pg instruments

analytical instruments for science

AUTOMATIC

Titration System

NEW

pg instruments

Automatic Titration System

PG Instruments – a leader in the development of first class scientific instruments – introduces the brand new Automatic Titration System.

Titration is a fundamental chemical analysis procedure, whereby the concentration of a chemical substance in solution is determined by reacting it with a measured amount of another chemical.

PG Instruments new Automatic Titration System performs this analysis using a motor driven dispenser, with a stirred reaction vessel and electrodes which sense the completion of reaction by measuring the difference between two electrodes. By using this instrument, it is possible to increase accuracy, repeatability and reproduce ability, whilst minimising the errors in calculation and documentation.

The system comes with a two-point auto calibration and standardisation (zero offset), capable of displaying pH and mV of the sample, with temperature compensation. The system accepts a variety of electrodes to cater for various applications in different fields.

Titration

- ***Incremental*** *– incremental titration operates with user selectable fixed dose and fixed intervals until the end point is detected or volume limit is reached.*
- ***Equilibrium*** *– universal and dynamic titration. In this titration the dose and time automatically get tuned to the titration trend with evaluation end point.*
- ***pH Cut-off/STAT*** *– in pH cut-off mode, the end point is determined in a pre-selected pH window – in pH STAT mode, the pH value is maintained until the pre-selected time interval is fulfilled.*

The system has been developed for the following:

- *Acid-base or aqueous titration*
- *Redox titration*
- *Complexometric titration or EDTA titration*
- *Blank titration*
- *Silver Assay Titrations (As per BIS 2113:2002)*
- *Non-aqueous titration*
- *Argentometric or Precipitation titration*
- *Voltametric titration - Karl Fischer Titration*
- *Back titration*

The system has user selective end point result calculation as follows:

- *Result calculation by highest potential change*
- *Result calculation by last potential change*
- *Result calculation with selected potential change*
- *Result calculation with potential change in window or selected parameters e.g. TAN/TBN analysis.*

Features

Advanced user-friendly Micro-Processor Controller, state-of-the-art design with alphanumeric splash-proof soft keyboard and interactive software in dialogue mode for ease of operation with protection against invalid entries.

Vortex stirrer for vigorous and homogenous stirring, with specially designed glass propeller for chemical inertness.

A quickly interchangeable calibrated burette with intelligent recognition for its volume size. Burette factor for dispensing corrections, also available for true end point calculations.

Temperature Sensor with 4-line measurement technique ensures correct temperature indication.

Composite Differential Electrode Amplifier unit for Potentiometric and Voltametric/Karl Fischer Titrations, with connectivity to various electrodes.

During titration, measured variables or the pH value is shown on the display together with dispensed volume and number of EP's detected.

User selectable End Point (EP) evaluation up to 9 EP's during the run, and calculation by first, last, largest, all or selected EP's with display of results and printout.

