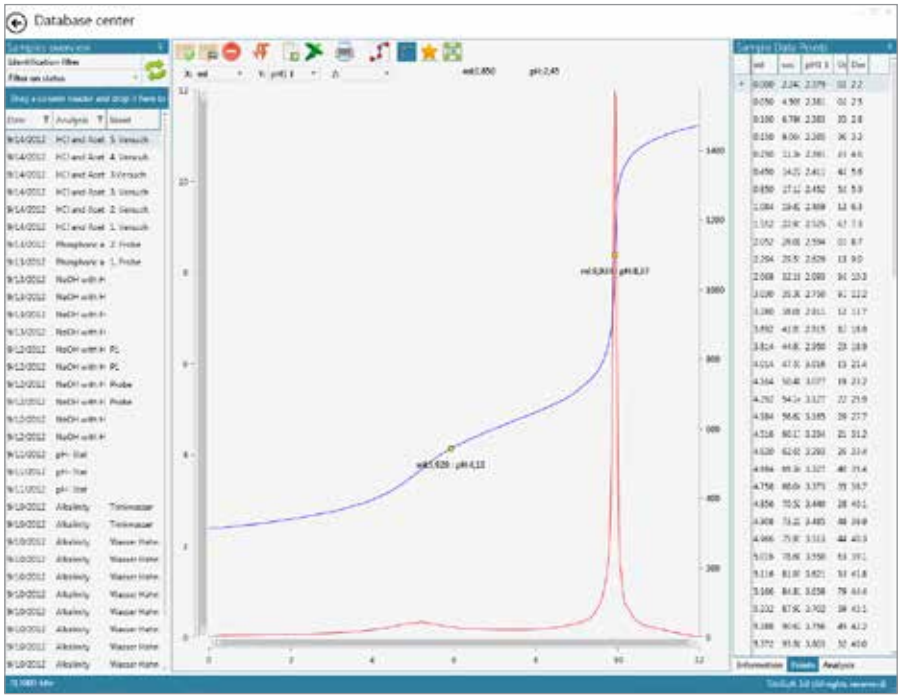
›Settings‹, the system configuration

In the system configuration, the software is set up for operation prior to running the first application, i.e. a configuration is set up with the connected hardware. The configuration of the attached hardware is automatically detected in a hardware scan. Each of these hardware configurations allows any number of "methods" and "work lists". Different configurations can work in parallel (see Connection Possibilities).

All TitriSoft users can be listed by their names. TitriSoft supports five user types. The Administrator has access to all configuration and software operation options. The "Administrator" has access to all configuration and software operation options. The "User" or "Advanced User" has the same rights as the Administrator but is not allowed to delete results, methods and worklists. Users are restricted to operation of the Titration Center which very much simplifies matters.

… clearly structured …





›Analysis‹,
your method center

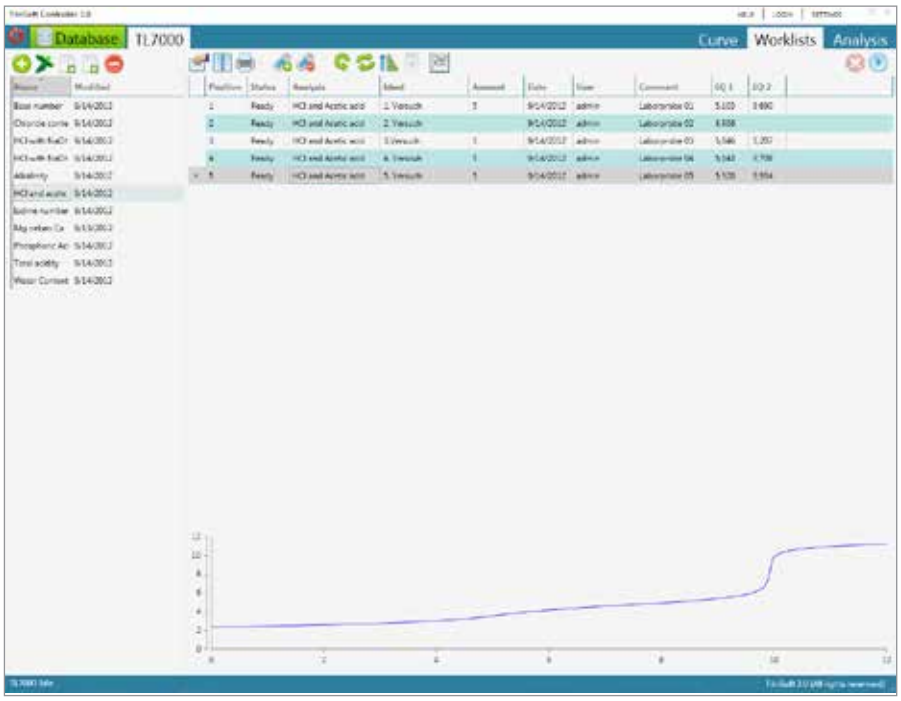
This is where you set up and save your titration methods. Even complex methods can be installed with a few mouse clicks. Adjustment of the titration parameters is facilitated by the use of symbolic slide controls. Functions such as waiting time, IF loops, repetition, dosings and measurements in addition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

