CONTENTS

Titration

Introduction

General procedure used in manual titration

Before starting, make sure that all glassware, especially the burette, is clean and dry.

Accurately measure a volume of the reactant into to a beaker or Erlenmeyer flask.

Add a suitable indicator to the flask.

Pour the titrant into the burette, read the start-point of the liquid on the burette.

Turn the tap of the burette to allow the titrant to slowly fall into the reactant. Swirl the flask with the other hand or with a magnetic stirrer.

The indicator should change colour as the titrant is added, but then quickly return to its original color.

As the end-point is approached, the indicator takes longer to turn back to its starting color. Add the titrant more slowly at this point (one drop at a time).

When the indicator remains at its end colour, the reaction has reached the end point.

Measure the amount of titrant liquid used, as shown on the scale of the burette.

Repeat as many trials as needed, and then average the volumes.

Once the number of moles of reactant that have been neutralised has been determined then calculate the concentration in moles per litre or other unit.

Titration is a quantitative measurement of an analyte in solution by it's complete reaction without a reagent. Titration is used in analytical chemistry to determine the amount or concentration of a substance. In a titration, one reagent (the titrant) is slowly added to a solution containing the species being measured (the analyte). As it is added, a chemical reaction occurs between the titrant and analyte. The point where all analyte is consumed, and an equal quantity of titrant and analyte are present, it is called the equivalence-point. This is determined by one type of indicator that it is also present in the solution, or by a measurable physical change in the solution, like pH, electrode potential, conductivity, or light absorption (color). In practice, an abrupt change of this physical property signals the end of titration, called the endpoint.

The purpose of titration (also called volumetric analysis) is to determine the analyte quantity or concentration, the titrant concentration being known beforehand. Titrations are based on chemical reactions, and these reactions must fulfill four requirements:

- **The reaction must be fast, so that after the titrant's addition, the reaction occurs within approximately one second**
- **The reaction must go to completion**
- **The reaction must have well-known stoichiometry (reaction ratios)**
- **A convenient method of endpoint detection must be available**

In any titration, there must be a quick, quantitave reaction taking place as the titrant is added.

Manual titration is done with a burette and a long graduated tube that holds the titrant. The amount of titrant used in the titration is determined by reading the difference between the volume of titrant in the burette before the titration and when the endpoint is reacted. The most important factor for making accurate titrations is to read the burette volumes repeatedly. Generally, chemists use the bottom of the meniscus (rounded liquid level) to read the reagent volume in the burette. Additional required instrumentation would be: a burette, a beaker, a pipette - to measure the sample volume, an indicator solution and the (standardized) titrant.

Automatic Titration

Automatic titration is done with automatic titrators. These titrators deliver the titrant, stop at the endpoint and calculate the concentration of the analyte automatically. They are the best for repeatitive titrations. A certain type of electrochemical measurement usually detects the endpoint.

Some complex analysis performed by automatic titrators are...

- **Acid-base, specific ion redox determination by pH/mV measurement with potentiometric detection.**
- **Determination of water with Karl Fischer reagent using coulumetric detection.**
- **Determination of chlorine in aqueous solution with phenylarsene oxide using amperometric detection.**

The required equipment would be the automatic titrator, the (standardized) titrant, a titrant reservoir, a pipette (to measure the sample volume), a beaker, and possibly a magnetic stir-bar for stirring.

The automatic titrator must have an accurate liquid dispensing system. In high accuracy systems, this is typically a stepper motor driven piston burette, a valve system to switch between titrant inlet and outlet, and a titration tip to dispense the titrant into the sample solution. These three main subsystems must be as accurate as possible, with very low gear backlash in the burette drive mechanism, low piston seal flexing, accurate burette glass cylinder diamter, low dead volume in the valve, evaporation/permeation and chemically resistant tubing and an anti-diffusion titrant dispensing tip.

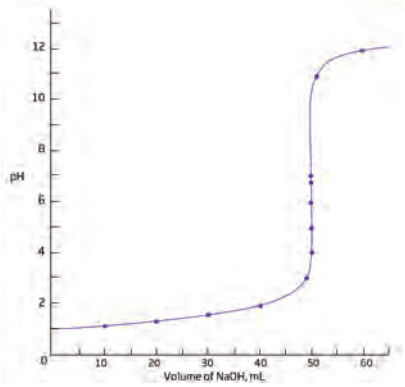
Standards and Standardization

One of the substances involved in a titration must be used as a standard for which the amount of substance is present is accurately known. The standard can be present either in the form of a pure substance or as a standard solution, a solution whose composition is accurately known. The titrant solution can be standardized in two ways; using a primary standard, or more commonly, titrating it against a previously standardized solution.

Type of Titrations

Acid-base titrations This is the most common type of titration - an acid-base reaction (simply exchange of protons). On the following table and graph you can see the variation of pH during the titration of a solution of 0.1 M HCl with one solution of NaOH 0.1 M

Volume of NaOH, mL	pH
0.00	1.00
10.00	1.18
20.00	1.37
30.00	1.60
40.00	1.95
49.00	3.00
49.90	4.00
49.99	5.00
50.00	7.00
50.01	9.00
50.10	10.00
51.00	11.00
60.00	11.96



In 1855, the German chemist, Friedrich Mohrn, defined titration as the "weighing without scale" method, because this process allows determination of the concentration of a sample without using complex instrumentation.

A manual titration requires high accuracy and precision, both in the preparation of the material, and the use of precisely dosed reagents. The operation must be repeated at least 3 times to obtain a reliable measured value. This procedure makes the manual analytical technique very long and fastidious; however, the infinite applications that titration presents, can't be neglected for both organic and inorganic parameters. In some applications, for example, in the food industry, the determination of the content of sulphur dioxide in must and wine and the level of acidity in cheese are still determined manually using the Soxhlet method.

The growing need for faster results has lead HANNA to develop the HI 901 and HI 902C titrators, two instruments that permit the automation of the titration procedures, while providing quick and reliable data.

Titration

Introduction

Potentiometric titrations are those where the potential from an electrode system is used as the analytical signal for the change occuring during the titration. Examples include pH electrodes used for acid-base titrations, ORP electrodes (platinum) used in a redox titration, ion selective electrodes used in a specific ion titration, and silver electrodes used to follow the silver ion concentration in argentometric titrations.

Precipitation titrations

Complexometric titrations In a complexometric titration metal ions are titrated using a titrant that binds strongly to the metal ions.

Amperometric titrations

Spectrophotometric titrations

Back-titrations In this type of titration, a large excess of a reagent is added to the sample solution, helping a slow reaction to go to completion; the unreacted excess reagent is then titrated.

Multiple endpoints titrations

Instrumental End-point Determination

Karl Fischer titrations (KFT) (HI 903) KFT use the Karl Fischer reaction between water, iodine and sulfur dioxide. There are 2 types of Karl fischer titrations: coulometric and volumetric. In the volumetric KFT, methanol solvent is pretitrated to the dryness end-point, sample is added, and the water in the sample solution that is titrated. The titrant contains iodine and SO_2. The CH_3OH solvent and SO_2 react to form (CH_3SO_3)- that reacts in the Karl Fischer reaction with water:

$CH_3OH + SO_2 + RN \rightarrow [RNH]CH_3SO_3$

$H_2O + I_2 + [RNH]CH_3SO_3 + 2RN \rightarrow [RNH]CH_3SO_4 + 2\,[RNH]I$

Were RN = base

In the coulometric KFT, the sample is added to a special reagent solution that contains CH_3OH solvent, SO_2 and iodide. During the titration, iodine (the active titrant) is generated electrochemically in-situ from iodide, by passing electricity across two platinum electrodes immersed in the reagents solution. A separate dual-platinum indicator electrode monitors the end-point, just as in the volumetric KFT. The quantity of passed electricity is measured and it is used to calculate the quantity of water that was present in sample.

The fundamental calculation for all titrations is based on:

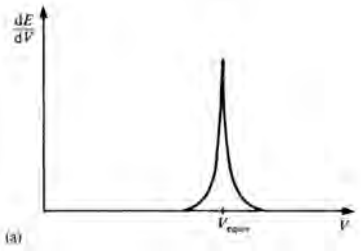
$C_1V_1 = C_2V_2$ or $N_1V_1 = N_2V_2$ or $C_1V_1E_1 = C_2V_2E_2$

Where C is the concentration in moles/liter, V is volume in liters or mL, N is the concentration in normality in equivalents. Liter, and E is the equivalents/mole factor for the analyte and titrant.

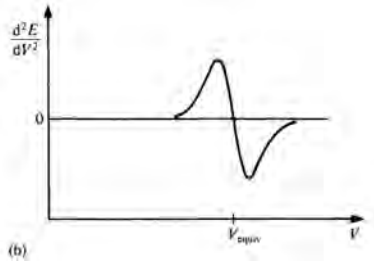
$C_{sample} = C_{titrant}\, V_{titrant} / V_{sample}$

This equation is the most basic form used for calculating the result of a titration. As will be shown in following illustrations, there are modifications to this basic equation necessary for obtaining results in other certain situations.

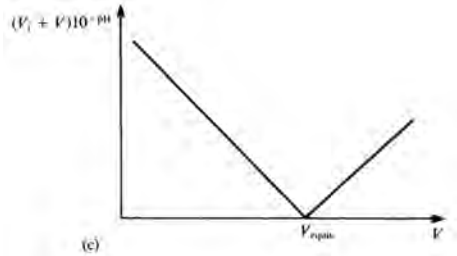
Methods for determining the equivalence point of a potentiometric titration curve (including acid-base titrations):



The first derivative (a); the equivalence point corresponds to the top of the peak.



The second derivative (b); the equivalence point is where the curve crosses the V-axis.



The Gran plot (c); this method consists of the mathematical transformation of the titration curve into straight lines via rearranged Nernst equations (titration of a strong acid with a strong base; V_i is the initial volume of acid and V the volume of base added)

Product Spotlights

HI 903

Karl Fischer Volumetric Titrator for Moisture Determination

5.8

The HI 903 Karl Fischer Volumetric Titrator is an extension of HANNA's highly successful potentiometric titrator platform. The HI 903 combines an ultra-high precision titrant delivery system with optically regulated magnetic stirring, and sophisticated endpoint determination, dynamic dosing and background drift correction algorithms.

The HI 903 comes equipped with a solvent handling system to reduce cell conditioning time and can be connected directly to your laboratory balance.

The result is an extremely adaptable titrator capable of titrating with superior accuracy and precision even for samples with low moisture content.

HI 902C

Automatic Titration Systems

5.12

The HI 902C is an automatic titrator that complements our wide range of products dedicated to quick and accurate laboratory analysis. HI 902C can perform acid/base, potentiometric, ORP, complexometric, precipitation, back titrations and titre determinations.

This versatile titrator supports up to 100 methods, standard or user defined. When powered on, the instrument initiates an internal diagnostics check and then readies itself for the first titration of the day. A large color LCD screen clearly shows the chosen method and related information. A real-time titration curve can be shown on the display; this feature is useful when new methods are tested or when a procedure needs to be optimized. At the end of the titration, all data, including the graph, are automatically stored in memory and can be copied via the built-in USB drive or through direct connection with a PC.

HI 84433

Formol Number Mini Titrator and pH Meter for Wines and Fruit Juices

5.34

The HI 84433 is an easy to use microprocessor-based automatic mini titrator and pH meter designed for the quick and accurate determination of formol number in wines or fruit juices. By eliminating subjective factors including color indicators, errors in mathematical calculations or erratic titrant additions from the measurement, the HI 84433 makes formol number determination precisely.