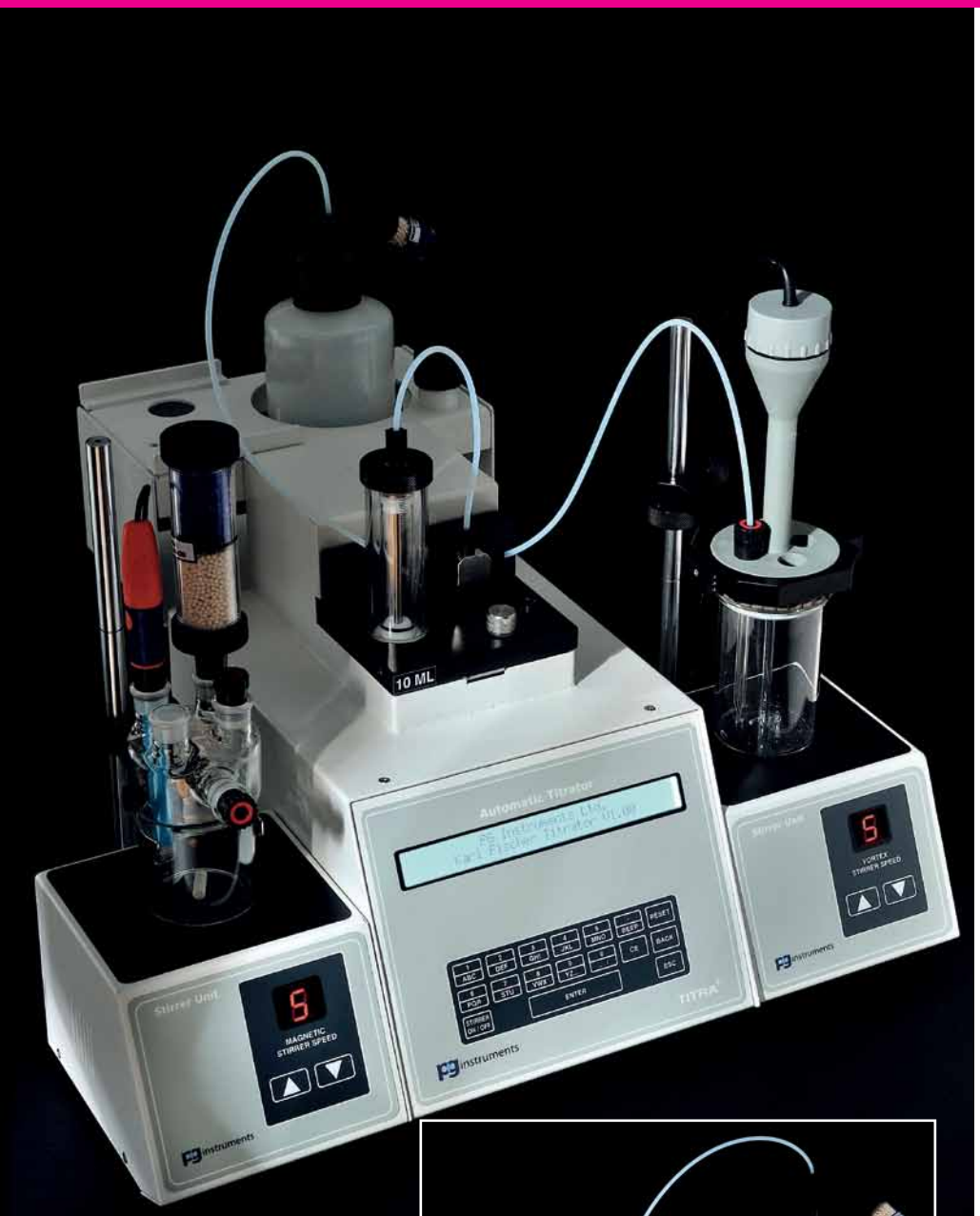
Reprocessing of threshold and recalculation of EP without performing the new run.

Alphanumeric entry of sample name, titrant name, identification number, date with type of electrode used for authentication.

Daily auto incremented run number and factory entered customer name and instrument Serial Number shown on report printouts, making the system Fully GLP Complaint.

Dispenser facility for fixed volume dosing or dilution, allowing manual titration with user defined dose and mV indication.

Pre-dispense facility with selectable dose and time, for quick titrant without disturbing the titration trend.



PG Instruments Automatic Titration System combined with Karl Fischer

Also available from PG Instruments the standalone Karl Fischer

The PG Instruments Automatic Titration System can be converted to perform Karl Fischer titrations by simply changing the burette assembly. All the specifications of the Karl Fischer are applicable – see additional Karl Fischer specification in this brochure.

Features continued

Tirtrant temperature factor for volume correction.

Automatic evaluation of molarity for standardisation of titrant, storage of 20 molarities and their retrieval for calculation.

Compliant to ASTM D664 and D4739 for TAN and TBN for oil samples.

Recalculation facility to obtain printout in different units such as molarity, factor % assay (wt), % voume (ml), ppm, mg/l, mg/g, ml/g, g/l, meq/l, mol/kg, TAN & TBN for oil samples.