›Database‹, your database

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.

Information on titrations performed can be displayed in the form of a diagram, results list or measured value list. You can optimize stored titration information in accordance with your requirements, e.g. add and store subsequent calculations or analyze titration curves and print it out together. Additionally, an export of the data to Excel and ASCII is also available.

… highly productive: TitriSoft 3.0



›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 if desired) the results at the end of a titration. The work list 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 *alpha* plus and TW 7400 sample changer, you can adjust various settings such as skip empty items, rinse and waiting options.

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.

TitriSoft 3.0 P – simply reliable …

In this case, the "P" stands for "pharmaceutical". "The TitriSoft 3.0 P fully meets all requirements of the FDA 21 CFR Part 11 regulation regarding „Electronic Records", „Electronic Signature" and „Audit Trail".

The FDA (i.e. **F**ood and **D**rug **A**dministration 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.

System requirements

For optimal and fast working with the TitriSoft 3.0 software your system should be equipped as shown below:

Interface: a free USB or RS232-interface per configuration

Computer: Pentium D (Dual-Core) 2 GHz or higher

Operating system: Windows XP, Vista or 7

RAM: minimum 2 GB

Hard disk:
minimum free storage volume 200 MB

Graphics card:
minimum resolution 1280 x 1024

Comparison between TitriSoft 3.0 and 3.0 P

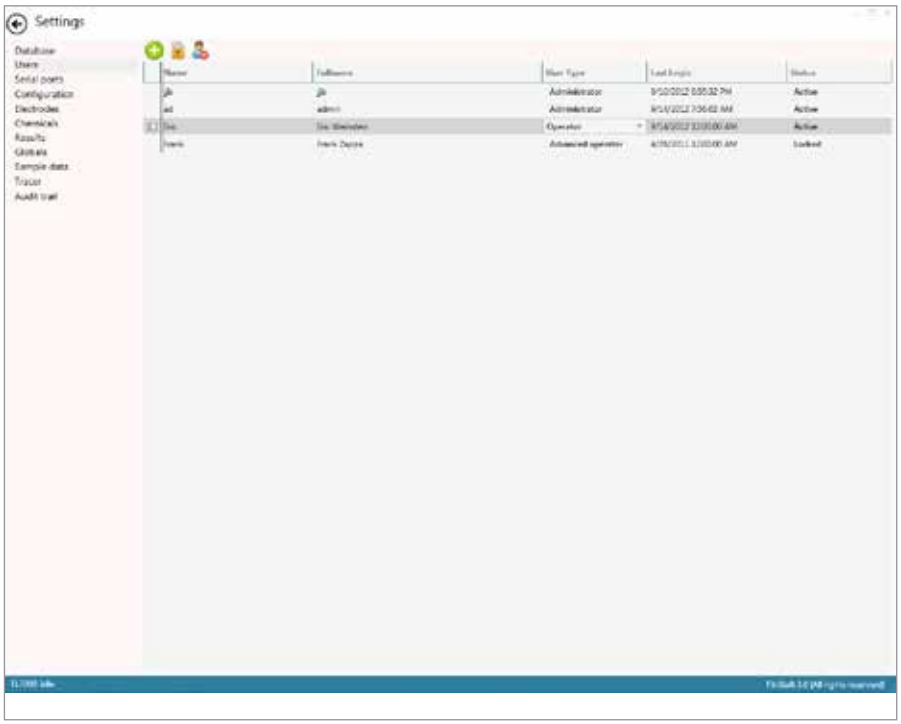
Functions	TitriSoft 3.0	TitriSoft 3.0 P
Electronic Record		■
Electronic Signature		■
Audit Trail		■
Controlled Access		■
Copies of Records		■
Manual with forms for SOPs, IQ, OQ, PQ and validation reports		■
Straightforward procedure	■	■
All types of titrations	■	■
Comfortable worklists	■	■
Online titration curves	■	■
Clear documentation	■	■
Perfect titration control by PC	■	■