A clear and intuitive user interface allows users to navigate the HI 84433's menus and functions quickly. A HELP key located on the keypad aids in set-up, calibration status and troubleshooting.

Product Spotlights

HI 84432

Titratable Acidity Mini Titrator and pH Meter for Fruit Juice

5.26

The HI 84432 digital automatic mini titrator and pH meter is designed for quick and accurate analysis of total titratable acidity in fruit juices. By eliminating subjective factors including color indicators, errors in mathematical calculations or erratic titrant additions from the measurement, the HI 84432 provides quick and accurate, repeatable results without guesswork.

A clear and intuitive user interface allows users to navigate the HI 84432's menus and functions quickly. A HELP key located on the keypad aids in set-up, calibration status and troubleshooting.

HI 84437

Titratable Acidity Mini Titrator and pH Meter for Mayonnaise

5.28

The HI 84437 is an easy to use microprocessor-based automatic mini titrator and pH meter designed for the quick and accurate analysis of titratable acidity in mayonnaise. By eliminating subjective factors including color indicators, errors in mathematical calculations or erratic titrant additions from the measurement, the HI 84437 makes titratable acidity analysis precisely. This instrument will quickly become a valuable tool for mayonnaise analysis.

A clear and intuitive user interface allows users to navigate the HI 84437's menus and functions quickly. A HELP key located on the keypad aids in set-up, calibration status and troubleshooting.

HI 83540

Alcohol in Wine Mini Titrator

5.38

With this instrument, alcohol determination is made using a new, state of the art method. The wine sample is measured before and after the HANNA reagent is added. The difference between measurements is used to calculate the alcohol content.

HANNA's new HI 83540 alcohol determination analyzer uses a patent pending conductimetric known addition procedure that allows wine makers to accurately determine alcohol concentration in minutes. The basis for this invention is that the change of electric conductivity (EC) of a wine after the addition depends on the amount of alcohol. The complex software of the instrument performs all the necessary calculations and adjustments, providing the user with a direct readout of alcohol in % volume on the graphic LCD.

Comparison Guide

GUIDE	Low Range Acidity	High Range Acidity	Ultra Low Range Alkalinity	High Range Alkalinity	pH Range	ORP Range	ISE Range	Temperature Range(s)	Citric Acid Range	Malic Acid Range	Tartaric Acid Range	Acetic Acid Range	Formol Number	Sulfur Dioxide Range	Alcohol Range	pH Calibration Points	Automatic Temperature Compensation	Clip Lock™	GLP	Logging	Backlit Display	PC Connectivity	Page
Karl Fischer Titrator																							
HI 903																		•	•	•	•	•	5.8
Bench Titrators																							
HI 902C					•	•	•	°C/°F K								5	•	•	•	•	•	•	5.12
HI 901					•	•	•	°C/°F K								5	•	•	•	•	•	•	5.16
HI 84430	•	•			•			°C								3			•	•	•		5.20
HI 84431			•	•	•			°C								3			•	•	•		5.22
HI 84442			•		•			°C								3			•	•	•		5.22
Acidity Mini Titrators																							
HI 84429	•	•			•			°C								3	•				•		5.24
HI 84432					•			°C	•	•	•					3	•		•	•	•		5.26
HI 84437					•			°C				•				3	•		•	•	•		5.28
HI 84435					•			°C				•				3	•		•	•	•		5.30
HI 84434					•			°C				•				3	•		•	•	•		5.32
HI 84433					•			°C					•			3	•		•	•	•		5.34
Wine Analysis Mini Titrators																							
HI 84100														•			•				•		5.36
HI 84102											•						•				•		5.37
HI 83540															•		•		•	•	•	•	5.38

HI 903

Karl Fischer Volumetric Titrator for Moisture Determination

Measures 100 ppm to 100% water content

- **Precision titrant delivery system**
  - 40,000 step, piston dosing pump
  - Accurate to 0.1%
  - Delivers as little as 0.125 µL of titrant
  - Precision ground, 5 mL glass burette with PTFE plunger, PTFE burette tubing, and polyurethane tube jacketing (thermally insulating, light blocking)
  - Glass anti-diffusion dispensing tip
  - Clip-Lock™ exchangeable burette system enables users to exchange reagent burettes in a matter of seconds
- **Sealed solvent system**
  - Change to fresh solvent in a matter of seconds without opening the titration vessel
  - Minimizes exposure to ambient humidity, reducing titrant consumption and saving time
  - PTFE solvent tubing is resistant to harsh KF solvents and titrants
- **Beaker top**
  - Chemically-resistant reaction vessel cap and fittings
  - Quick-remove sample port plug with replaceable silicone rubber septum
- **Anti-diffusion burette tip**
  - Delivers titrant in high turbulence zone, ensuring rapid reaction
  - Prevents unwanted diffusion of titrant
- **Built-in stirrer**
  - Automatic, integrated magnetic stirrer adjustable from 200-2000 RPM
  - Optical feedback for automatic speed control
  - Optional external stirrer available
- **Rechargeable indicating desiccant**
  - Prevents the ingress of ambient humidity into the sealed solvent system while maintaining full titrator functionality
  - Minimizes changes to titrant titre
  - Indicates when adsorption capacity is depleted
  - Regenerates at 150°C
- **PTFE bottle cap**
  - Caps fit any GL45-threaded bottle
  - Chemically resistant caps and fittings
  - Removable desiccant cartridges

Adaptable, High Accuracy Moisture Determination

The HI 903 Karl Fischer Volumetric Titrator for moisture analysis is an extension of HANNA's highly successful potentiometric titrator platform. The HI 903 combines an ultra-high precision titrant delivery system with optically regulated magnetic stirring, sophisticated endpoint determination, dynamic dosing and background drift correction algorithms.

The result is an extremely adaptable titrator capable of titrating with superior accuracy and precision even for samples with low moisture content. The HI 903 dispenses the titrant, detects the endpoint and performs all necessary calculations automatically.

The HI 903 comes equipped with a solvent handling system to reduce cell conditioning time and can be connected directly to your laboratory balance via serial interface.

The HI 903's powerful software and intuitive menus are easily navigated on the large, color LCD display making it simple to view results. Choose from included methods or develop a custom method for almost any application or sample type. Using a USB flash drive or connecting the titrator to the HI 900PC application, methods (standard and user) can be upgraded, stored or deleted.

Clip-Lock™ Exchangeable Burette System

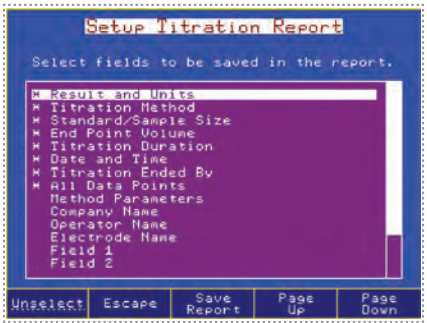
With Clip-Lock™, it only takes a couple of seconds to exchange the reagent burettes to perform a different titration.

The Clip-Lock™ exchangeable burette system prevents cross contamination while reducing loss of time and reagents. Burettes simply slide out for quick exchanges, and detaching the aspiration and dispensing tubes from the titrant bottles is easy.

Interrupting an important cycle of analysis due to a malfunctioning burette is a thing of the past. With the HANNA Clip-Lock™ system you can simply substitute the burette and complete all your tests with the same titrant! Having several prepared burettes on hand will make the HANNA HI 903 one of the fastest and most versatile titration systems available.

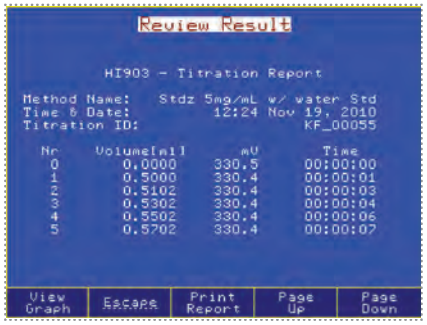
Versatile Data Management

- **HI 900 Series titration systems can be easily incorporated into any existing GLP data management program:**
  Easily record all necessary GLP information with every sample such as sample identification, company and operator name, date, time, electrode ID codes and calibration information
- **Data can be transferred to a PC using the HANNA HI 900PC software application**
- **The USB port allows for the easy transfer of methods, reports and software upgrades via a USB flash drive**
- **Users can print reports of analyses directly from the titrator using a standard parallel printer**
- **An external monitor and keyboard can be attached for added versatility**



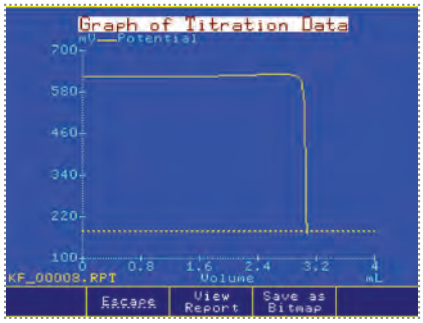
Customizable reports

Titration reports are fully customizable



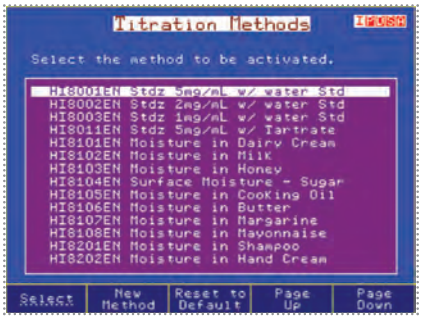
Versatile results

Titration or pH/mV/ISE reports can be viewed on-screen or transferred to a USB storage device



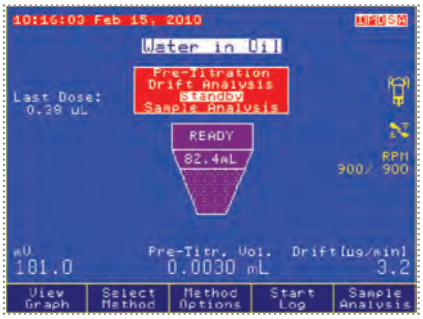
Titration graphs

Titration graphs can be viewed on screen or saved as a bitmap and transferred to a PC via USB



Methods

The HI 903 comes with a standard method pack



Standby

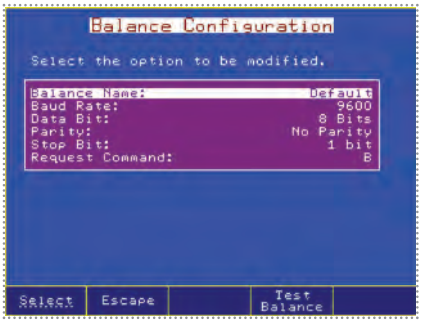
The HI 903 keeps the solvent dry between samples and monitors the drift rate

Results

Titration results are displayed with links to average results or a user-customized report

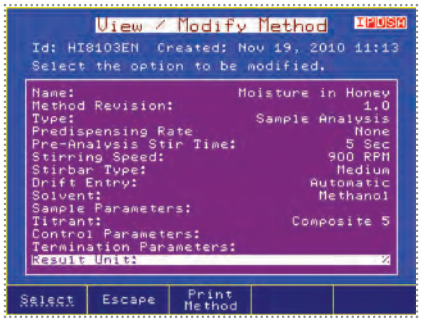
Titrant database

The HI 903 stores standardization information for up to 20 titrants and displays a reminder when standardization is due



