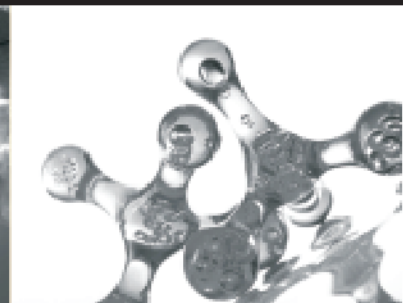


Auto Titrator



LABINDIA[®]
Where commitment is culture



Titration is the fundamental chemical analysis procedure whereby concentration of chemical substance in solution is determined by reacting it with measured amount of another chemical. Auto titrator performs this analysis using motor driven dispenser, stirred reaction vessel and electrodes which sense the completion of reaction by measuring the potential difference between two electrodes. Making use of this instrument, it is possible to increase the accuracy, repeatability, reproducibility and minimize the errors in calculation and documentation.

The instrument provides following modes of Titrations :

• **Incremental:**

Incremental titration operates with user selectable fixed dose and fixed intervals till the end point is detected or volume limit is reached.

• **Equilibrium:**

This is universal and dynamic titration. In this titration the dose and time automatically get tuned to the titration trend with evaluation of end point.

• **pH Cut-off/STAT:**

a) In pH cut-off mode, the end point is determined in a pre-selected pH window.

b) In pH-STAT mode, the pH value is maintained until the pre-selected time interval is fulfilled.

The following Titrations are possible with TITRA

- Acid-base or aqueous titration
- Redox titration
- Complexometric titration or EDTA titration
- Blank titration
- Silver Assay Titrations (As per BIS 2113 : 2002)
- Nonaqueous titration
- Argentometric or Precipitation titration
- Voltametric titration / KF Titration
- Back titration

Applications

- Pharmaceuticals and Bio-Chemistry
- Food and Beverages
- Pesticides and Fertilizers
- Metallurgy and Electroplating
- Environmental and Water Pollution
- Dyes and Chemicals
- Petrochemicals, Plastics and Polymers
- Jewellery Industry

TITRA is provided with two-point auto calibration and standardisation (zero offset). The instrument is capable of displaying pH and mV of the sample, with temperature compensation. TITRA can accept a variety of electrodes to cater to various applications in different fields. The liquid path comprises Teflon tubings, Teflon lined valve and gas tight burette with Teflon plunger head. It creates chemically inert system for any sensitive analysis. The instrument is supplied with high speed vortex stirrer with digital speed indication. This specially designed stirrer provides excellent homogenous mixing of samples. An optional magnetic stirrer is also available.

Result Calculation

TITRA has user selective end point result calculation as follows :

- a) Result calculation by highest potential jump
- b) Result calculation by last potential jump
- c) Result calculation with selected potential jump
- d) Result calculation with potential jump in window of selected parameters

For example – TAN/TBN analysis.