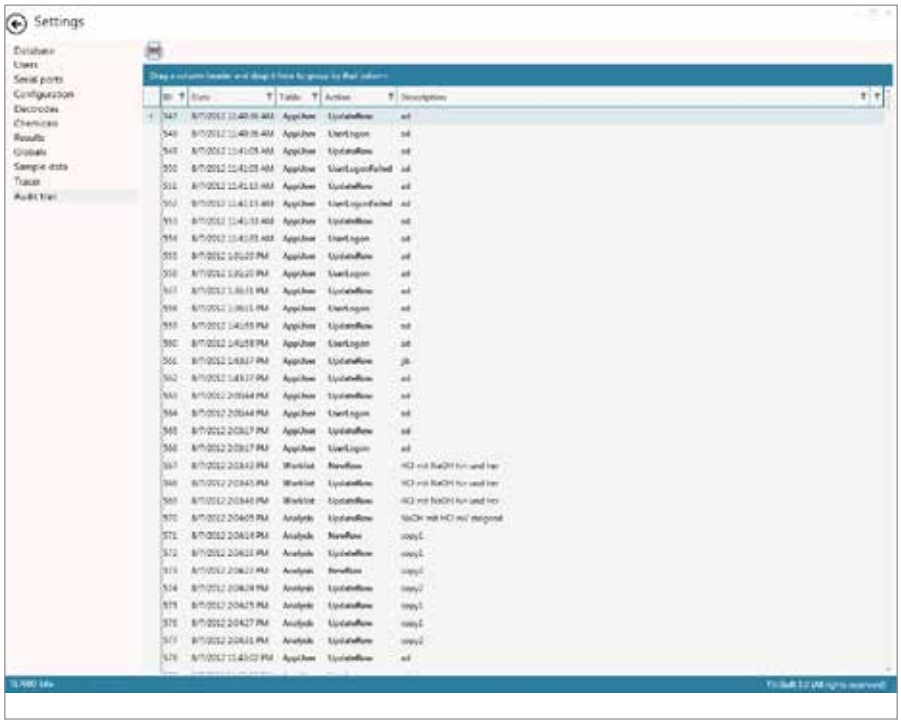
TitriSoft

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.