Fully configurable balance interface

Enter sample size automatically from any laboratory balance with serial output



Fully customizable titration methods

Customize methods for any application

- **Titrant database**
  - Stores standardization information for up to 20 titrants
  - Standardization reminders
- **Supports up to 100 titration methods (standard and user defined)**
- **Dynamic dosing with optional pre-dispensing**
- **Results displayed directly in the selected units**
- **Titration graph can be displayed on-screen and saved as a bitmap**
- **Multi language support**
- **USB flash drive input**
  - Transfer methods, reports and graphs to either a PC or other titration system
  - Field-upgradeable software
- **Incorporates into any GLP data management program:**
  - Easily record all necessary GLP information with every sample including company and operator name, date, time, electrode ID codes and calibration information
- **Compatible with most major titrant and solvent brands**
- **Proper mixing of titrant and analyte**
  - Digital, magnetic stirring system with optical feedback
  - Conical titration cell to facilitate mixing over a wide volume range
  - Upward dispensing of titrant to ensure rapid reaction
- **Flexible, accurate detection of the titration endpoint**
  - Dual platinum pin polarization electrode for bivoltametric indication
  - Signal averaging reduces noise
  - Selectable endpoint criteria: fixed mV persistence, relative drift stop or absolute drift stop
- **Balance interface**
  - Automatically acquire sample mass or volume via serial RS-232 interface
- **Easy to operate**
  - User friendly interface
  - Context-sensitive help screens
  - Self diagnostic features for external components including dosing pump, burette and stirrer
- **Ideal for**
  - Food and beverage, pharmaceuticals, cosmetics, chemical and petrochemical manufacturing and solvents

HI 903 Connectivity

PC with HANNA software

VGA Display

Parallel Printer

PC Keyboard

Balance

USB Flash Drive

HANNA instruments

With Great Products, Come Great Results™

SPECIFICATIONS		HI 903
Range		100 ppm to 100%
Resolution		1 ppm (0.0001%)
Result Units		%, ppm, mg/g, µg/g, mg, µg, mg/mL, µg/mL, mg/pc, µg/pc
Sample Type		liquid or solid
Determination	Pre-Titration Conditioning	automatic
	Background Drift Correction	automatic or user selectable value
	Endpoint Criteria	fixed mV persistence, relative drift stop or absolute drift stop
	Dosing	dynamic with optional pre-dispensing rate
	Result Statistic	mean, standard deviation
Clip Lock™ Exchangeable Burette System	Dosing Pump Resolution	1/40000 of the burette volume (0.125 µL per dose)
	Dosing Pump Accuracy	±0.1% of full burette volume
	Syringe	5 mL precision ground glass with PTFE plunger
	Valve	motor driven 3-way, PTFE liquid contact material
	Tubing	PTFE with light block and thermal jacketing
	Dispensing Tip	glass, fixed position, anti-diffusing
	Titration Vessel	conical with operation volume between 50-150 mL
	Solvent Handling System	sealed system, integrated diaphragm air pump
Electrode	Type	dual platinum pin, polarization electrode
	Connection	BNC
	Polarization Current	1, 2, 5, 10, 15, 20, 30 or 40 µA
	Voltage Range	2 mV to 1000 mV
	Voltage Resolution	0.1 mV
	Accuracy (@25°C/77°F)	±0.1 mV
External Stirrer	Type	magnetic, optically regulated, digital stirrer
	Speed	200-2000 rpm
	Resolution	100 rpm
Peripheral Devices	PC	easily view, transfer, print or delete methods and reports via HI900PC application
	USB Flash Drive	easily upgrade software or transfer methods and reports between devices using a USB drive
	Laboratory Analytical Balance	RS232 to connect any laboratory balance
	Printer	print directly from the HI 903 to a printer via parallel port
	Monitor	instrument status and titrations can be viewed on a larger screen using any VGA compatible external monitor
	Keyboard	alphanumeric text can be entered using an optional PS/2 keyboard
Graphic Display		5.7" (320 x 240 pixel) color LCD
Titration Methods		up to 100 (standard and user) methods
Data Storage		up to 100 complete titration reports and drift rate reports can be stored
GLP Conformity		Good Laboratory Practice and instrument data storage and printing
Languages		English, Portuguese and Spanish
Enclosure Material		ABS plastic and steel
Keypad		polycarbonate
Power Supply		"-01" model: 115VAC, 50/60 Hz; "-02" model: 230VAC, 50/60 Hz;
Operating Environment		10 to 40°C, up to 95% RH
Storage Environment		-20 to 70°C, up to 95% RH
Dimensions		390 x 350 x 380 mm (15.3 x 13.8 x 14.9")
Weight		approximately 10 kg (22 lbs.)

ORDERING INFORMATION

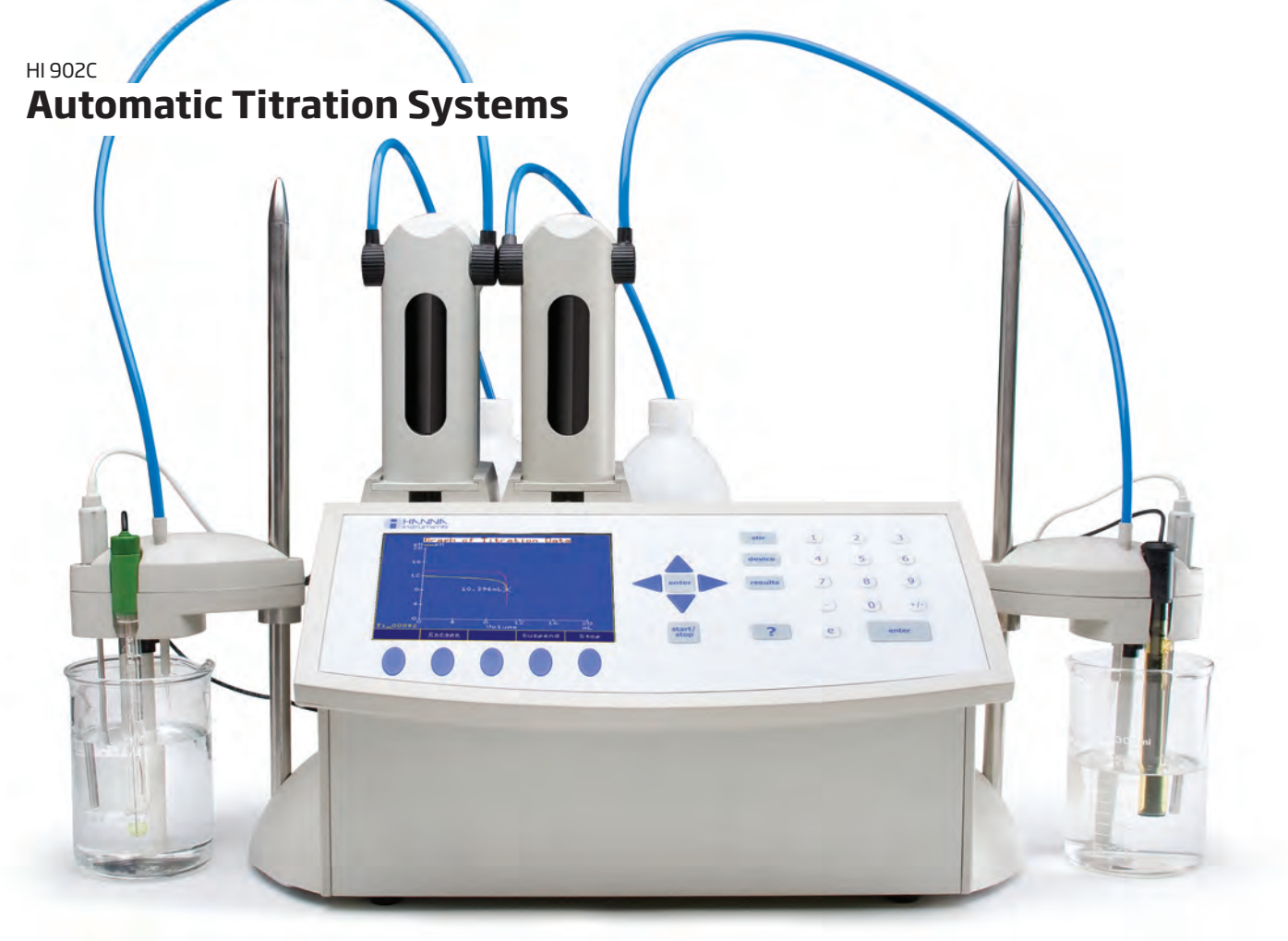
HI 903-01 (115V) and **HI 903-02** (230V) are supplied with dual platinum pin electrode, dosing pump, 5 mL burette assembly with tubing, air pump assembly with tubing, beaker and bottle top assemblies and all fittings, desiccant cartridges (4) with indicating desiccant, stir bar, waste bottle, calibration key, USB cable, power cable, HI 900PC application, USB flash drive, quality certificate, ISO 8655 burette compliance report and instruction manual binder.

ACCESSORIES

HI 76320D	KF electrode
HI 900100	Titrant dosing pump
HI 900520	Beaker assembly
HI 900505	5 mL burette assembly (includes syringe and aspiration and dispensing tubes)
HI 900205	5 mL burette syringe
HI 900260	3-way valve (includes 3 gaskets and 2 screws)
HI 900522	KF beaker
HI 900523	Dispensing tip (2)
HI 900527	Septum (5)
HI 900528	Solvent port plugs (2)
HI 900530	Titrant bottle top assembly
HI 900534	Waste bottle
HI 900531	Solvent/waste bottle top assembly
HI 900532	Desiccant cartridge for beaker or titrant
HI 900533	Desiccant cartridge for use with solvent or waste bottle top assemblies
HI 900180	Solvent-handling pump
HI 900535	Tubing for solvent/waste handling
HI 900536	Tubing for solvent-handling pump
HI 900540	O-ring set
HI 900570	Aspiration tubing (PTFE titrant tubing, blue protection tubing and tube lock)
HI 900580	Dispensing tubing and fitting (PTFE titrant tubings, blue protection tubing, fitting and tube lock)
HI 900930	RS232 cable for PC connection

HI 902C

Automatic Titration Systems



Full featured research grade pH/ISE meter

- **Intuitive user interface**
- **USB port allows for the transfer of methods and reports to a PC or another titrator via USB flash drive**
- **Field upgradeable software**
- **RS232 port allows direct connection to an analytical laboratory balance**
- **Multi language support**
- **Four working modes; potentiometric titrator, pH meter, mV meter, and ISE meter**
- **Potentiometric titrator**
  - Linked titration methods allow two methods to run in sequence
  - Acid/base, non-aqueous, ORP, complexation, back, precipitation titrations and titre determination can be performed
  - Supports up to 100 titration methods (standard and user defined)
  - Supplied standard methods pack or create your own
  - Titration graph can be displayed on-screen and saved as a bitmap
  - Choice of endpoint detection: equivalence point (1st or 2nd derivative) or fixed pH/mV value
  - Reminders for titrant age and standardization expiration
  - Multiple end-point titrations with multiple molecular weights and reaction ratios
  - Two sensor inputs with the addition of a second analog board
  - Supports two burette dosing pumps with the ability to perform back titrations
  - Clip-Lock exchangeable burette system enables users to exchange burettes in a matter of seconds
  - 25 mL precision ground glass syringe with PTFE plunger
  - 40,000 step screw drive, piston dosing pump
  - 3-way motor driven valve
  - PTFE burette tubing with polyurethane tube jacketing
- **pH meter**
  - Full featured research grade pH meter
  - Automatic Temperature Compensation (ATC)
  - Up to five calibration points with automatic recognition of standard buffers
  - Up to five custom buffers can be used for calibration
- **mV (ORP) meter**
  - Relative mV calibration
- **ISE meter**
  - Numerous concentration units including: mol/L, mmol/L, mg/L, mg/mL, ug/L, %, ppt, ppm, g/L, and user defined
  - Up to 5 calibration points with 5 custom standards

Support for 2 electrodes, 2 burette dosing pumps and 2 stirrers

Clip-Lock™ Exchangeable Burette System

With Clip-Lock™, it only takes a few seconds to exchange the reagent burettes to perform a different titration

Easy upgrades

Field upgradeable software via USB

Method sequencing

Linked titration methods allow two methods to run in sequence

Powerful Customization, Accurate Analysis

The HI 902C is an automatic titrator that complements our wide range of products dedicated to quick and accurate laboratory analysis. HI 902C can perform acid/base, potentiometric, ORP, complexometric, precipitation, back titrations and titre determinations.

