

On-line, automatic titration of a wide array of chemical water parameters



Flexibility in titration methodology

Potentiometric or (photo) colorimetric titration — the flexible analyzer mainframe of the **TitriLyzer®** Series of On-line Titrimetric Analyzers allows to carefully select the most suitable titration methodology in function of the application, parameter and measuring range.

Advanced features

- Straight-forward design, single methodology, single parameter, factory set measuring range
- Complete separation between electronics and wet part
- Smart features and add-on units reduce down-time and unnecessary checks substantially
- Up to three (3) sampling points possible
- Incorporated industrial PC with AppliTek controller software

Application fields

From mg/L up to g/L measuring ranges

On-line monitoring of chemical parameters and quality indices in clean and dirty water types:

- Boiler feed water / steam cycle monitoring
- Anaerobic digestion control
- Drinking water monitoring
- Waste water monitoring

High analytical performance

- Reduced reagent consumption by batch-wise operation principle and high precision titration techniques
- Smart features: automatic validation and cleaning
- High sensitivity and selectivity
- Factory configured, tested and calibrated



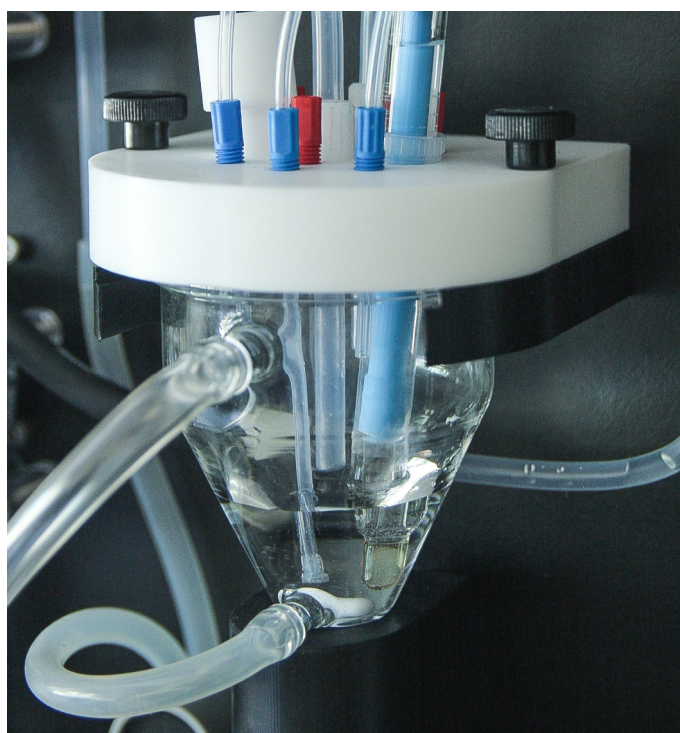
TitriLyzer®

Series of On-line Titrimetric Analyzers

Introduction

Titration involves determining the analyte(s) of interest by the addition of accurately known volumes of standardized titrant to a sample solution. The **TitriLyzer®** Series of On-line Titrimetric Analyzers are state of the art titration systems equipped with a high precision dispenser system and other quality components, available at an attractive price/quality ratio. The inherent batch-wise operating principle of the analyzer, coupled with AppliTek's controller software, provides users the following advantages:

- To program the analysis sequence according to your needs
- To introduce rinsing and cleaning after each analysis cycle
- To limit the loading of the electrodes
- To reduce reagent consumption



Titration methodology

AppliTek uses two distinct titrimetric techniques in function of the measuring range, the application and parameter.

Acid-base, redox or precipitation titration are typically used in the **potentiometric** configuration, where the endpoint is determined by use of a pair of electrodes or a combination electrode, i.e. the indicator and reference electrode. The electrodes for this kind of titration are chosen that a change in potential of the titration solution is optimally detected. In the **(photo)colorimetric** analyzer configuration, color change is used to determine the endpoint of the titration. The color change is accurately measured by AppliTek's own compact photometer, a design with high sensitivity and zero contact between sample and optical parts. Its narrow-band optical filter eliminates any interference from ambient light.