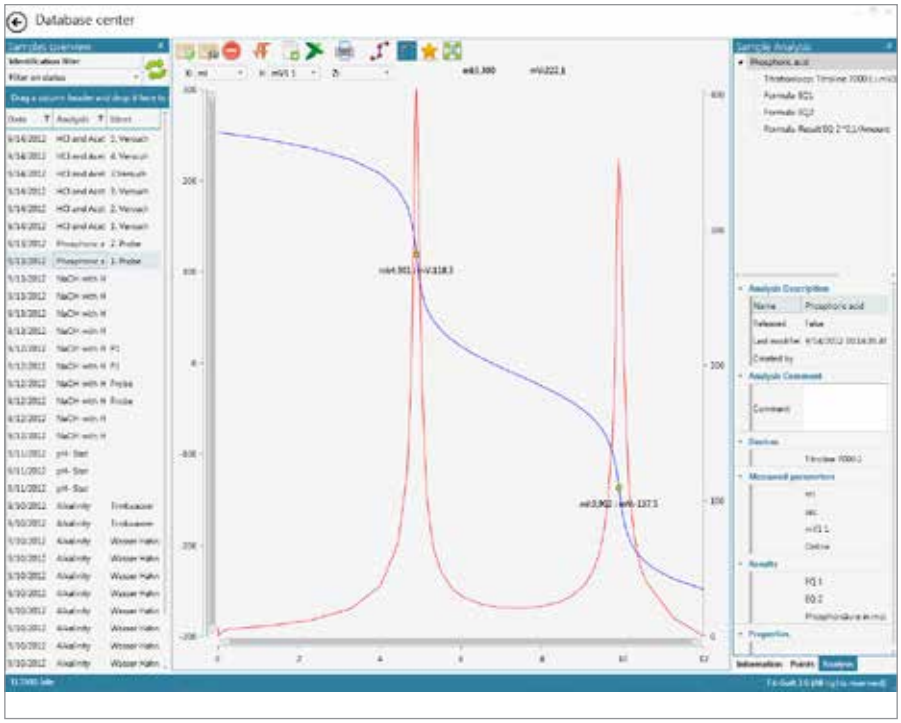
TitriSoft 3.0 P has 5 different access levels: The "Operator" level does only allow to carry out the routine titrations, whereas the "Advanced User" level is entitled to approve the methods. The highest level, the "Administrator" may set up the users and assign them the user rights. He even has the permission to delete records, but only after a copy of the database has been generated.





Audit Trail

The 21 CFR Part 11 prescribes that creating methods, modifying passwords or saving results, generates an entry in the Audit Trail. TitriSoft 3.0 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.



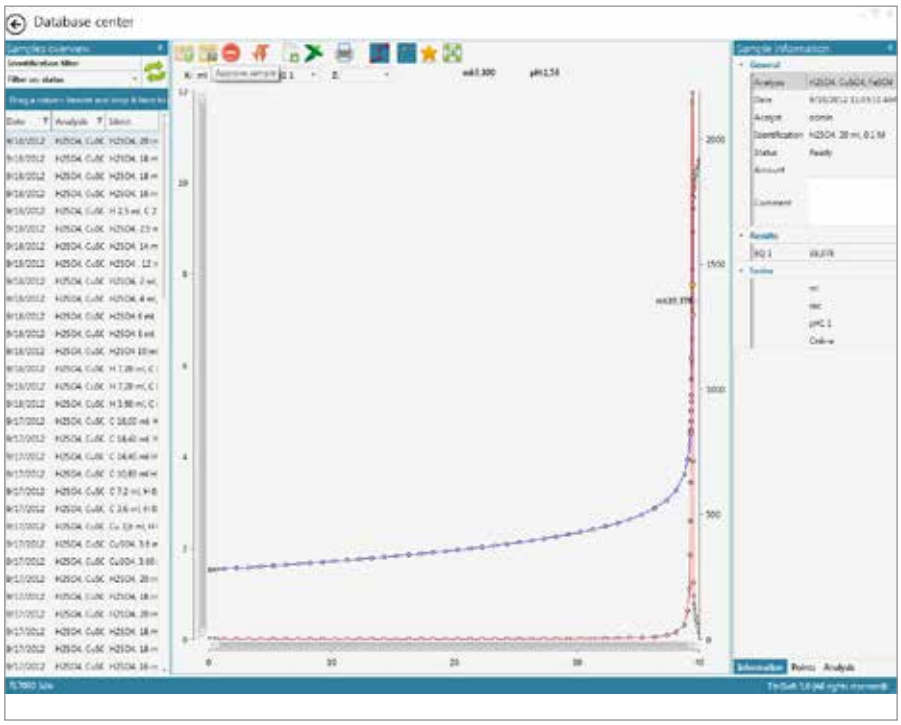
Electronic Records

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 already integrated in the software. The purchase of expensive third-party software for generating PDF files ist not necessary.

Of course the database is password protected against unauthorized access.