The HI 902C dispenses the titrant, detects the endpoint and performs all necessary calculations automatically.

This versatile titrator supports up to 100 methods, standard or user defined. When powered on, the instrument initiates an internal diagnostics check and then readies itself for the first titration of the day. A large color LCD screen clearly shows the chosen method and related information. A real-time titration curve can be shown on the display; this feature is useful when new methods are tested or when a procedure needs to be optimized. At the end of the titration, all data, including the graph, are automatically stored in memory and can be copied via the built-in USB drive or through direct connection with a PC.

This titrator is supplied with a pack of standard methods or you can create your own. Methods (standard and user) can be upgraded, stored or deleted by connecting the titrator to a PC with HANNA software or USB flash drive. Software updates can also be performed using a USB flash drive.

Users can connect pH, ORP or ISE electrodes to the HI 902C, as well as create a complete workstation with a PC, monitor, keyboard and printer.

The HI 902C complies with GLP specifications. All GLP information from each sample can be stored, including ID number, date and time of analysis, electrode ID code, and last calibration date.

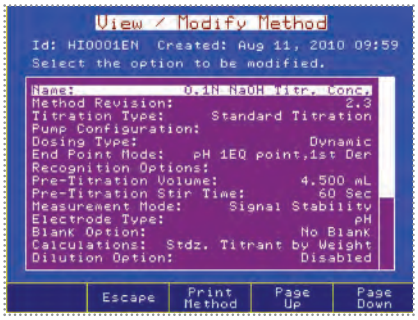
Clip-Lock™ Exchangeable Burette System

With Clip-Lock™, it only takes a few seconds to exchange the reagent burettes to perform a different titration.

The Clip-Lock™ exchangeable burette system prevents cross contamination while reducing loss of time and reagents. Burettes simply slide out for quick exchanges and detaching the aspiration and dispensing tubes from the titrant bottles is easy.

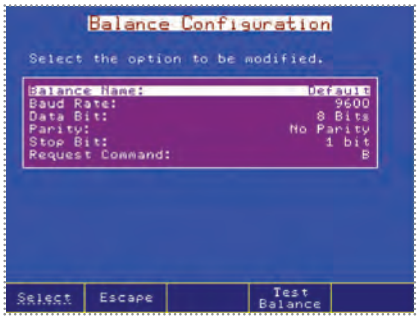
Interrupting an important cycle of analysis due to a malfunctioning burette is a thing of the past. With the HANNA Clip-Lock™ system you can simply substitute the burette and complete all your tests with the same titrant!

Having several prepared burettes on hand will make the HANNA HI 902C one of the fastest and most versatile titration systems on the market.

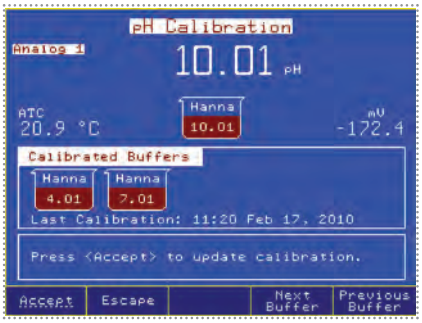


Fully customizable titration methods

Linked methods allow two methods to run in sequence

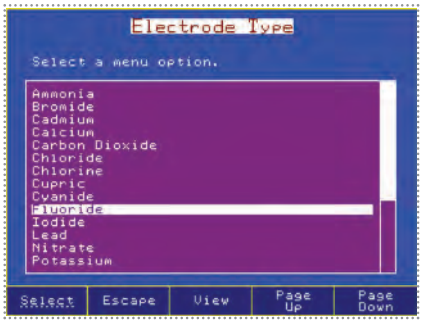


Fully configurable balance interface



Up to 5 pH calibration points, with automatic buffer recognition

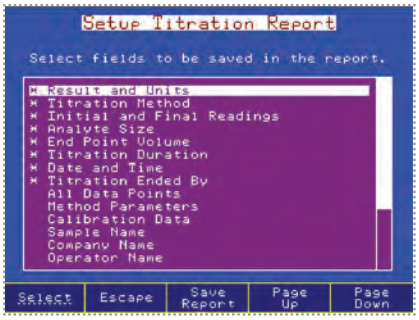
Relative mV calibration allows for a mV offset



Select your ISE type from the available list

Versatile Data Management

- **HI 902C Series titration systems can be easily incorporated into any existing GLP data management program:**
  Easily record all necessary GLP information with every sample such as sample identification, company and operator name, date, time, electrode ID codes and calibration information
- **Data can be transferred to a PC using the HANNA HI 900PC application**
- **The USB port allows for the easy transfer of methods, reports and software upgrades via USB flash drive**
- **Users can print reports of analyses directly from the titrator using a standard parallel printer**
- **An external monitor and keyboard can be attached for added versatility**

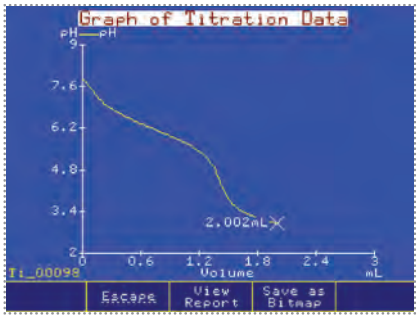


Customizable reports

Titration reports are fully customizable

Versatile results

Titration or pH/mV/ISE reports can be viewed on-screen or transferred to a USB storage device



Titration graphs

Titration graphs can be viewed on screen or saved as bitmaps and transferred to a PC via USB

HI 902C Connectivity

PC with HANNA software

VGA Display

Parallel Printer

PC Keyboard

Balance

USB Flash Drive

HANNA instruments

With Great Products, Come Great Results™

SPECIFICATIONS	mV	pH	ISE	Temperature
Range	-2000.0 to 2000.0 mV	-2.000 to 20.000 pH	1 x 10^{-6} to 9.99 x 10^{10}	-5.0 to 105.0°C/23 to 221°F/ 268.2 to 378.2 K
Resolution	0.1 mV	0.1/0.01/0.001 pH	1, 0.1, 0.01	0.1°C/0.1°F/0.1K
Accuracy (@25°C/77°F)	±0.1 mV	±0.001 pH	±0.5% monovalent; ±1% divalent	±0.1°C/±0.2°F/±0.1K (excluding probe error)
Burette Sizes	5, 10, and 25 mL			
Burette Resolution	1/40000			
Display Resolution	0.001 mL			
Dosing Accuracy	±0.1% of full burette volume			
Display	5.7" (320 x 240 pixel) backlit color LCD			
Languages	English, Portuguese, Spanish			
Methods	load up to 100 methods (standard and user-defined)			
Burette Auto-Detection	burette size is automatically recognized when inserted into the unit			
Programmable Stirrer	propeller type, 100-2500 RPM, automatically held within 10% of the set value, resolution 100 rpm			
Flow Rate	user-selectable from 0.1 mL/min to 2 x burette volumes/min			
Temperature Compensation	manual or automatic (ATC)			
End-point Determination	equivalence point (1st or 2nd derivative) or fixed pH/mV value			
pH Calibration	up to five point calibration, eight standard buffers and five custom buffers			
mV Calibration	single point offset			
ISE Calibration	up to five point calibration, seven standard solutions and five user defined standards			
Potentiometric Titrations	acid-base (pH or mV-mode), redox, precipitation, complexometric, non-aqueous, ion-selective, argentometric, back titrations and titre determination			
Measurement Units	user specified expression of concentration units to suit specific calculation requirements			
Real Time & Stored Graphs	mV-volume or pH-volume titration curve, 1st derivative curve or 2nd derivative curve, in pH-mode, mV-mode or ISE mode; pH/mV/concentration values versus time-datalogging results			
Data Storage	up to 100 titration and pH/mV/ISE reports			
USB Host (Side)	flash drive compatibility for transfers of methods and reports			
Peripherals (Rear)	connections for VGA display, PC-keyboard, parallel printer, USB device input, RS232, interface for future expansion			
GLP Conformity	instrumentation data storage and printing capabilities			
Operating Environment	10 to 40°C (50 to 104°F), up to 95% RH			
Storage Environment	-20 to 70°C (-4 to 158°F), up to 95% RH			
Power	"-01" models: 115VAC; "-02" models: 230VAC; 50/60 Hz			
Dimensions	390 x 350 x 380 mm (15.3 x 13.8 x 14.9 in)			
Weight	approximately 10 kg (22 lbs.) with one pump and stirrer assembly			

HI 900301 stirrer

Ensures effective mixing with a selectable speed from 100 to 2500 rpm.

Quick change

Having several prepared burettes on hand will make this one of the fastest and most versatile titration systems available.

ORDERING INFORMATION

HI 902C1-01 (115V) titrator with one analog board
HI 902C1-02 (230V) titrator with one analog board
HI 902C2-01 (115V) titrator with two analog boards
HI 902C2-02 (230V) titrator with two analog boards

All models include stirrer with stand, 25 mL glass burette, dosing pump drive, temperature sensor, USB cable, 256 Mb USB flash drive and PC software.

ACCESSORIES

HI 900100	Dosing pump
HI 900150	50 mL burette assembly (includes syringe and aspiration and dispensing tubes)
HI 900125	25 mL burette assembly (includes syringe and aspiration and dispensing tubes)
HI 900110	10 mL burette assembly (includes syringe and aspiration and dispensing tubes)
HI 900105	5 mL burette assembly (includes syringe and aspiration and dispensing tubes)
HI 900225	25 mL burette syringe
HI 900210	10 mL burette syringe
HI 900205	5 mL burette syringe
HI 900260	3-way valve (includes 3 gaskets and 2 screws)
HI 900270	Aspiration tube with fitting (includes blue protection tube, gasket, and tube lock)
HI 900280	Dispensing tube with fitting (includes standard dispensing tip, blue protection tube, gasket, and tube lock)
HI 900301	Overhead stirrer assembly (includes overhead stirrer and 3 propellers)
HI 900302	Propeller (includes 3 propellers)
HI 900310	Overhead electrode holder (includes overhead stirrer without electronics and stir bar)
HI 900320	Stirrer stand
HI 900920	Temperature probe
HI 900930	RS232 cable for PC connection
HI 900942	Burette cap removal tool
HI 900941	Shorting connector

HI 901

Automatic Titration System

- Precise dosing system (accuracy under 0.1% of burette volume)
- Supports up to 10,000 titration methods (standard and user defined)
- Clip Lock™ – change burettes quickly with auto burette recognition
- Dynamic/Linear dosing feature
- Fixed end point potential or pH
- Equivalence point detection (first derivative and second derivative)
- The results are displayed directly in the selected units
- Titration graph can be displayed on-screen and saved
- User customized reports can be printed, saved on floppy disk or transferred to PC via RS232 interface
- Reminders for titrant age and standardization expiration
- Self diagnostic features for peripheral devices including pump, valve, burette and stirrer

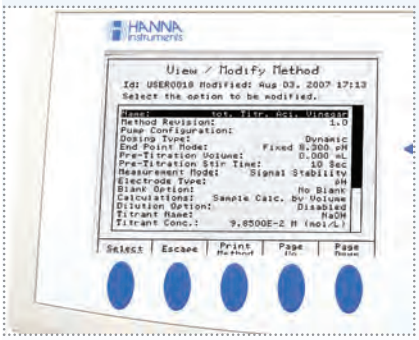
HANNA instruments

With Great Products, Come Great Results™

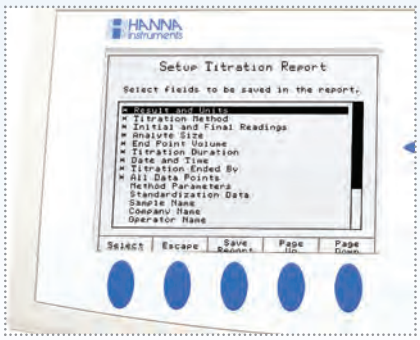
Keep an accurate record of analyses!

