The first address for Titration

TitroLine® 7800

SI Analytics

a xylem brand

Selection table titration – TITRONIC® and TitroLine®

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

Application	TITRONIC® 500	TitroLine® 6000	TitroLine® 7000	TitroLine® 7500 KF	TitroLine® 7500 KF *trace*	TitroLine® 7750	TitroLine® 7800
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	–	■	■	■	■	■	■
Cond measurement with ID sensors (IDS®)	–	–	–	–	–	–	■
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

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, electro-magnetic fields or pulses. The higher measuring accuracy raises confidence in your readings to a whole new level.

TitroLine® 7800 with accessories

- 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
- 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®)

Benefits
TitroLine® 7800

TitroLine® 7800 –
Featuring enhanced automation and additional methods

Besides the specifications of the series and the TitroLine® 7750, the TitroLine® 7800 provides more functions.

Ideal for measurements/titration tasks with pH and Cond.

Typical example:

Measurement of the pH value and Cond, then titration of the acid capacity.

Connections

Measurement and calibration with the highest accuracy

The wireless sensor recognition automatically recognizes SI Analytics ID and IDS electrodes which instantly send the specific data to the titrator. Therefore TitroLine® 7800 always uses correct calibration data. False measurements became impossible.

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:

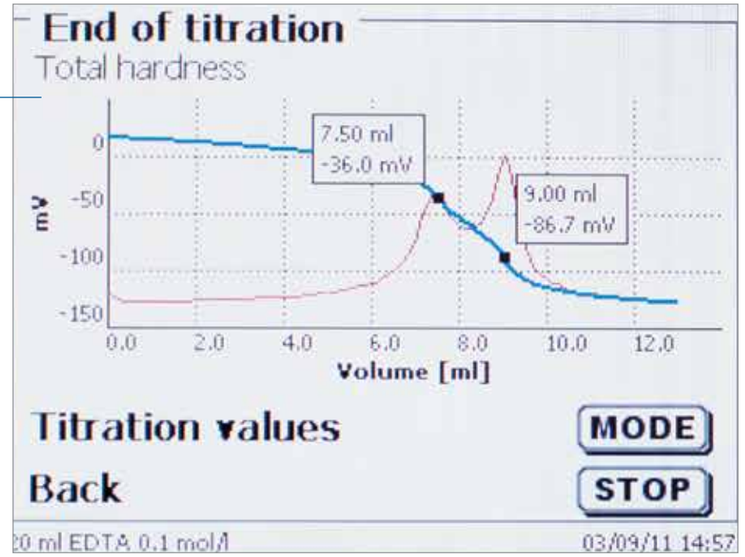
- Acid and base numbers in oils.
- Titrations in glacial acetic acid with perchloric acid.
- Hydroxyl, NCO (Isocyanate) number and further specific values.

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)



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® 7800 and can be used after the input of equivalent substance weight.

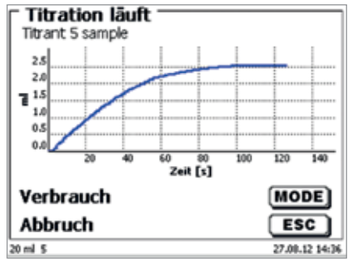
More equivalence points to expand application possibilities

Yes, it is now possible to detect and calculate up to two equivalence points during one titration. It is possible to determine both the calcium and magnesium hardness individually in a single step.

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.



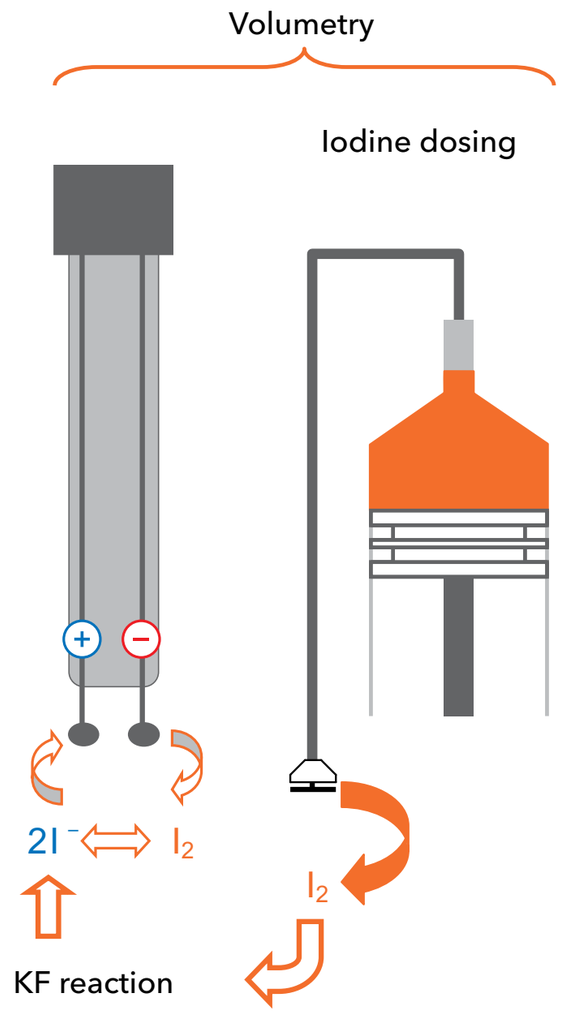
Karl Fischer Titration – the method for determining water

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 (fig.).