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.



riSoft 3 P

Specifications – Piston burettes TITRONIC® 500 and automatic

Features	TITRONIC® 500	TitroLine® 6000
Display	Color online graphic	Color online graphic
Measuring input pH/mV with reference input	–	■
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	2 x USB-A, 1 x USB-B 2 x RS232	2 x USB-A, 1 x USB-B 2 x RS232
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)	10,000	10,000
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	–	1 EQ
Particularly suitable for non aqueous titrations	–	–
Dead-stop-titration	–	■
pH-stat-titration	–	–
Water determination according to KF volumetry (10 ppm – 100 %, recommended)	–	–
Water determination according to KF coulometry (1 ppm – 5 %, recommended)	–	–
Standard methods	■	■
Number of user methods	15	15
Connection and control of autosamplers	–	–
Can be controlled with TitriSoft 3.0	■	–

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

Titrators TitroLine® 6000 / 7000 / 7500 KF / 7500 KF *trace* / 7750

TitroLine® 7000	TitroLine® 7500 KF	TitroLine® 7500 KF *trace*	TitroLine® 7750
Color online graphic	Color online graphic	Color online graphic	Color online graphic
■	–	–	■
■	–	–	■
■	■	■	■
–	–	■	
■	–	–	■
2 x USB-A, 1 x USB-B 2 x RS232	2 x USB-A, 1 x USB-B 2 x RS232	2 x USB-A, 1 x USB-B 2 x RS232	2 x USB-A, 1 x USB-B 2 x RS232
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
■	■	–	■
10,000	10,000	–	10000
■	–	–	■
■	■	–	■
■	■	–	■
■	■	■	■
2 EP	–	–	2 EP
2 EQ	–	–	2 EQ
■	–	–	■
■	■	–	■
■	–	–	■
–	■	–	■
–	–	■	-
■	■	■	■
50	50	50	50
■	–	–	■
■	■	■	■

Specifications – Piston burette TITRONIC® 500

Features	TITRONIC® 500	TitroLine® 6000
Measuring input 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
Measurement range pH	–	–3.0 to 18.00
Display resolution pH	–	0.001
Accuracy pH (without sensor probe)	–	0.002 ± 1 Digit
Measurement range mV	–	–2000 to 2000
Display resolution mV	–	0.1
Measurement input Dead stop (2 x 4 mm socket)	–	Connector (µA) for double platinum electrodes Polarisation voltage variably adjustable from 40 to 220 mV
Measurement range µA	–	0 to 100
Display resolution µA	–	0.1
Accuracy µA (without sensor probe)	–	0.2 ± 1 Digit
Measurement input temperature (2 x 4 mm socket)	–	Connector for Pt 1000 resistance thermometer
Measurement range temperature °C	–	–75 to 175
Display resolution °C	–	0.1
Accuracy °C (without sensor probe)	–	0.2 K ± 1 Digit
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
Display resolution °C	–	Polypropylene Polypropylene
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
Dosiing accury according 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)

TitroLine® 6000/7000/7500 KF/7500 KF *trace*/7750

TitroLine® 7000	TitroLine® 7500 KF	TitroLine® 7500 KF *trace*	TitroLine® 7750
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	–	–	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
–3.0 to 18.00	–	–	–3.0 to 18.00
0.001	–	–	0.001
0.002 ± 1 Digit	–		0.002 ± 1 Digit
–2000 to 2000	–	–	–2000 to 2000
0.1	–	–	0.1
Connector (µA) for double platinum electrodes Polarisation voltage variably adjustable from 40 to 220 mV	Connector (µA) for double platinum electrodes Polarisation voltage variably adjustable from 40 to 220 mV	Connector (µA) for double platinum electrodes	Connector (µA) for double platinum electrodes Polarisation voltage variably adjustable from 40 to 220 mV
0 to 100	0 to 100	–	0 to 100
0.1	0.1	–	0.1
0.2 ± 1 Digit	0.2 ± 1 Digit	–	0.2 ± 1 Digit
Connector for Pt 1000 resistance thermometer	–	–	Connector for Pt 1000 resistance thermometer
–75 to 175	–	–	–75 to 175
0.1	0.1	–	0.1
0.2 K ± 1 Digit	–	–	0.2 K ± 1 Digit
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 XX x 29,6 cm (W x H x D)	15.3 x 45 x 29.6 cm (W x H x D), height with interchangeable unit
Polypropylene	–	–	Polypropylene
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	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)
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)

The right electrode for your titration application

The applicable electrode for the titration application is a decisive factor for the accuracy and reproducibility of the results. In order to support you with selecting the appropriate electrode, we have summarized the according electrodes for the most important applications in the following.