HANNA's 900 Series titration systems are easily incorporated into any existing GLP data management program:

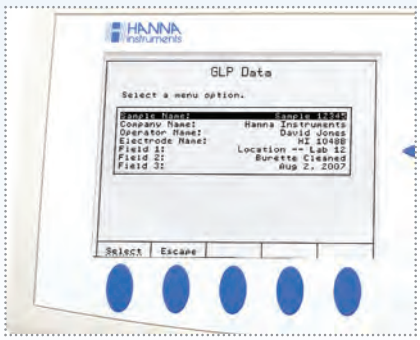
- Users can easily record all necessary Good Laboratory Practice information with every sample including sample identification, company and operator name, date, time, electrode ID codes and calibration information.
- Data can also be transferred using the integral floppy disk drive for communication with a PC or even other titration systems. Special memory cards are not required.
- All test results can be transferred directly to a PC.
- Users can print reports of analyses directly from the titrator using a standard parallel printer.
- An external monitor and keyboard can be attached for added versatility.
- RS485 port for future expansion.



Custom methods



Record up to 100 reports



Incorporate HANNA 900 series titrators into any GLP data management program

Powerful Customization, Accurate Analysis

The HI 901 is an automatic titrator that compliments our wide range of products dedicated to quick and accurate laboratory analysis.

This titration system is provided with a host of numerous features suitable for routine sample analysis and performs acid/base, potentiometric and amperometric titrations. The HI 901 can also drive two pumps separately.

This versatile titrator supports up to 10,000 methods: standard or user defined. When powered on, the instrument initiates an internal diagnostics check and then readies itself for the first titration of the day. A large LCD screen clearly shows the chosen method, correlated information and also indicates which parameters may be adjusted. A real-time titration curve is shown on the display; this feature is useful when new methods are tested or when a procedure needs to be optimized. At the end of the titration, all data, including the graph, are automatically stored in memory and can be copied to disk via the built-in floppy drive or through direct connection with the serial cable supplied with the titrator. The titrators are equipped with an RS485 serial port.

Burette maintenance is simple and completely automated. The user can decide to purge it or wash it and can select how many washings to perform. With our exclusive Clip Lock™ system for burette replacement, changing from one titrant to another is done in a flash! Often, preliminary titration operations are very long and arduous. A burette often needs to be adjusted for correct dosing, which extends waiting time for new sample analysis. HANNA has engineered a way to solve this problem.

The innovative Clip Lock™ system allows users to change burettes in two simple steps, passing from one titrant to the next without any problem. Additionally, HI 901 automatically recognizes the volume of the new burette.

Users can connect pH or ORP electrodes to this unit, as well as create a complete workstation with a PC, monitor, keyboard and printer. This unit complies with GLP specifications, providing validation support for analysis. All GLP information from each sample can be stored, including ID number, date and time of analysis, electrode ID code and last calibration date.

Up to 100 reports of analysis, complete with titration curve graphing is possible. A calibration "time-out" can be set and the user can be advised when the pH electrode needs to be calibrated. The instrument's status can be viewed clearly on the large LCD screen. Contained in the set-up menu, features like language, display brightness, resolution, pH electrode calibration, date and hour can be adjusted. During analysis, the titration is displayed in real-time together with the stored data. Date, hour, temperature (when probe is connected) and warning messages, such as a pH electrode calibration message, can all be displayed for your convenience.

Automatic Burette Volume Recognition

This feature makes exchanging titrants convenient, safe and fast.

Quick Change

Keep several burettes on hand for a quick change.

Stirrer

The optional stirrer ensures an effective mixing with a selectable speed from 100 to 2500 rpm.

A. Aspiration Tube (Titrant Inlet)
B. Dispensing Tube (Titrant Outlet)
C. Burette Assembly
D. Light Shield (in closed state)
E. Burette Support
F. Support Bar
G. Sliding Positioning Collar
H. Dispensing Tip
I. Temperature Sensor
J. pH Electrode
K. Stirrer Propeller
L. Stirrer Stand
M. Numeric Keys
N. Function Keys
O. Help Key
P. Arrow Keys
Q. Option Keys
R. 320 x 240 Pixel Graphic LCD

A Complete Analysis

These instruments perform a complete analysis comprising of sample preparation, dispensing of titrant solution, stirring, measuring and waiting times, recognition of the end point and storing the results. All the parameters that a titration requires are grouped into a method.

The titrators are already supplied with a set of standard methods or you can create your own. Using a floppy disk or connecting the titrator to the HI 900 PC application, methods (standard and user) can be upgraded, stored or deleted.

Clip-Lock™ Exchangeable Burette System

With Clip-Lock™, it only takes a couple of seconds to exchange the reagent burettes to perform a different titration.

With conventional titrators, there is the risk of cross contamination of titrants when exchanging reagents. Reconfiguring the titrator for different sample methods consumes time and reagents. Each method may need different reagents and care must be used when purging and cleaning the burette. To avoid these problems, HANNA introduces the Clip-Lock™ exchangeable burette system to prevent cross

contamination while reducing loss of time and reagents. Burettes simply slide out for quick exchanges and detaching the aspiration and dispensing tubes from the titrant bottles is easy.

Having several prepared burettes on hand will make the HANNA 900 series the fastest and most versatile titration systems available. Interrupting an important cycle of analysis due to a malfunctioning burette is a thing of the past. With the HANNA Clip-Lock™ system you can simply substitute the burette and complete all your tests with the same titrant!

HANNA's burettes feature a threaded screw connection to prevent leakage problems. Burettes are available in 5 mL, 10 mL & 25 mL sizes and are made of chemically resistant material to ensure many years of trouble-free operation.

HI 901 Connectivity

PC with HANNA software

VGA Display

Parallel Printer

PC Keyboard

SPECIFICATIONS	mV	pH	Temperature
Range	-2000.0 to 2000.0 mV	-2.000 to 20.000 pH	-5.0 to 105.0°C/23 to 221°F/ 268.2 to 378.2 K
Resolution	0.1 mV	0.1/0.01/0.001 pH	0.1°C/0.1°F/0.1K
Accuracy (@25°C/77°F)	±0.1 mV	±0.001 pH	±0.1°C/±0.2°F/±0.1K (excluding probe error)
Burette Sizes	5, 10, and 25 mL		
Burette Resolution	1/40000		
Display Resolution	0.001 mL		
Dosing Accuracy	±0.1% of full burette volume		
Display	graphic LCD, 320 x 240 pixel LCD		
Languages	English, Italian, Portuguese, Spanish		
Methods	up to 10,000 methods (standard and user-defined)		
Burette Auto-Detection	burette size is automatically recognized when inserted into the unit		
Programmable Stirrer	propeller type, 100-2500 RPM, automatically held within 10% of the set value, resolution 100 rpm		
Flow Rate	user-selectable from 0.1 mL/min to 2 x burette volumes/min		
pH/mV Measurement	titrators can also perform direct pH and mV measurements		
Temperature Compensation	manual or automatic (ATC)		
pH Calibration	manual or automatic at one to five points with four buffer sets or custom buffers		
Potentiometric Titrations	acid-base (pH or mV-Mode), redox, precipitation, complexometric, non-aqueous,ion-selective, argentometric (in mV-mode only)		
HI 901 Titration Methods	fixed mV or pH end-point detection & first equivalency point detection (with the 1st or 2nd derivatives)		
Measurement Units	user specified expression of concentration units to suit specific calculation requirements		
Real Time & Stored Graphs	mV-volume or pH-volume titration curve, 1st derivative curve or 2nd derivative curve, in pH-mode or mV-mode; pH/mV values versus time-datalogging results		
Data Storage:	up to 100 complete titration and pH/mV logging complete reports		
Disk Drive:	built-in 3.5" floppy disk drive allows storage and transfer of configurations, preprogrammed methods, custom methods, titration reports and bitmap graph files		
Peripherals	connections for VGA display, PC-keyboard, parallel printer, RS 232 input, interface for future expansion		
GLP Conformity	instrumentation data storage and printing capabilities		
Operating Environment	10 to 40°C (50 to 104°F), up to 95% RH		
Storage Environment	-20 to 70°C (-4 to 158°F), up to 95% RH		
Power	110V/220 Vac; 50-60Hz		
Dimensions	390 x 350 x 380 mm (15.3 x 13.8 x 14.9 in)		
Weight	approx. 10 kg (22 lbs.) with one pump and stirrer assembly		

ORDERING INFORMATION

HI 901-01 (115V) and **HI 901-02** (230V) is supplied with (1) 25 mL glass burette, (1) burette driver assembly, power adapter and instructions.

HI 84430

Total Titratable Acidity Titrator

- User-friendly interface
- Dedicated HELP key
- Simple to operate
- Log on demand
- GLP features

Titrator, pH meter, pH electrode and magnetic stirrer in one compact unit!

Total Titratable Acidity

The HI 84430 is an automatic titrator designed for easy, fast and accurate analysis of total titratable acidity in water. Potentiometric endpoint determination, peristaltic titrant delivery and integrated magnetic stirring systems eliminate the error and technique dependent results associated with manual titrations.

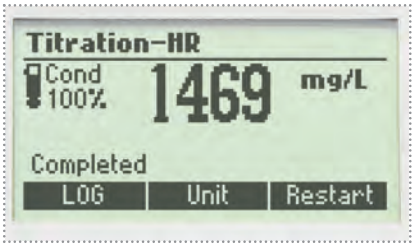
The accuracy of the instrument is ensured by performing a peristaltic pump calibration using the provided HANNA standard. The HI 84430 endpoint determination algorithm analyzes the pH vs. volume curve to determine the exact pH endpoint and performs the necessary calculations. The results are displayed in mg/L $CaCO_3$ or meq/L $CaCO_3$ units on the graphic display. Titrations are conducted using the low range reagent (15 to 500 mg/L as $CaCO_3$) or the high range reagent (400 to 4000 mg/L as $CaCO_3$).

An intuitive interface makes the instrument simple to use. A dedicated HELP key guides the user through set-up and calibration sequences, reports instrument status and aids in troubleshooting.

HI 84430 features include: log on demand for up to 100 samples (50 pH measurements, 50 titration results), GLP compliance.