The way of dosing:



TitroLine® 7800 - Technical data

Display	Color graphics 3.5 inches -1/4 VGA TFT display with 320x240 pixels
Measurement input 1 (analogue) 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	- 3.0 ... 18.00 / - 2000 ... 2000 0.001 / 0,1 0.002 / 0.1 mV ± 1 Digit
Measurement range pH/mV Display resolution pH/mV Accuracy pH/mV (without sensor)	- 3.0 ... 18.00 / - 2000 ... 2000 0.001 0.1 0.002 0.1 mV 1 Digit
Measurement input 2 (IDS) Accuracy +/- 1 digit in dependence from the used IDS-electrode	pH 0.000 … 14.000 +/-0.004 pH mV +/- 1200.0 mV +/- 0.2 mV Temperature -5.0 … 105.0. °C +/- 0.2 °C Conductivity 0.00 … 2000 mS/cm +/- 0.5 % from m.v.
Calibration pH (analogue and IDS)	2 or 3 – point calibration with DIN/NIST or technical buffers. Own buffers can be programmed.
Calibration conductivity (IDS)	1 point with 0.01 mol/l KCl
Temperature compensation conductivity (IDS)	Automatic/manual nLF non-linear function natural waters according EN 27888 and ultra-pure water function, linear compensation from 0.000… 10.000 %/K
Measurement input Dead stop (2 x 4 mm socket) Measurement range µA Display resolution µA Accuracy µA (without sensor)	Connector (µA) for double platinum electrodes Polarization voltage variably adjustable 40 … 220 mV 0 ... 100 0.1 0.2 ± 1 digit
Measurement input temperature (2 x 4 mm socket) Measurement range temperature °C Display resolution ° Accuracy °C (without sensor)	For Pt 1000 resistance thermometer NTC 30 kOhm - 75 ... 175 -40 … 170 °C 0.1 0.2 K ± 1 digit/0.3 K ± 1 digit
Interfaces	1 x LAN, 2 x USB-A, 1 x USB-B 2 x RS 232
Balance connection	RS 232
Printer (USB-A)	HP PCL, Seiko DPU S445, PDF
Housing material	Polypropylene
Front keyboard	Polyester coated
Housing dimensions	15.3 x 45 x 29.6 cm (W x H x D), height with interchangeable unit
Ambient conditions	Ambient temperature + 10 ... + 40 °C for operation and storage
Weight	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 ... + 40 °C for operation and storage
Intelligent interchangeable modules (5, 10, 20 and 50 ml)	Valve: PTFE/ETFE Cylinder: borosilicate glass 3.3 (DURAN®) Hoses FEP, blue
Burette resolution (steps)	10,000
Dosing accuracy according DIN EN ISO 8655, part 3	Accuracy : >0.15 % Precision: >0.05 - 0.07 % (Depending on the used interchangeable unit)

Manual titration	■
Measurement pH. mV and cond. single and continous	■
Measurement parallel (e.g.. pH + cond.) single and continuously	■
Solution preparation (manual or automatic when connected to balance)	■
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)	■
Standard methods	■
Number of user methods	50
Connection and control of autosamplers	■
Can be controlled with TitriSoft 3.2	■

Measurement range/ resolution/ Accuracy (all values ±1 digit), according to the used ID sensor (IDS®)	pH	0.000 … 14.000 +/-0.004 pH
	mV	+/- 1200.0 mV +/- 0.2 mV
	temperature	-5.0 … 105.0 °C +/- 0.2 °C
	conductivity	0.00 … 2,000 mS/cm +/- 0.5 % v. Mw.
Calibration pH	calibration points	1-, 2-, 3-point
	stored buffers	SI Analytics® technical and DIN buffer
Calibration cell constant cond, according to the used ID sensor (IDS®)	solid	0.475cm-1; 0.100cm-1; 0.010cm-1
	calibratable (1 point)	0.450 to 0.500cm-1, 0.800 … 0.880 cm-1, standard: 0.01 mol/L KCl
	adjustable	0.250 … 25.000cm-1; 0.090 … 0.110 cm-1
Temperature compensation cond, according to the used ID sensor (IDS®)	set-up	automatically/manually
	temperature coefficient	nCond: non-linear function natual waters after EN 27 888 and high-purity water function
		Linear compensation 0.000 … 10.000 %/K
		no compensation

IDS® Electrodes - The intelligent sensors

When determining the pH value, there are very high requirements of the sensor and the transmission of the measuring value from the sensor to the measuring device. The sensitive measuring signals and very high interior resistors of the sensors require a very complex shielded signal transfer to the measuring device in analog systems. If there is moisture present on the contacts, this can change the measuring value all the way to a complete failure of the measurement. This risk is eliminated by the IDS technology. The measuring value is processed in the sensor, then digitalized and transmitted to the device without interference.