Application	Electrode (w.o. temp.-sensor)	Electrode with integrated. temp.-sensor
Acid-base-titrations		
Aqueous, general strong acid and bases	A 7780	A 7780 1M-DIN-ID
Kjeldahl	A 7780	A 7780 1M-DIN-ID
Alkalinity	N 62, N 61	A 162-2M-DIN-ID
Aqueous, difficult applications	IL-pH-A120MF IL-pH-A170MF	A 162-2M-DIN-ID
Low ionic liquids	IL-pH-A120MF IL-pH-A170MF	A 162-2M-DIN-ID
Small sample amounts	N 5900 A	A 157 IL-MICRO-pHT-A-DIN-N
Titration with sample changer (100 – 250 ml vessels)	N 65	N 1051 A IL-pHT-A170-DIN-N
Titration with sample changer (50 ml vessels, micro)	N 5900 A	–
Non aqueous acid base-titrations		
TAN (ASTM 664)	N 6480 eth	–
OH-No, NCO-No, FFA saponification No. …	N 6480 eth	–
TBN (ISO 3771/ASTM 2896)	N 6480 eis	–
Epoxy value	N 6480 eis	–
Titrations with perchloric acid/acetic acid	N 6480 eis	–
Precipitation titrations		
Halogenides (chloride, "salt")	AgCl 62, AgCl 62 RG	–
Halogenides, sample changer	AgCl 65, AgCl 62 RG	–
Pseudo halogenides (cyanide …)	Ag 6280	–
Detergents	TEN 1100*	–
Redox titrations		
General, iodometric, permanganometric, cerimetric	Pt 62 Pt 6280	–
Iodine number, peroxid number	Pt 61	–
COD	Pt 61	–
Sample changer, general	Pt 6580	–
Sample changer, COD	Pt 5901	–
Dead stop (SO_2 bromine no. …) general	Pt 1200	–
Dead stop (SO_2 bromine no. …) sample changer, general and titration vessels	Pt 1400	–
Dead stop (SO_2 bromine no. …) sample changer micro	KF 1100	–
KF-titrations	KF 1100	–
Complexometric titrations		
Water hardness (Ca/Mg separated)	Ca 1100 A*	–
Water hardness, total	Cu 1100 A*	–
Copper, zinc, nickel, aluminia …	Cu 1100 A*	–

* An applicable reference electrode is required:. B 2920+ respectively. B 3520+

Ordering information: TITRONIC® 500, TitroLine® 6000 / 7000 / 7500 KF / 7500 KF *trace* / 7750

Type-no.	Order no.	Description
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 6000-M1/10	285220050	TitroLine® 6000 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 6000-M1/20	285220060	TitroLine® 6000 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 6000-M1/50	285220070	TitroLine® 6000 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 6000-M2/20	285220080	TitroLine® 6000 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 6000-M2/50	285220090	TitroLine® 6000 6000 basic unit with magnetic stirrer TM 235 and 50 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 low maintenance pH-combination electrode A 7780-1M-DIN-ID and buffer set.
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 7500 KF 05	285220810	Volumetric KF-Titrator, 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 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 7500 KF trace M1	285220860	Module 1, 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 1751, micro double platinum electrode KF 1150
TL 7500 KF trace M2	285220870	Module 2, coulometric KF-Titrator, scope of supply: basic titrator unit, generator electrode TZ 1752 without junction + connection cable, TM 235 KF titration stand with integrated stirrer and pump, stand rod, titration vessel TZ 1754, micro double platinium electrode KF 1150
TL 7500 KF trace M3	285220880	Module 3, coulometric KF-Titrator, scope of supply: basic titrator unit, generator electrode TZ 1753 with junction + connection cable, magnetic stirrer TM 235, stand rod, titration vessel TZ 1751, micro double platinum 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 junction + connection cable, TM 235 KF titration stand with integrated stirrer and pump, stand rod, titration vessel TZ 1754, micro double platinum electrode KF 1150
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