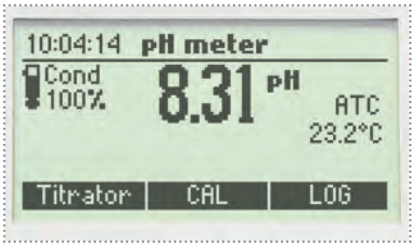
Water acidity is an important parameter to monitor, it can affect the corrosive capacity of water, chemical reaction rates and biological processes. Acidity can also be used to monitor pollution in wastewater and drinking water.

Total titratable acidity is a measure of all of the hydrogen ions present in a sample. Many factors can contribute to the acidity of a water sample including strong acids (hydrochloric, sulfuric, nitric, etc.), weak acids (organic acids) and other acidic components (aluminum, iron, etc.).



Easy and clear measurement

The HI 84430 is a single parameter titrator designed to measure total acidity in a few easy steps. The HI 84430 displays the results directly on the screen in user selectable units.



pH meter with electrode condition on display

The HI 84430 features a pH meter. The HI 84430 also displays the electrode condition on the LCD using HANNA's exclusive electrode diagnostics.

Peristaltic pump

The HI 84430 features a precision peristaltic based titrant delivery system.

The titrant only makes direct contact with the titrant tubing and not the pump interior to virtually eliminate titrant contamination ensuring a long pump operating life.

SPECIFICATIONS		HI 84430
Range	Titratable Acidity (LR)	**mg/L (ppm):** 15.0 - 500.0 mg/L (ppm) as $CaCO_3$ **meq/L:** 0.3 - 10.0 meq/L as $CaCO_3$
	Titratable Acidity (HR)	**mg/L (ppm):** 400 - 4000 mg/L (ppm) as $CaCO_3$ **meq/L:** 8 - 80 meq/L as $CaCO_3$
	pH	-2.0 to 16.0 pH / -2.00 to 16.00 pH
	Temperature	-20.0 to 120.0 °C (-4.0 to 248.0 °F)
Resolution	Titratable Acidity (LR)	0.1 mg/L (ppm); 0.1 meq/L
	Titratable Acidity (HR)	1 mg/L (ppm); 1 meq/L
	pH	0.1 pH / 0.01 pH
	Temperature	0.1 °C
Accuracy (@25°C/77°F)	Titratable Acidity (LR)	5% of reading
	Titratable Acidity (HR)	5% of reading
	pH	± 0.01 pH
	Temperature	±0.4 °C without probe error
Titration Method		acid-base titration (total acidity / strong acidity)
Titration Principle		endpoint titration : 8.30 pH / 3.7 pH
Pump Volume		0.5 mL/min
Stirring Speed		600 rpm
pH Temperature Compensation		manual or automatic from -20 to 120 °C (-4 to 248 °F)
Logging	Titration	up to 50 samples
	pH	up to 50 samples
pH Calibration		one, two or three point calibration; three available buffers (1.68, 4.01; 8.30)
pH Electrode		HI 1131B glass body pH electrode with BNC connector and 1 m (3.3') cable
Temperature Probe		HI 7662-M stainless steel temperature probe with 1 m (3.3') cable(included)
Environment		0 to 50 °C (32 to 122 °F); max 95% RH non-condensing
Power Supply		12 VDC adapter
Dimensions		208 × 214 × 163 mm (8.2 × 8.4 × 6.4") (with beaker)
Weight		2200 g (77 oz.)

ORDERING INFORMATION

HI 84430-01 (115V) and **HI 84430-02** (230V) are supplied with HI 1131B pH electrode, HI 7071 filling solution (30 mL), HI 7662-M temperature probe, HI 84430-50 titrant low range (100 mL), HI 84430-51 titrant high range (100 mL), HI 84430-55 pump calibration solution (230 mL), HI 84430 additional reagent (30 mL), HI 7061 cleaning solution, HI 7001M pH 1.68 buffer solution (230 mL), HI 7004M pH 4.01 buffer solution (230 mL), HI 70083M pH 8.30 buffer solution (230 mL), 100 mL beakers (2), tube set with dispensing tip, medium stir bars (2), 12 VDC adapter, instruction manual and quick reference guide.

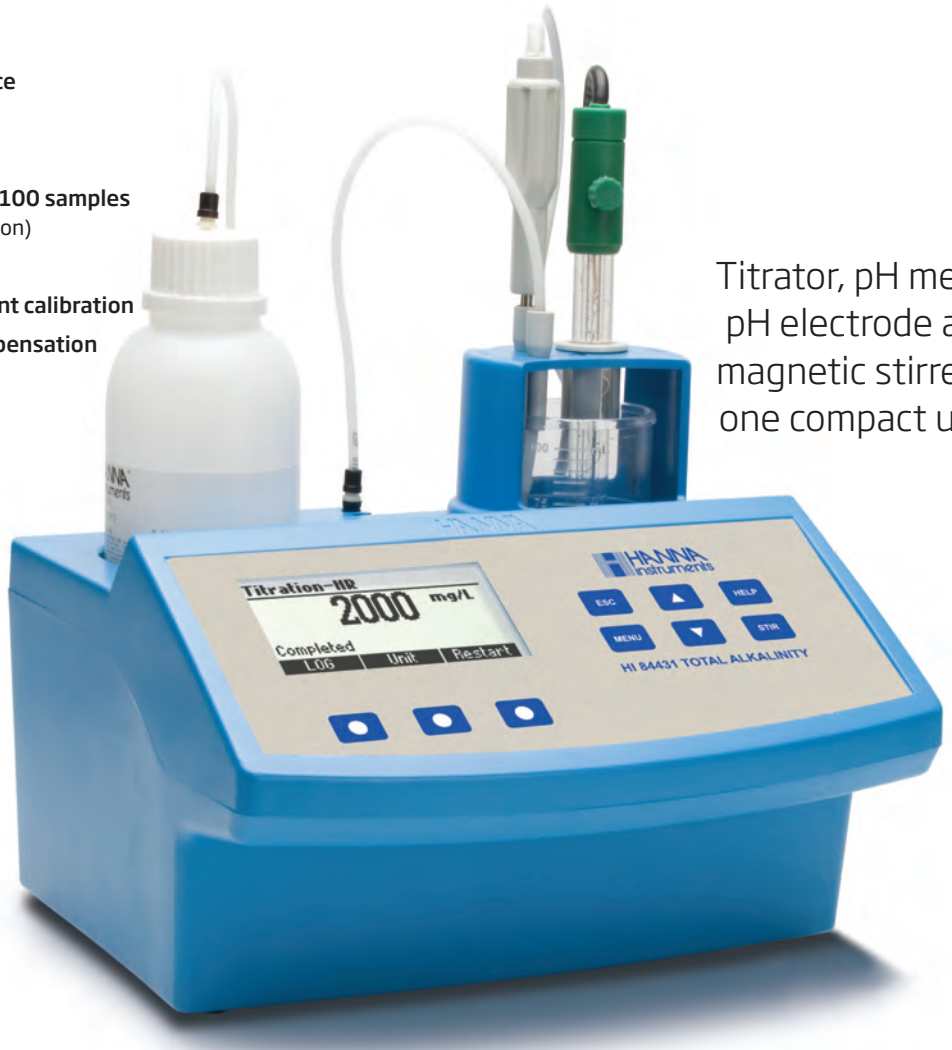
ACCESSORIES

HI 84430-50 Titrant solution for Low Range, 100 mL
HI 84430-51 Titrant solution for High Range, 100 mL
HI 84430-55M Pump calibration solution, 230 mL
HI 84430-58 Additional reagent, 30 mL
HI 84430-70 Reagents kit for low and high range (about 150 titrations)
HI 84430-71 Reagents kit for low range (about 150 titrations)
HI 84430-72 Reagents kit for high range (about 150 titrations)
HI 70483T Tube set with cap for titrant bottle and tip
HI 731319 Stir bar, 25 x 7 mm (10)
HI 731342 Pipette for automatic dosage, 2000 µL
HI 731352 Tip for 2000 µL graduated pipette (4)
HI 731341 Pipette for automatic dosage, 1000 µL
HI 731351 Tip for 1000 µL graduated pipette (25)

HI 84431 • HI 84442

Total Titratable Alkalinity Titrators

- **User-friendly interface**
- **Dedicated HELP key**
- **Simple to operate**
- **Log on demand up to 100 samples** (50 for pH; 50 for titration)
- **GLP features**
- **One, two or three point calibration**
- **pH temperature compensation**



Titrator, pH meter, pH electrode and magnetic stirrer in one compact unit!

Total Titratable Very Low Alkalinity

The HI 84442 is a dedicated mini titrator and pH meter designed for very low levels of alkalinity displayed as 5.0 to 20.00 mg/L as $CaCO_3$ or 0.1 to 0.4 meq/L as $CaCO_3$. It utilizes an electrometric titration with a pH electrode to determine the total titratable alkalinity in water. As titrant is slowly added to the sample solution the pH and temperature are carefully monitored. The software analyzes the resulting pH curve and determines the volume of titrant required to reach the endpoint of 4.5 pH. (known as bromcresol green alkalinity).

The dispensed titrant volume is used to automatically calculate the water alkalinity, which can be displayed in mg/L $CaCO_3$ or meq/L. Titrations are conducted using the reagent HI 84442-50.

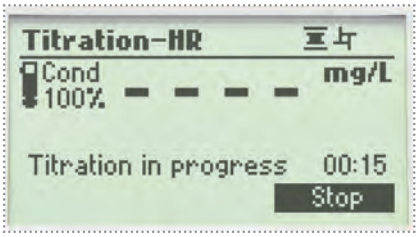
Total Titratable Low to High Alkalinity

The HI 84431 is a dedicated mini titrator and pH meter designed for low to high levels of alkalinity. It utilizes an electrometric titration with a pH electrode to determine the total titratable alkalinity in water. Titrant is slowly added to the sample solution the pH and temperature are carefully monitored. The software analyzes the resulting pH curve and determines the volume of titrant required to reach the endpoint. The user can choose either 8.3 pH (known as phenolphthalein alkalinity) or 4.5 pH (known as bromcresol green alkalinity as endpoints).

The dispensed titrant volume is used to automatically calculate the water alkalinity, which can be displayed in mg/L $CaCO_3$ or meq/L. Titrations are conducted using the low range reagent HI 84431-50 (10 to 500 mg/L as $CaCO_3$) or the high range reagent HI84431-51 (400 to 4000 mg/L as $CaCO_3$).

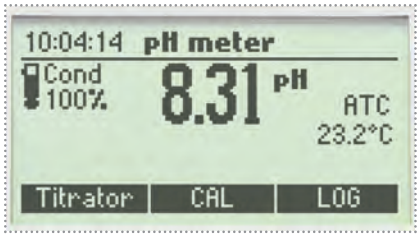
Total titratable alkalinity is a measure of primarily three types of alkalinities present in a water sample: hydroxide, carbonate and bicarbonate. Alkalinity in water can be the result of contributions from common chemicals including carbonate, bicarbonate, hydroxide, phosphates, borate and organic acid salts.

The alkalinity of a water sample indicates the ability to resist pH change, mostly due to the bicarbonate/ carbonate buffer. A low alkalinity level indicates that the water is susceptible to pH changes. While a high alkalinity level indicates that the water will be able to resist pH changes. Alkalinity can also be used to determine the corrosive capacity of water and water hardness.



Electrode condition on display

These titrators feature a pH meter which also displays the electrode condition on the LCD.



Easy and clear measurement

These titrators are designed to measure in a few easy steps. The results are displayed directly on the screen.