Smart functions

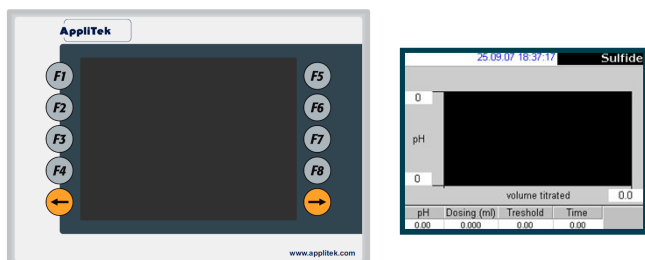
Designing a robust, automated analyzer mainframe is not merely restricted to excellent analytical specifications. It is common that repetitive and peripheral actions are necessary just to keep the analyzer running. AppliTek's controller software automates these actions and assures enhanced performance, reduced down-time and negligible operator intervention.

Automatic validation can be carried out with a standard solution with a known concentration in order to check the analysis program and analyzer functionality. An automatic cleaning cycle of the sample lines and vessel eliminates unnecessary cross interference in the analysis stage. The sequence and interval of validation and cleaning, as well as the analysis cycle are user programmable.

Image: close-up of the analysis vessel inside the TitriLyzer®.

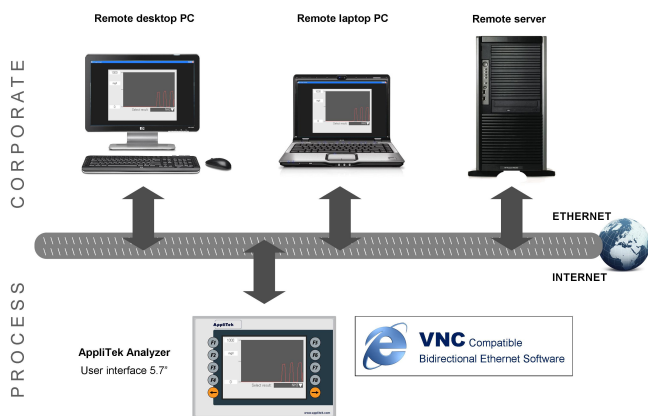
Data exchange and supervision

All analysis procedures of the **TitriLyzer®** Series of On-line Titrimetric Analyzers are controlled by the incorporated industrial PC/controller. Gaining access and exchange information with your analyzer system is easy since the controller coordinates all tasks and job files within a LAN network.



Above: industrial controller with 5.7" user interface. Function button F6 allows to display the titration curve in real-time.

All actions and logs are controlled by the industrial PC, which generates large amounts of information. The incorporated software flexibility minimizes physical operator intervention. The analyzer screen (the client) can remotely be taken over by means of LAN Ethernet software (such as VNC software). Authorized users can carry out all manual operations and settings from a remote PC, such as trouble-shooting before doing any physical intervention and capturing cross-platform screenshots for reports.



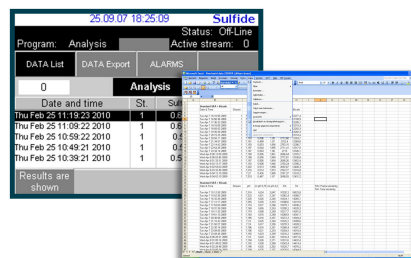
Analysis of multiple streams

AppliTek's integrated multiplexing unit **ModuPlex®** consists of extra solenoid valves controlled by a special valve control software. This option enables you to monitor up to 3 streams sequentially, thus reducing the cost per sampling point. Results of each stream can be communicated through individual analogue outputs.

Image: example of TitriLyzer® in an IP65 cabinet for outdoor use.

Data logging

The incorporated industrial PC has a solid state data logger. A history of the records of the last 1,000 analysis results can be visualized in a chronological data table and equally be exported as Microsoft Excel files through the sealed USB port outside the analyzer cabinet.