Accessories for TITRONIC® 500, TitroLine® 6000 / 7000 / 7500 KF / 7500 KF *trace* / 7750

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 r/min, 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.
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

Software TitriSoft 3.0

Type-no.	Order no.	Description
TZ 3071	285220717	Titration software for TitroLine® 7000, TitroLine® 7500 KF/7500 KF trace, TitroLine® 7750 and TitroLine® alpha plus
TZ 3072	285220727	Titration software like Version 3.0, but 21 CFR, part 11 compliant version

Data cable

Type-no.	Order no.	Description
TZ 3840	285220690	USB-connection cable type A (M), USB type B (M), 1,8 m
TZ 3081	1007979	TW alpha *plus*, Mettler AB-S, PG – balances, 5 m
TZ 3082	1007977	TW alpha *plus*, Sartorius-balances, 5 m
TZ 3087	1007976	TitroLine® 7000, TitroLine® 7750, TITRONIC® 500 or TITRONIC® *universal*, TW 7400, 1,5 m
TZ 3091	285223504	TITRONIC® *universal*, TITRONIC® 500 TitroLine® *easy*, TitroLine® 6000, 7000, 7500 KF, 7500 KF *trace*, PC, 5 m
TZ 3092	285223529	TitroLine® 6000,7000, 7500 KF, 7500 KF trace, Sartorius balances
TZ 3094	285223545	TITRONIC® *universal*, TITRONIC® *universal*, TITRONIC® 500, TITRONIC® 500, TitroLine® 7000, TitroLine® 7000
TZ 3097	285223578	TITRONIC® *universal*, TITRONIC® 500 TitroLine® *easy*, TitroLine® 6000, 7000, 7500 KF, 7500 KF *trace*, PC 1,5 m
TZ 3099	285223594	TitroLine® 6000,7000, 7500 KF, 7500 KF *trace*, Mettler AB-S, PG – balances, 1,5 m
TZ 3987	285217860	TitroLine® 7000, TitroLine® 7750, TITRONIC® 500 or TITRONIC® *universal*, TW 7400, 1,5 m

Ordering information:

Sample changer TW *alpha* plus and TW 7400

Type-no.	Order no.	Description
TW alpha plus, 230 V	1007290	Basic unit with integrated magnetic stirrer, incl. mains cable and connection cable for rod stirrer TZ 1581, 230 V
TW alpha plus, 115 V	1007291	Basic unit with integrated magnetic stirrer, incl. mains cable and connection cable for rod stirrer TZ 1581, 115 V
TW alpha plus 12, 230 V	1007292	Basic unit TW alpha plus with sample rack TZ 1452 for 12 samples, incl. titration head TZ 1463, mains cable, connection cable TZ 3084 and 20 beakers, 250 ml, low form, 230 V
TW alpha plus 12, 115 V	1007293	Basic unit TW alpha plus with sample rack TZ 1452 for 12 samples, incl. titration head TZ 1463, mains cable, connection cable TZ 3084 and 20 beakers, 250 ml, low form, 115 V
TW alpha plus 16, 230 V	1007294	Basic unit TW alpha plus with sample rack TZ 1459 for 16 samples, incl. titration head TZ 1463, mains cable, connection cable TZ 3084 and 20 beakers, 150 ml, low form, 230 V
TW alpha plus 16, 115 V	1007295	Basic unit TW alpha plus with sample rack TZ 1459 for 16 samples, incl. titration head TZ 1463, mains cable, connection cable TZ 3084 and 20 beakers, 150 ml, low form, 115 V
TW alpha plus 24, 230 V	1007296	Basic unit TW alpha plus with sample rack TZ 1454 for 24 samples, incl. titration head TZ 1469, mains cable, connection cable TZ 3084 and 30 beakers, 50 ml, high form, 230 V
TW alpha plus 24, 115 V	1007297	Basic unit TW alpha plus with sample rack TZ 1454 for 24 samples, incl. titration head TZ 1469, mains cable, connection cable TZ 3084 and 30 beakers, 50 ml, high form, 115 V
TW alpha plus MP, 230 V	1007305	Basic unit TW alpha plus with sample rack TZ 1459 for 16 samples, incl. titration head TZ 1467, washing unit MP 25, mains cable, connection cable TZ 3084 and 20 beakers, 150 ml, low form, 230 V
TW alpha plus MP, 115 V	1007306	Basic unit TW alpha plus with sample rack TZ 1459 for 16 samples, incl. titration head TZ 1467, washing unit MP 25, mains cable, connection cable TZ 3084 and 20 beakers, 150 ml, low form, 115 V
TW alpha plus CSB, 230 V	1007298	Basic unit TW alpha pluswith sample rack TZ 1444 for COD-24 samples according to DIN 38 409, incl. titration head TZ 1461, redox electrode Pt 5901, rod stirrer TZ 1846, titration tip TZ 1648, mains cable and connection cable TZ 3084, 230 V
TW alpha plus CSB, 115 V	1007299	Basic unit TW alpha pluswith sample rack TZ 1444 for COD-24 samples according to DIN 38 409, incl. titration head TZ 1461, redox electrode Pt 5901, rod stirrer TZ 1846, titration tip TZ 1648, mains cable and connection cable TZ 3084, 115 V
TW 7400	1007400	Basic unit without titration head and sample rack. With connection cable TZ 3987 for the connection on titrator TitroLine® 7000, power supply 100-240 V