SPECIFICATIONS		HI 84431 Total Titratable Very Low Level Alkalinity	HI 84442 Total Titratable Ultra Low Level Alkalinity
Range	Total Titratable Alkalinity (Very Low/Ultra Low Range)	**mg/L (ppm) :** 10.0 - 500.0 mg/L (ppm) as $CaCO_3$ **meq/L :** 0.3 - 10.0 meq/L	**mg/L (ppm) :** 3.00-10.00 mg/L (ppm) as $CaCO_3$ **meq/L :** 0.06-0.20 meq/L
	Total Titratable Alkalinity (HR)	**mg/L (ppm) :** 400 - 4000 mg/L (ppm) as $CaCO_3$ **meq/L :** 8 - 80 meq/L	–
	pH	-2.0 to 16.0 pH / -2.00 to 16.00 pH	
	Temperature	-20.0 to 120.0 °C (-4.0 to 248.0 °F)	
Resolution	Total Titratable Alkalinity (VL/UL)	0.1 mg/L (ppm); 0.1 meq/L	0.01 mg/L; 0.01 meq/L
	Total Titratable Alkalinity (HR)	1 mg/L (ppm); 1 meq/L	–
	pH	0.1 pH / 0.01 pH	
	Temperature	0.1 °C	
Accuracy (@25°C/77°F)	Titratable Alkalinity (VL/UL)	5% of reading	
	Titratable Alkalinity (HR)	5% of reading	–
	pH	± 0.01 pH	
	Temperature	±0.4 °C without probe error	
Titration Method		acid-base titration (total alkalinity)	
Titration Principle		endpoint titration: 4.5 pH / 8.3 pH	endpoint titration: 4.5 pH
Pump Volume		0.5 mL/min	
Stirring Speed		600 rpm	700 rpm
pH Temperature Compensation		manual or automatic from: -20 to 120 °C (-4 to 248 °F)	
Logging	Titration	up to 50 samples	
	pH	up to 50 samples	
pH Calibration		one, two or three point calibration; three available buffers (4.01; 8.30; 10.01)	
pH Electrode		HI 1131B glass body pH electrode with BNC connector and 1 m (3.3') cable	
Temperature Probe		HI 7662-M stainless steel temperature probe with 1 m (3.3') cable(included)	
Environment		0 to 50 °C (32 to 122 °F); max 95% RH non-condensing	
Power Supply		12 VDC power adapter	
Dimensions		208 × 214 × 163 mm (8.2 × 8.4 × 6.4") (with beaker)	
Weight		2200 g (77 oz.)	

Peristaltic pump

Titrant only makes direct contact with the titrant tubing and not the pump interior virtually eliminating titrant contamination and ensuring a long pump operating life.

ORDERING INFORMATION

HI 84431-01 (115V) and **HI 84431-02** (230V) are supplied with HI 84431-50 titrant solution low range (100 mL), HI 84431-51 titrant high range (100 mL) and HI 84431-55M pump calibration solution (230 mL).
HI 84442-01 (115V) and **HI 84442-02** (230V) are supplied with HI 84442-50 titrant solution (100 mL), and HI 84442-55 pump calibration solution (230 mL).

Both meters are supplied with:
HI 1131B pH electrode, HI 7071 filling solution (30 mL), HI 7662-M temperature probe, HI 7061 cleaning solution, HI 7004M pH 4.01 buffer solution (230 mL), HI 70083M pH 8.30 buffer solution (230 mL), HI 7010M pH 10.01 buffer solution (230 mL), 100 mL beakers (2), tube set with dispensing tip, medium stir bars (2), 12 VDC adapter, Instructions and quick reference guide.

HI 84431 ACCESSORIES

HI 84431-50	Titrant solution for low range, 100 mL
HI 84431-51	Titrant solution for high range, 100 mL
HI 84431-55M	Pump calibration solution, 230 mL
HI 84431-70	Reagents kit for low and high range (about 150 titrations)
HI 84431-71	Reagents kit for low range (about 150 titrations)
HI 84431-72	Reagents kit for high range (about 150 titrations)

HI 84442 ACCESSORIES

HI 84442-50	Titrant solution (100 mL)
HI 84442-55	Pump calibration solution (230 mL)

ACCESSORIES

HI 70483T	Tube set with cap for titrant bottle and tip
HI 731319	Stir bar, 25 x 7 mm (10)
HI 731342	Pipette for automatic dosage 2000 µL
HI 731352	Tips for 2000 µL graduated pipette (4)
HI 731341	Pipette for automatic dosage 1000 µL
HI 731351	Tip for 1000 µL graduated pipette (25)

HI 84429

Titratable Acids Mini Titrator and pH Meter for the Dairy Industry

Perform a Complete Analysis with One Compact Meter!

HI 84429 is a low cost, easy to use, automatic titrator and pH meter that reflects HANNA's years of experience as a manufacturer of analytical instruments. HI 84429 performs automatic analysis with all the necessary calculations through a clear and simple interface.

This advanced automatic titrator and pH meter has a powerful and effective built-in algorithm to analyze the shape of the pH electrode response and determines the reaction completion. By pressing the START key, the instrument automatically conducts an endpoint titration the and result is immediately displayed. The HI 84429 has a simple and reliable peristaltic pump to ensure accuracy in dosing and repeatability in measurement.

The HI 84429 comes with a pre-programmed analysis method designed for total titratable acidity measurements on milk. The determination of total acids in dairy products is made according to a neutralization reaction; that is the reaction between the acids found in dairy products and a base. This type of reaction forms the basis of titration methods of analyzing acids. Titratable acidity is measured on a degassed sample at the endpoint of 8.30 pH. The results are expressed in °SH, °Thm °D or % l.a.

Acidity Measurement and Its Significance in the Dairy Industry

There are two fundamentally different conventions for expressing acidity in dairy products: titratable acidity and pH. The pH is a measurement of hydrogen ion concentration while titratable acidity is the neutralizing capacity by a base.

Acidity affects taste, thus this parameter is tested to determine the quality of the milk product. As milk acidity increases over time, measuring this parameter is also a means of monitoring storage conditions. Acidity is determined by an endpoint titration using sodium hydroxide (a base) and is defined as the consumption of base necessary to shift the pH value from 6.6 (corresponding to fresh milk) to a pre-determined basic pH value. While pH 7.0 is the actual point of neutralization, phenolphthalein is commonly employed as a color indicator to determine the endpoint of reaction and with it, color change occurs at pH 8.3. Titratable acidity is expressed as one of a variety of units, the use of which reflects the titration method and strength of base employed during titration.

°SH – Soxlet Henkel degrees: obtained by titrating 100 mL of milk with 0.25N NaOH, using phenolphthalein as the indicator. This method is common in Central Europe.

°Th – Thorner degrees: obtained by titrating 100 mL of milk thinned with 2 parts distilled water, with 0.1 N NaOH, using phenolphthalein as an indicator. Method is used mostly in Sweden and the CIS.

°D – Dornic degrees: obtained by titrating 100 mL of milk thinned with two parts distilled water, with 0.9N NaOH, using phenolphthalein as an indicator. Used mostly in the Netherlands and France.

% l.a. – percent lactic acid: obtained as °D divided by 100. Frequently used in the UK, USA, Canada, Australia and New Zealand.

Note: Taking into account the concentration of sodium hydroxide, the results expressed in one value can be easily converted into any other unit value by consulting the chart at right.

The HI 84429 Mini Titrator eliminates the subjective endpoint color change detection determined by the human eye, and instead employs the sensitivity and accuracy of a pH sensor. The titration method is a potentiometric endpoint determination using a pre-determined pH value.

Acidity of dairy products can be expressed in any of the units described earlier by simply selecting the desired unit. After performing a pump calibration with the supplied standard, you can then make titrations, expressed in the desired unit, using the same titrant. This eliminates the inconvenience of changing tubes, purging the titrant for tube cleaning and being sure that you have the right titrant concentration - saving time and titrant. The quantity of sample needed is much smaller in comparison to a traditional method, where 100 mL of product is used.

	°SH	°Th	°D	% l.a.
NaOH Concentration (N)	0.25	0.1	0.111	0.111
	1	2.5	2.25	0.0225
	0.4	1	0.9	0.009
	4/9	10/9	1	0.01

SPECIFICATIONS		HI 84429
Titrator	Titratable Acidity Low Range	0.0 to 15.0 °SH; 0 to 40 °Th; 0 to 35 °D; 0.00 to 0.35 % l.a.
	Titratable Acidity LR Resolution	0.1 °SH; 1 °Th; 1 °D; 0.01% l.a.
	Titratable Acidity High Range	10 to 75 °SH; 20 to 200 °Th; 20 to 175 °D; 0.0 to 2.0 % l.a.
	Titratable Acidity HR Resolution	0.5 °SH; 1 °Th; 1 °D; 0.1% l.a.
	Accuracy (@25°C/77°F)	5% of reading
	Titration Method	acid-base titration
	Principle	endpoint titration, 8.30 pH
	Pump Debit	0.5 mL/min
	Stirring Speed	800 rpm
	Logging Data	up to 50 samples
pH Meter	Range	-2.0 to 16.0 pH / -2.00 to 16.00 pH
	Resolution	0.1 pH / 0.01 pH
	Accuracy (@25°C/77°F)	±0.01 pH
	Calibration	one, two or three point calibration (pH 4.01, 6.00, 8.30)
	Temperature Compensation	manual or automatic from -20 to 120°C (-4 to 248°F)
	Logging Data	up to 50 samples
Temperature	Range	-20.0 to 120.0°C (-4.0 to 248.0°F)
	Resolution	0.1°C
	Accuracy (@25°C/77°F)	±0.4°C without probe error
Electrodes		FC 260B pH electrode with 1 m (3.3') cable (included), HI 5315 reference probe with 1 m (3.3') cable (included)
Temperature Probe		HI 7662-M stainless steel temperature probe with 1 m (3.3') cable (included)
Environment		0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply		12 VDC adapter (included)
Dimensions		208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight		2200 g (77 oz.)

ORDERING INFORMATION

HI 84429-01 (115V) and **HI 84429-02** (230V) are supplied with FC 260B pH electrode, HI 5315 Reference electrode, HI 7072 Filling solution (30 mL), HI 7662-M temperature probe, HI 84429-50 titrant (100 mL), HI 84429-55 Standard (500 mL), HI 700640 cleaning solution for milk deposits (20 mL, 2), pH 4.01 buffer solution (230 mL), pH 6.00 buffer solution (230 mL), pH 8.30 buffer solution (230 mL, 50 mL beakers (2), 20 mL beakers (2), tube set with cap, stir bars (2 small, 2 large), power cord, 1 mL syringe, capillary dropper pipette and Instruction manual.

SOLUTIONS

HI 84429-50	Titrant solution, 100 mL
HI 84429-55	Pump calibration standard, 500 mL
HI 84429-65	pH 4.01 buffer solution, 230 mL (6)
HI 84429-70	pH 6.00 buffer solution, 230 mL (6)
HI 84429-60	pH 8.30 buffer solution, 230 mL (6)
HI 84429-20	Reagent set starter kit (20 tests)
HI 70640L	Cleaning solution for remaining milk deposits, 500 mL
HI 70641L	Cleaning and disinfecting for dairy products, 500 mL
HI 70642L	Cleaning solution for remaining cheese deposits, 500 mL
HI 7072	Reference electrode filling solution (4)

ACCESSORIES

HI 70483T	Tube set with cap for titrant bottle and tip
HI 731316	Stir bar 12 x 5 mm (5)
HI 731319	Stir bar 25 x 7 mm (10)
HI 740036P	50 mL plastic beaker (10)
HI 740037P	20 mL plastic beaker (10)
HI 740143	Syringe 1 mL (6)
HI 740144	Pipette tip 1 mL (6)

HI 84432

Titratable Acidity Mini Titrator and pH Meter for Fruit Juice

- **Internationally accepted methodology**
  Based on the AOAC International accepted method for acidity determination
- **Data logging**
  Log on demand up to 100 total samples
- **GLP features**
- **Eliminates subjective factors**
- **Three point calibration**
- **Automatic pH temperature compensation**
- **Automatic "anytime" help**
- **Intuitive user interface**

All-in-One Fruit Juice Titrator, pH Meter, pH Electrode and Magnetic Stirrer

FOODCARE line

The HI 84432 digital automatic mini titrator and pH meter is designed for quick and accurate analysis of total titratable acidity in fruit juices. By eliminating subjective factors including color indicators, errors in mathematical calculations or erratic titrant additions from the measurement, the HI 84432 provides quick and accurate, repeatable results without guesswork.