Features

- Advanced Micro controller based user-friendly-state-of-the-art product design with alphanumeric splash waterproof polyester soft keys for keyboard. User 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 total chemical inertness.
 - Quick interchangeable imported burette assemblies with intelligent recognition for its volume size. Burette factor for dispensing corrections is available for true end point calculations.
 - Composite Differential Electrode Amplifier unit for Potentiometric and Voltametric/KF Titrations, having connectivity to various Electrodes. Temperature Sensor with 4-line measurement technique ensures correct temperature indication.
 - Three standardised modes of titration, namely incremental, equilibrium and cut-off by pH mode to perform almost all types of titration. By selecting titration method, instrument prints the type of appropriate electrode.
 - During titration, the measured variable i.e. electrode potential (mV) or the pH value is shown on the display together with dispensed volume and number of End Points (EP) detected.
 - User selectable End Point (EP) evaluation up to 9 EP during the run, and calculation by first, last, largest, all or selected EP with display of results and printout.
 - 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 Sr. No. on report printouts make the system foolproof and GLP compliant.
 - Facility to use as a dispenser for fixed volume dosing or dilution allows to perform manual titration with user defined dose and mV indication.
 - Predispense facility with selectable dose and time for quick titrant addition without disturbing the titration trend.
 - Automatic evaluation of molarity for standardisation of titrant, storage of 20 molarities and their retrieval for calculation.
 - Compliant to ASTM D664, D2896 & D4739 for TAN and TBN analysis for oil samples.
 - Titrant temperature factor for volume correction.
 - Result recalculation facility to obtain printout in different units such as molarity, factor, % assay (wt), % volume (ml), ppm, mg/l, mg/g, ml/g, g/l, meq/l, mol/kg, TAN & TBN for oil samples.
 - Reprocessing of threshold and recalculation of EP without performing the new run.
 - Statistic function with Run Selectivity for finding Mean, S.D., R.S.D., and C.V. of last 10 repeat run results could be viewed or printed.
 - User Programmed selectivity for report format, complying with GLP requirements:
 - a) Report giving parameter and result.
 - b) Data table giving mV, pH, δ mV, mV/ml, 2nd derivative and volume (μ l).
 - c) Graphics report giving mV v/s μ l titration curve.
 - d) Graphics report 1st derivative graph v/s μ l titration curve.
 - e) Graphical report of 2nd derivative curve.
 - f) Report of method parameters for 50 methods.
 - g) Condensed report of titration parameters and results.
 - h) Auto evaluation report for multi EP samples - EP1, EP2-EP1 etc. available.The reports can be obtained even after resetting/power off/power fail conditions.
 - Real Time Clock (RTC) for time display and report printout with run time indication.
 - Balance interface to directly transfer the sample weight.
 - Two tier - a) Admin and b) User password protection for method editing.
 - TITRA can be converted to perform Karl Fischer titrations by simply changing burette assembly. All the specifications of LABINDIA Karl Fischer Titrator are applicable.
- Optional :**
- Availability of optional in situ accessory to perform titrations from 5°C to 80°C.
 - Data down loading facilities to PC with window based PC Titra software.
 - IQ, OQ, PQ, documents available.

Titration Analysis Report

09:30:45 20/01/10

#1

Instrument Sr.No.: LAB-1	Pre. Disp. Intv	:2 sec	
Burette Size	:10 ml	Threshold	:300
Burette Factor	:1.0000	Stir time	:30 sec
Run Time	:00:07:12	Volume Limit	:8250 µl
Method Parameters	Minimum Control Dose	:10 µl	
Method No.	:1	Identification No.	:STD 1
Sample Name	:KHP	Titrant Temp Factor	:1.0000
Titrant Name	:NAOH	Initial mV	:168 mV
Measurement Type	:Potentiometric	Temperature	:25°C (manual)
Titration Type	:Acid-Base Ag.	Calculation by	:1st
Electrode	:Epoxy/Glass	Calculation Parameters	
	body combina-	Concentration	:1.0000 mol./lit
	tion pH	Blank Volume	:0.0000 ml
Titration Mode	:Equilibrium	Constant	:0.2042 C12
Initial Dose	:100 ul	Sample Weight	:0.15062 gm
Eq. Factor	:6	Results	
Sample Analysis Parameters	Volume Dispensed	:8.2260 mol./lit	
P.D. Criterion	:0 mV	EP1	:7.7186 ml
Pre. Disp. Vol.	:5400 µl	Molarity (T)	:0.0956
Pre. Disp. Dose	:200 µl		