Hardware and analyzer enclosures

The **TitriLyzer®** Series are equipped with a new analyzer enclosure consisting of a solid steel back, combined with an ergonomic ABS hinged part containing the actual analytical part. Purging with instrument air is possible in case of extreme humidity or risk of accumulation of corrosive gases. The transparent door allows instant visual inspection of the wet-chemical part. The analyzer can also be integrated in an IP65 rated protective cabinet for outdoor use or use in any atmosphere where risk of ingress of dirt or moisture is considerable.



Technical specifications

Parameters

Please check the respective datasheet for more details on the analysis method.

Acetic acid	
Acidity	
Alkalinity	
Aluminium	▲
Ammonia	▲
Bicarbonate	
Calcium	▲
Chloride	
Chlorine	▲
Chlorine (free)	▲
Chromium III	▲
Chromium VI	▲
Copper	▲
Cyanide	▲
Fatty acids (volatile)	
Fluoride	
Formaldehyde	
Hardness (total)	▲
Hydrochloric acid	
Hydrogen fluoride	
Hydrogen peroxide	
Hydroxide	
Iron II	▲
Iron III	▲
Lime	
Magnesium	▲
Nitrite	
Oxalic acid	
Phosphoric acid	
Potassium hydroxide	
Sodium hydroxide	
Sodium hypochlorite	
Sulphate	
Sulphide	▲
Sulphite	
Sulphuric acid	
Total hardness	
Volatile fatty acids	

▲ Remark: analysis of this parameter is also available by colorimetry.

Utilities

Power

220 - 240 VAC, 10 A, 50 Hz
Max. power consumption: 150 VA
Other voltages available on request

Instrument air

Dry and oil free according to ISA-S7.0.01-1996 quality standard for instrument air

Demineralized water

For rinsing, calibration and/or dilution

Drain

Atmospheric pressure, vented, min. Ø 64 mm

Earth connection

Dry and clean earth pole with low impedance (< 1 ohm) using an earth cable of > 2.5 mm²

Environmental data

Ambient operating conditions

10 °C – 30 °C +/- 4 °C deviation at 5 - 95% relative humidity non-condensing
(50 °F – 86 °F +/- 7.2 °F deviation)

Reagent temperature

Keep between 10 °C - 30 °C (50 °F - 86°F)

Sample pressure

Atmospheric up to 0.1 bar (1.45 psi)
Note: higher sample pressures on request

Sample flow rate

10 - 30 ml per minute

Sample particulates

Maximum size 200 µm, < 0.1 g/l

Mechanical data

Protection class

Analyzer cabinet: IP55
Touch screen/Industrial PC: IP65

Cabinet and materials, hinged part

Thermoform ABS
Bottom: leak detection
Door: antistatic plexiglass

Cabinet and materials, wall section

Galvanized steel, powder coated

Dimensions

69 cm (27.2") x 46.5 cm (18.3") x 33 cm (13")
(H X W X D)

Total weight

25 kg (55 lbs.)

Control and communication

User interface / controller

Industrial PC with 5.7" TFT colour user interface, compact flash memory
Backlit touchscreen, brightness adjustable

Data handling, logging and security

- Standard TCP/IP Ethernet
- Log files with 1000 values/result are stored
- Sealed USB port for data download/upload
- User interface with administrator access and menu keys activated/inactivated
- Data retention in case of power failure, initialization program for safe status after restart

Analogue outputs

Max. 6 AO, active 4 – 20 mA (max. 500 Ohm load)

Analogue inputs

Max. 4 AI

Alarms (digital outputs)

- Malfunctioning alarm (potential free contact)
- Result alarm (potential free contact)

Digital outputs (potential free)

Max. 24 DO

Digital inputs (potential free)

Max. 6 DI

RS232 / RS485 / MODBUS

Optional

Options / add-on units

Settling / Dilution

EZ-Settler® automatic sampling/ settling/ dilution system for saturated or dirty matrices

Filtration

MicroSize® self-cleaning microfiltration unit, various pore sizes

Reagent level detection

Installed on reagent containers; alarms are generated by controller software

Multiple streams

ModuPlex® 2 or 3 streams (6 on demand)

Outdoor cabinet

IP65

Certification

CE approval

Certified to CE approval

Factory Acceptance Test (FAT)

At AppliTek NV, Belgium.