Reports

User programmed selectivity for reports, complying with GLP requirements:

- *Report giving parameter and result*
- *Data table giving mV, pH, mV/ml, 2nd derivative and volume µ*
- *Graphics report giving mV v µ titration curve*
- *Graphics report first derivative graph v sµ titration curve*
- *Graphics report of two derivative curves*
- *Report of method parameters for 50 methods*
- *Condensed report for titration parameters and results*
- *Auto evaluation report for multi EP samples*
- *Reports can be obtained even after resetting or power failure*
- *Real Time Clock (RTC) for time display and report printout with run time indication*
- *Balance interface, directly transfers the sample weight*
- *Two tier user password protection*

Other Options

Availability of optional accessories to perform titrations from 5°C to 80°C

Data downloading facilities to PC with Windows based PC software

IQ, OQ, PQ documents available.

Specifications

Automatic Titration System

Principle	*Volume determination by equivalent point, end point or pH STAT*
Control	*Micro-Processor based*
mV Range	*=/- 3200mV*
Accuracy	*+/- 0.1mV (+/- 0.0016pH)*
Amplifier Input Impedance	*>10^{12} Ohms*
Burette Resolution	*1/5000 for 5ml, 1/10000 for 10ml, 1/50000 for 25ml*
Filing Time	*<20S*
Keyboard	*Alphanumeric splash-proof polyester soft keys.*
Titration Head	*Manual Stand with swivelling arm*
Stirrer System	*Microcontroller based variable speed, high torque vortex stirrer with digital indicator. (Magnetic Stirrer Optional)*
Sensors	*· Electrodes for Potentiometric titration (pH, Ion, Redox, Argentometric)* *· Any Combination Electrode* *· Differential Electrode System comprising sensing (indicator) Electrode with various adaptors such as BNC connector, and Reference Electrode with 4mm Connector* *· Electrode for Karl Fischer with BNC/TNC Connectors* *· Temperature Sensor.*
Calibration	*3-point Calibration with entered buffer values and standardisation with pH 7 Buffer*
End Point Detection	*· Potentiometric* *· Voltametric* *· Thermometric & Photometric*
Cut-off Criteria	*· Volume* *· End Point* *· mV/pH*
Analysis Methods	*· Titrations* *· Acid -Base* *· Non-aqueous* *· Redox* *· Precipitation* *· Complexometric* *· Back Titration* *· Karl Fischer*
Results & Concentration Units	*· Molarity* *· % Assay (wt)* *· % Volume (ml)* *· ppm, mg/l, mg/g, g/l, meq/l, mol/kg, TAN and TBN for Oil Sample*
Method Storage	*50 methods with Parameters*
Titrant Molarity Storage	*20 Values*
Report Format	*· Method Parameters* *· Titration Analysis Report* *· Titration Analysis Condensed Report* *· Titration Data Table* *· Titration Graphic Report* *· Micro Litre v mV* *· Micro Litre v First and/or Second Derivative* *· Micro Litre v Time* *· Auto Evaluation Report* *· Statistics Report* *· End Point Titration Report* *· Calibration Report*
Input/Output peripheral Interface	*· Parallel Port for Printer* *· Serial Ports for Balance, Auto-Sampler and PC*
Power	*110V/ 230V 50Hz/60Hz*
Environmental Conditions for Operation	*· Laboratory Use* *· Temperature Ambient to 45°C* *· Humidity 5 - 90% Non Condensing*

Karl Fischer

Principle	*Karl Fischer Method of Volumetric Water Determination*
mV Range	*+/- 3200mV*
Accuracy	*+/- 1mV*
End point Detection	*Voltametric*
Polarising Current Range	*1uA to 80uA in 8 steps. User selectable via manual keyboard entry*
Measuring Range	*10ug to 500ug*
Sensor	*Dual Pin Platinum Electrode*
Burette	*5ml or 10ml capacity interchangeable with auto recognition*
Burette Resolution	*1/5000 for 5ml and 1/10000 for 10ml.*
Results	*mg/ml, %, ppm, mg/g, and on line leak rate with cumulative titrant consumption*
Power Requirements	*110V/ 230V 50Hz/60Hz*
Operation	*Laboratory Based*
Temperature	*Ambient to 45°C*
Humidity	*5 to 90% non condensing*
Drying Oven	*10°C to 350°C*

The highly qualified and long experienced team at PG Instruments Ltd are recognised experts in electrochemistry and relevant technology. They have been developing and manufacturing analytical instruments for science for over a decade and have a worldwide recognised reputation for excellence in their field.

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