Signature : _____

Name: _____

Analysis done on Labindia TITRA

Identification No.: STD-1 09:30:45 20/01/10

S.No.	mV	mV/ ml	Vol. (d2mV/dm12) (µl)	Time
1	83.60	-	5400	-
2	81.80	-17.99	5500	0.29 00:02:10
3	80.30	-15.00	5600	0.00 00:02:15
4	78.80	-15.00	5700	0.30 00:02:21
5	77.00	-18.00	5800	0.00 00:02:27
6	75.20	-17.99	5900	0.00 00:02:33
7	73.40	-18.00	6000	0.10 00:02:39
8	71.50	-19.00	6100	0.19 00:02:45
9	69.40	-20.99	6200	0.10 00:02:51
10	67.20	-21.99	6300	0.09 00:02:57
11	65.10	-21.00	6400	0.29 00:03:03
12	62.70	-23.99	6500	0.10 00:03:09
13	60.20	-25.00	6600	0.30 00:03:15
14	57.40	-27.00	6700	0.29 00:03:21
15	54.40	-31.25	6796	0.30 00:03:27
16	51.30	-34.06	6887	0.18 00:03:33
17	48.20	-35.63	6974	0.56 00:03:39
18	44.90	-40.24	7056	-1.31 00:03:45
19	40.90	-50.63	7135	0.55 00:03:51
20	37.50	-46.57	7203	-2.32 00:03:57
21	33.10	-62.85	7278	0.34 00:04:03
22	29.10	-60.60	7344	-4.44 00:04:08
23	23.40	-89.06	7408	0.37 00:04:14
24	18.20	-91.22	7465	-8.14 00:04:20
25	10.90	-135.18	7519	-3.69 00:04:26
26	3.90	-152.17	7565	-13.65 00:04:32
27	-4.90	-209.52	7607	-33.21 00:04:38
28	-17.20	-332.43	7644	-47.81 00:04:44
29	-32.10	-480.64	7675	-129.34 00:04:50
30	-52.19	-804.00	7700	-366.31 00:04:55
31	-80.69	-1500.00	7719	4.44 00:05:02
32	-103.10	-1493.33	7734	107.29 00:05:13
33	-120.69	-1353.84	7747	503.20 00:05:22
34	-129.69	-750.00	7759	127.21 00:05:33
35	-137.30	-584.61	7772	87.52 00:05:43
36	-144.10	-453.33	7787	39.15 00:05:52
37	-151.30	-378.94	7806	26.25 00:06:00
38	-158.10	-323.80	7827	25.54 00:06:07
39	-164.39	-262.49	7851	5.31 00:06:13
40	-171.10	-248.14	7878	-1.93 00:06:19
41	-178.19	-253.57	7906	31.19 00:06:25
42	-183.00	-160.00	7936	5.82 00:06:30
43	-187.39	-141.93	7967	5.41 00:06:36
44	-191.60	-123.52	8001	-1.61 00:06:42
45	-196.80	-129.99	8041	7.70 00:06:48
46	-200.89	-97.61	8083	5.39 00:06:54
47	-204.10	-74.41	8126	0.98 00:07:00
48	-207.89	-79.16	8174	2.65 00:07:05
49	-211.30	-65.38	8226	- 00:07:11

Signature : _____

Name: _____

Analysis done on Labindia TITRA

pH Calibration Report

10:58:23 20/01/10

Instrument Sr.No.: LAB-1

Buffer 0 (pH) :7.00 Offset (mV):0.6

Buffer 1 (pH) :4.00 E.Pot (mV):172.79

Buffer 2 (pH) :10.00 E.Pot (mV):-176.30

Slope/1 :102.7% Slope 2 :100.6%

Temperature :25°C (manual)

Calibration done on : 20/01/10 at 10:58:21

Signature : _____

Name: _____

Analysis done on Labindia TITRA

KOEHLER PHARMA TITRATOR STATISTICS REPORT

10:13:54 20/01/10 #5

Identification No. : STD-5

S.No.	Results
1	0.0956 Molarity (T)
2	0.0952 Molarity (T)
3	0.0953 Molarity (T)
4	0.0948 Molarity (T)
5	0.0950 Molarity (T)
Mean	:0.0952 Molarity (T)
S.D.	:0.0002
R.S.D.	:0.0027
C.V.	:0.2748

Signature : _____

Name: _____

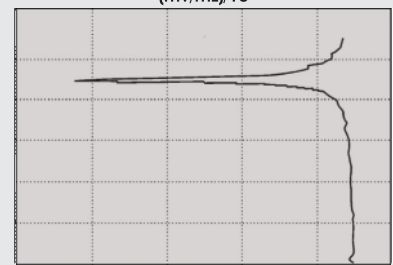
Analysis done on Labindia TITRA

Titration Graph Report

09:30:45 20/01/10 #1

Identification No. : STD-1

(mV/mL)/10



-(00180,5500)
(µl)

00020

X Scale = 40 units/div
Y Scale = 500 µl/div

Accessories



BURETTE CHANGE ACCESSORY : Burette change accessory facilitates the user for quick change over to other burette assembly with different volume (size) or different titrant eliminating the time consuming process of cleaning and rinsing of burette and connecting tubes. Also, safety in chemical handling is achieved. KF burette assembly when fixed will change Auto titrator operation to KF titrator operation.



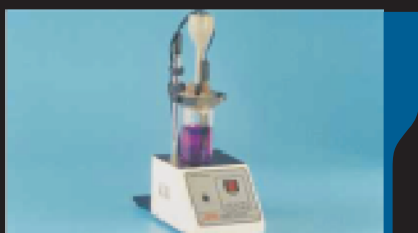
FILTER DRYERS : LABINDIA designed the Filter Dryers to suit the design of TITRA and KAFI. They are typically filled with Silica Gel and molecular sieve.