When the IDS® sensors are connected to the measuring device, they automatically identify themselves with their serial numbers and type designation and transmit their calibration data to the device. With conventional systems, the sensor must be calibrated with every sensor change, as the calibration data is merely saved in the devices and is only available with the combination device-sensor. The IDS® concept helps here as well due to its calibration, which is saved in the sensor. Every sensor brings along its own calibration. There is no mandatory calibration when the sensor is changed in order to obtain a safe measurement.

The already proven analog SI Analytics sensors are used as sensors. The possibility to distinguish between sensors of the same type by their serial numbers allows the easy allocation and documentation of electronically recorded and saved measurement results.

IDS® Sensors

- The measuring signals are transmitted without interference
- Perfect galvanized separation
- Resistant against environmental influences
- Effortless allocation and documentation of the sensor to electronically captured and saved calibration results
- Highest possible operator comfort and measuring accuracy

Advantages
IDS® Electrodes

Order information

Titrators

Type no.	Order No	Description
TitroLine® 7800	285220980	TitroLine® 7800 basic unit with two measuring inputs, one analogue and one digital (IDS) measuring input
TitroLine® 7800	285220990	TitroLine® 7800 basic unit with two measuring inputs, one analogue and one digital (IDS) measuring input, with magnetic stirrer TM 235

Electrodes, exchangeable units and further accessories have to be ordered separately

Required accessories for the volumetric KF titration

Type no.	Order No	Description
TM 235 KF, 115-230 V	285220900	Titration 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 ... 240 V)
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
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 1789	285221120	Starter kit KF consisting of molecular sieve, needles with syringes and glass wool

Recommended exchangeable units for the KF titration

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

Order information

IDS® Sensors

Type-Nr.	Order No.	Description
A 157 IDS		IDS® 4 pole conductivity cell, plastic shaft, 3 m cable with digital plug, sensor material graphite, cell constant 0.475 cm-1, temp.-sensor NTC 30 kOhm, length 120 mm, 15.3 mm Ø, -5...+80 °C
A 162 IDS	285100120	Glass shaft, Pt junction, electrolyte KCl 3 mol/l, Silamid® reference, temp. sensor NTC 30 kOhm, sphere membrane, A glass, 1.5 m fixed cable with digital plug, length 120 mm, 12 mm Ø, -5...+100 °C, 0...14 pH
A 7780 IDS	285101080	Glass shaft, 3 x ceramic junction, gel electrolyte, Silamid®-reference system, temperature sensor NTC 30 kOhm, sphere membrane, A-glass, 1.5 m fixed cable with digital plug, length 120 mm, 12 mm Ø, -5...+80 °C, 0...14 pH
BlueLine 14 pH IDS	285129140	Glass shaft, platinum junction, electr. KCl 3 mol/l, Ag/AgCl-reference system, temp.-sensor NTC 30 kOhm, cone membrane, A-glass, 1.5 m fixed cable with digital plug, length 120 mm, 12 mm Ø, -5...+100° C, 0...14 pH
BlueLine 31 RX IDS	285129310	Glass shaft, ceramic junction, electrolyte KCl 3 mol/l, Ag/AgCl-reference system, temp.-sensor NTC 30 kOhm, sensor platinum disk 4 mm Ø, 1.5 m fixed cable with digital plug, length 120 mm, 12 mm Ø, -5...+100 °C
FDO1100IDS	285202440	IDS® optical oxygen sensor (photoluminescence), plastic shaft, temperature sensor NTC30kOhm, 1.5 m fixed cable with digital plug, length 150 mm, 15.3 mm Ø, 0...+50 °C
LF413T IDS	285202410	IDS® 4 pole cell, plastic shaft, 1.5 m cable with digital plug, sensor material graphite, cell constant 0.475 cm-1, temp.-sensor NTC 30 kOhm, length 120 mm, 15.3 mm Ø, -5...+80 °C
LF413T3MIDS	285202420	IDS® 4 pole conductivity cell, plastic shaft, 3 m cable with digital plug, sensor material graphite, cell constant 0.475 cm-1, temp.-sensor NTC 30 kOhm, length 120 mm, 15.3 mm Ø, -5...+80 °C
LF413T3MForkIDS	285206290	IDS® 4 pole cond. cell for small sample volumina, plastic shaft, 3 m cable with digital plug, sensor material graphite, cell constant 0.47 cm-1, temp.-sensor NTC 30 kOhm,minimum immmersion depth 16 mm, length 120 mm, 15.3 mm Ø, -5...+80 °C

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Pricing on any accessories shown can be found by keying the part number into the search box on our website.

The specifications listed in this brochure are subject to change by the manufacturer and therefore cannot be guaranteed to be correct.
If there are aspects of the specification that must be guaranteed, please provide these to our sales team so that details can be confirmed.

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