Accessories for sample changer TW *alpha* plus and TW 7400

Type-no.	Order no.	Description
TZ 1444	285213836	Sample tray for TW alpha plus for 24 COD vessels according to DIN 38 409
TZ 1452	285214927	Sample tray for TW alpha plus for 12 sample vessels, incl. 20 beakers, 250 ml, low form
TZ 1454	285213844	Sample tray for TW alpha plus for 24 sample vessels, incl. 30 beakers, 50 ml, tall form
TZ 1459	285213166	Sample tray for TW alpha plus for 16 sample vessels, incl. 20 beakers, 150 ml, low form
TZ 1463	285213647	Titration head for TW alpha plus for 12 (TZ 1452) and 16 sample rack TZ 1459 with 7 drillings NS 14.5
TZ 1467	285213671	Titration head for TW alpha plus for 12 (TZ 1452) and 16 sample rack TZ 1459 with 7 drillings NS 14.5 incl. splash shield and rinsing spray
TZ 1469	285213884	Titration head for TW alpha plus for 24 pos. sample rack TZ 1454 with 4 openings (2 x NS 14,5 and 2 x NS 7,5) and 1 adapter for micro electrodes with 6 mm diameter.
TZ 3942	285217790	Sample rack for TW 7400 with 42 positions for 150 ml beakers low form or 250 ml beakers tall form
TZ 3948	285217800	Sample rack for TW 7400 with 48 positions for 100 ml beakers low form
TZ 3972	285217810	Sample rack for TW 7400 with 72 positions for 50 ml beakers tall form
TZ 1846	285215134	Rod stirrer long version with NS 14,5 for COD-reaction vessles according to DIN 38 409, part 41 zu Probenwechsler TW alpha plus
TZ 1847	285215175	Rod stirrer, short version with NS 14,5 for titration head TZ 1463, TZ 1467, TZ 1469, TZ 3942, TZ 3948 and TZ 3972
TZ 1545	285214232	Magnetic stirrer bar, 30 mm, 30 mm, 10 pcs. for TW alpha plus
MP 25 230 V	285216010	Membrane pump MP 25 with accessories (5 L - storage bottle, connection tubes, rinsing nozzle, connection cable) for TW alpha/TW alpha plus, 230 V
MP 25 115 V	285216010	Membrane pump MP 25 with accessories (5 L - storage bottle, connection tubes, rinsing nozzle, connection cable) for TW alpha plus and TW 7400, 115V

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980 065US *Version 09/2013*