MAGNETIC STIRRER WITH HOLDING RING (Model A) : Magnetic Stirrer is essential for vigorous stirring of any sample at an optimized speed for reproducible results, particularly for samples where stirring from top is not possible. For example, stirring in Karl Fischer Titration Vessel. Labindia Magnetic Stirrer is a micro controller based instrument with digital speed indicator which ensures stable stirring speed.



MAGNETIC STIRRER WITH ELECTRODE ARM (Model B) : Similar to Magnetic Stirrer described at 3 above with electrode holding arm instead of holding ring. This is used with flanged open top vessels, with clamping facility. This ensures hermetic sealing for zero leak of air.



VORTEX STIRRER : Vortex Stirrer is an essential accessory for vigorous stirring of any sample at an optimized speed for reproducible results. LABINDIA Vortex Stirrer meets the standard essential for a perfect Titration. A constant set speed for proper mixing and chemically inert Glass Stirrer Blade ensures reproducible titration results. LABINDIA Vortex Stirrer is designed to fit on to the Electrode Holder Arm of TITRA as well as a stand-alone stirrer. A micro controller based digital speed controller with speed indicator ensures stable stirring speeds. Operating Voltage : 230Vac \pm 10%, 50 Hz.



VESSEL HEATING /COOLING ACCESSORY : Vessel Heating Accessory is an optional accessory for Titrimetric analysis at elevated temperatures. In some cases Titration is required to be performed at lower temperature around say 5°C. Both the requirements could be met with this specially developed Vessel Heating Accessory. The VHA temperature can be set between 5°C to 85°C. Control accuracy: \pm 1.0°C. Operating voltage: 230Vac \pm 10%, 50 Hz. Power consumption: 100 Watts.



pH CHECKER : LABINDIA has developed a unique pH CHECKER to resolve the ambiguity of correctness between pH measured by pH electrode and actual pH value. You can check your pH meter for showing correct pH values with the help of pH checker.

Specifications

- Principle : Volume determination by equivalence point, end point or pH STAT.
 - Control : Microcontroller based (Advanced version of microprocessor).
 - mV range : ± 3200 mV.
 - Accuracy : ± 0.1 mV (± 0.0016 pH).
 - Amplifier input impedance : $> 10^{12}$ ohms
 - Burette Resolution : 1/5000 for 5 ml, 1/10000 for 10 ml, 1/5000 for 25 ml.
 - Filling time : < 20 sec.
 - Keyboard : Alphanumeric splash waterproof polyester soft keys.
 - Display : 40 x 2 line back lighted liquid crystal display (LCD).
 - Titration Head : (a) Manual stand with swivelling arm.
 - Stirrer System : Microcontroller based variable speed, high torque vortex stirrer with digital indication. Magnetic Stirrer optional.
 - Sensors : (1) Electrodes for Potentiometric titration - (pH, Ion, Redox, Argentometric).
- a) Any combination electrode. b) Differential Electrode System comprising sensing (Indicator) Electrode with BNC Connector and Reference Electrode with 4mm Banana Connector. (2) Electrode for KF/Voltametric titration with BNC/TNC Connectors. (3) Temperature sensor (PRT/PT100)
- Calibration : 3-point Calibration with user entered buffer values and standardisation with 7 pH buffer.
 - End Point detection : a) Potentiometric, b) Voltametric, c) Thermometric and Photometric.
 - Cut-off criteria : a) Volume b) End point c) mV/pH.
 - Methods : 1) Titrations - a) Acid base, b) Nonaqueous. c) Redox d) Precipitation e) Complexometric f) back titration 2) KF titration (Optional)
 - Results : a) Molarity b) % Assay(wt), c) % volume (ml) d) ppm e) mg/l f) mg/g g) g/l h) meq/l i) mol/kg j) TAN and TBN for oil samples.
 - Method Storage : 50 methods with parameters.
 - Titrant Molarity storage : 20 values
 - Report Format : 1) Method Parameters 2) Titration analysis report 3) Titration analysis condensed report 4) Titration data table 5) Titration graphic report - i) μ l v/s mV ii) μ l v/s First derivative iii) μ l v/s Second derivative iv) μ l v/s Time 6) Auto evaluation report 7) Statistics report 8) End Point Titration report 9) Calibration report.
 - Input/Output Peripheral Interface : (a) Parallel Port : 1 No. - for printer (b) Serial Port : 2 Nos. - for Balance & PC.
 - Power : 230 V AC $\pm 10\%$, 50 Hz.
 - Environmental Operating Conditions: - a) Operation : Indoor b) Temperature : Ambient to 45°C c) Humidity : 5 to 90% non-condensing.

LABINDIA®

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www.labindia.com / For Enquiries: sales.mfd@labindia.com

Labindia Analytical Instruments Pvt. Ltd.

FACTORY: Plot No. EL-72, Electronic Zone, TTC Industrial Area, Thane Belapur Road, Navi Mumbai - 400 705.
Tel.: +91-22-2762 6660/61/62/63/65/163480/81
Fax: +91-22-27626664 E-mail: lipfactory@vsnl.net

APPLICATION & TRAINING CENTRE:

R-909, TTC Industrial Area, Thane Belapur Road, Rabale, Navi Mumbai - 400 701. Tel.: +91-22-2760 6955
Fax: +91-22-2760 6706

HEAD OFFICE & REGIONAL OFFICES:

Thane: 201, Nand Chambers, LBS Marg, Near Vandana Cinema, Thane (W) - 400 602. Tel.: +91-22-2598 6075 / 2598 6000
Fax: +91-22-2541 0420 / 2533 5940 E-mail: sales.mfd@labindia.com
Delhi: G-4, Pal Mohan Sadan, 26/32, East Patel Nagar, New Delhi - 110 008. Tel.: +91-11-4330 6001 / 10
Fax: +91-11-2585 1066
Chennai: B-1, Alsa Regency, 165, Eldams Road, Chennai - 600 018.
Tel.: +91-44-2434 7008 / 2432 0352 Fax: +91-44-2434 6328
Kolkatta: 165-A, S. P. Mukherjee Road, Kolkatta - 700 026.
Tel.: +91-33-2466 1396 / 2466 3362 Fax: +91-11-2466 1352

BRANCH OFFICES:

Bangalore: #105, Bhimajyothi Colony, West of Chord Road, Basaveshware Nagar, Above Coffee Day, Bangalore - 560 079 Tel.: +91-80-2323 0923 / 21
Fax: +91-80-2323 0924
Lucknow: 403, 4th Floor, Sahara Shopping Complex, Faizabad Road, Indira Nagar, Lucknow - 226 016. Tel.: +91-522-2346 535 / 2346 496 Fax: +91-522-23488 847
Hyderabad: 6-3-1090/11, Uma Hyderabad House, 2nd Floor, Somajiguda, Raj Bhavan Road, Hyderabad - 500 082. Tel.: +91-40-6550 4133 / 2331 3300
Fax: +91-40-2331 3312
Gurgaon: Plot No. 372, Uday Vihar Phase II, Gurgaon - 122 015, Harayana.
Tel.: +91-124-2843 300 / 2843 600 Fax: +91-124-2843 399
Tiruvanthapuram: Megha Complex, Ground Floor, TC No. 26/857, Women College Road, Thycaud, Thruvanthapuram - 695 014
Tel.: +91-471-2324 064 / 2320 082 Fax: +91-471-2320 082
Vadodara: 401/402, Manan Commercial Landmark, Opp. Dhara Hospital, Above HDFC Bank, Gotri Road, Vadodara - 390 015 Tel.: +91-265-2342 929
Fax: +91-265-2352 924
Pune: Kailaschandra 128 / 1A, 2nd Floor, Paud Road, Kothrud, Pune - 411 038
Tel.: 098220 43622
Chandigarh: S.C.O. 208-209, 4th Floor, Basera Building, Sector-34 A, Chandigarh - 160 022, U.T. Tel.: +91-172-4090 001-07 / 4090 009
Fax: +91-172-4090 008



Striving to become the best individuals, we endeavour to foster the best team. Performing sensibly, we try to achieve the best efficiency. Working innovatively, we seek to make the best products. Listening patiently, we excel to offer the best service. So, no matter what you needs are, **come to us, GET THE BEST**

LABINDIA reserves the right to change specification without notice as part of its continuous programme of product development.