A clear and intuitive user interface allows users to navigate the HI 84432's menus and functions quickly. A HELP key located on the keypad aids in set-up, calibration status and troubleshooting.

By simply pressing the START key, the HI 84432 automatically starts pump operation and titrates the sample to the endpoint. This instrument employs a powerful and effective algorithm to analyze the pH response to determine the exact pH endpoint, then uses this algorithm to make the necessary calculations.

The titratable acidity determination is instantaneously displayed in selected measurement units on the large dot matrix display. The instrument is immediately ready for the next analysis.

The HI 84432 has a simple and accurate peristaltic pump to ensure the best accuracy and repeatability. To ensure instrument accuracy, perform a pump calibration with the provided HANNA standard.

Why This Instrument is So Important...

The measurement of titratable acidity in fruit juices measures the concentration of titratable hydrogen ions contained in the fruit juice samples by neutralization with strong base solution to a fixed pH. This value includes all the substances of an acidic nature in the fruit juice: free hydrogen ions, organic acids, acid salts and cathions.

Because the organic acid is the most acidic component of the fruit juices that react with strong base solutions, the titratable acidity is usually expressed as a percentage (mass/volume) of the predominant acid:

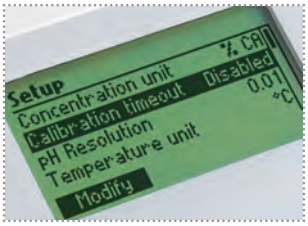
- **Citric acid is present in many fruit species.**
- **Tartaric acid is essentially found in grapes.**
- **Malic acid is present in many fruit species, sometimes together with citric acid or tartaric acid in unripe grapes.**

The HI 84432 Mini Titrator uses a method based on the Official Methods of Analysis of AOAC International. The fruit juice is titrated with a sodium hydroxide solution until the end point at 8.2 pH is reached (determined by potentiometric method). Additionally the HI 84432 has a built-in pH meter for pH measurement (electrode and meter must be calibrated).

Features

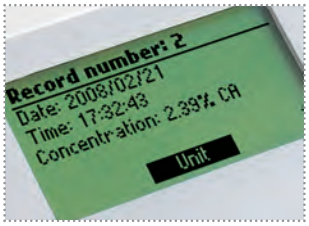
Clear, accurate measurements

Measurement results as well as electrode condition are clearly displayed on the LCD.



Set up configuration menu

Accessed from pH or Titration screens, this menu allows parameters such as date formats, measurement units and language selection to be configured quickly and easily.



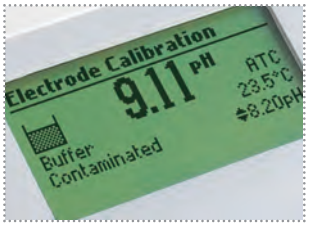
Log and recall data

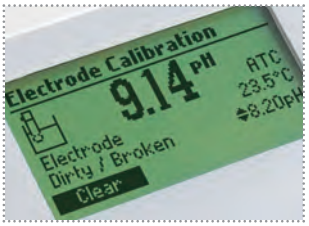
Measurements along with time and date can be stored and recalled at a later date.

Calibration reminder

When calibration is required or due, users are reminded on screen.

The HI 84432 can also display when pump and electrode calibration was last performed.





Calibration warnings

For the most accurate performance, The HI 84432 warns users if there are errors in the calibration process. HI 84432 pinpoints the problem and displays the appropriate error message taking the guesswork out diagnosing errors such as dirty or broken electrodes or contaminated buffers.

Other calibration warnings include: wrong buffer temperature, wrong slope (high and low) and wrong buffer.

SPECIFICATIONS		HI 84432
Titrator	Titratable Acidity Range 15 mL sample	g/100 mL as citric acid : 0.20 - 1.20% CA g/100 mL as tartaric acid : 0.23 - 1.41% TA g/100 mL as malic acid : 0.21 - 1.26% MA
	Titratable Acidity Range 2 mL sample	g/100 mL as citric acid : 0.80 - 8.00% CA g/100 mL as tartaric acid : 0.94 - 9.30% TA g/100 mL as malic acid : 0.84 - 8.30% MA
	Titratable Acidity Resolution	0.01%
	Accuracy (@25°C/77°F)	5% of reading ±0.02
	Titration Method	acid-base titration
	Principle	endpoint titration: 8.20 pH
	Pump Debit	0.5 mL/min
	Stirring Speed	600 rpm
	Logging Data	up to 50 samples
pH Meter	Range	-2.0 to 16.0 pH / -2.00 to 16.00 pH
	Resolution	0.1 pH / 0.01 pH
	Accuracy (@25°C/77°F)	±0.01 pH
	Calibration	one, two or three calibration points; three available buffers (4.01; 7.01; 8.20)
	Temperature Compensation	manual or automatic from -20 to 120°C (-4 to 248°F)
	Logging Data	up to 50 samples
Temperature	Range	-20.0 to 120.0°C (-4.0 to 248.0°F)
	Resolution	0.1°C
	Accuracy (@25°C/77°F)	±0.4°C without probe error
Electrode		HI 1131B glass body pH electrode with BNC connector and 1 m (3.3') cable
Temperature Probe		HI 7662-M stainless steel temperature probe with 1 m (3.3') cable(included)
Environment		0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply		12 VDC adapter (included)
Dimensions		208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight		2200 g (77 oz.)

Titratable acidity of fruit is an important parameter to determine fruit maturity.

ORDERING INFORMATION

HI 84432-01 (115V) and **HI 84432-02** (230V) are supplied with HI 1131B pH electrode, HI 7662-M temperature probe, HI 84432-50 titrant (100 mL), HI 84432-55 pump calibration solution (100 mL), HI 70004 pH 4.01 buffer solution sachets (2), HI 70007 pH 7.01 buffer solution sachets (2), HI 700082 pH 8.20 buffer solution sachets (2), 100 mL beakers (2), tube set with dispensing tip, medium magnetic stir bars (2), 12 VDC adapter and instruction manual.

REAGENTS

HI 84432-50	Titrant solution (1 mL/analysis), 100 mL
HI 84432-55	Pump calibration solution (2.00 mL/calibration), 100 mL
HI 84432-70	Reagents kit (about 150 titrations)

SOLUTIONS

HI 7004M	pH 4.01 buffer solution, 230 mL
HI 7007M	pH 7.01 buffer solution, 230 mL
HI 70082M	pH 8.20 buffer solution, 230 mL
HI 70300M	Storage solution, 230 mL

HI 84437

Titratable Acidity Mini Titrator and pH Meter for Mayonnaise

- **No filtering, just mix and titrate**
- **Data logging**
  Log on demand up to 100 total samples
- **GLP features**
- **Eliminates subjective factors**
- **Can measure in % or g/L acetic acid**
- **Three point calibration**
- **Automatic pH temperature compensation**
- **Automatic "anytime" help**
- **Intuitive user interface**

All-in-One Mayonnaise Titrator, pH Meter, pH Electrode and Magnetic Stirrer

FOODCARE line

The HI 84437 is an easy to use automatic mini titrator and pH meter designed for the rapid and accurate analysis of titratable acidity in mayonnaise. By eliminating subjective factors including color indicators, errors in mathematical calculations or erratic titrant additions from the measurement, the HI 84437 makes titratable acidity analysis precise. This instrument will quickly become a valuable tool for mayonnaise analysis.

A clear and intuitive user interface allows users to navigate the HI 84437's menus and functions quickly. A HELP key located on the keypad aids in set-up, calibration status and troubleshooting.

Simply weigh the sample, dilute with water and press start. The HI 84437 automatically stirs the sample, starts pumps operation and titrates the sample to the endpoint.

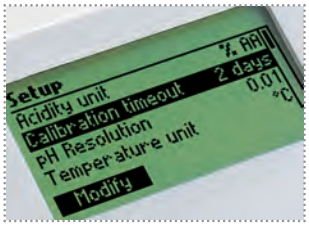
The instrument employs a powerful and effective built-in algorithm to analyze the pH response to determine the exact pH endpoint, then uses this to make the necessary calculations.

Titratable acidity determination is instantaneously displayed in the selected measurement unit on the display. The instrument is then immediately ready for the next analysis .

The HI 84437 employs a simple peristaltic pump to ensure the best accuracy and repeatability in measurements. To ensure the most consistent results, pump calibrations can be performed with the provided HANNA standard.

Clear, accurate measurements

Measurement results as well as electrode condition are clearly displayed on the LCD.



Set up configuration menu

Accessed from pH or Titration screens, this menu allows parameters such as date formats, measurement units and language selection to be configured quickly and easily.

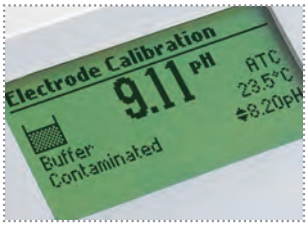
Log and recall data

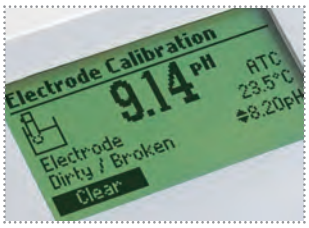
Measurements along with time and date can be stored and recalled at a later date.

Calibration reminder

When calibration is required or due, users are reminded on screen.

The HI 84437 can also display when pump and electrode calibration was last performed.





Calibration warnings

For the most accurate performance, The HI 84437 warns users if there are errors in the calibration process. HI 84437 pinpoints the problem and displays the appropriate error message taking the guesswork out diagnosing errors such as dirty or broken electrodes or contaminated buffers.

Other calibration warnings include: wrong buffer temperature, wrong slope (high and low) and wrong buffer.

SPECIFICATIONS		HI 84437
Titrator	Titratable Acidity Range	g/100 g as acetic acid : 0.16 - 1.60% AA g/L (ppt) as acetic acid : 1.6 - 16.0 g/L (ppt) AA
	Resolution	0.01% AA 0.1 g/L (ppt) AA
	Accuracy (@25°C/77°F)	5% of reading
	Titration Method	acid-base titration
	Pump Debit	0.5 mL/min
	Stirring Speed	700 rpm
	Logging Data	up to 50 samples
pH Meter	Range	-2.0 to 16.0 pH / -2.00 to 16.00 pH
	Resolution	0.1 pH / 0.01 pH
	Accuracy (@25°C/77°F)	±0.01 pH
	Calibration	one, two or three calibration points; 3 available buffers (4.01; 7.01; 8.20)
	Temperature Compensation	manual or automatic from -20 to 120°C (-4 to 248°F)
	Logging Data	up to 50 samples
Temperature	Range	-20.0 to 120.0°C (-4.0 to 248.0°F)
	Resolution	0.1°C
	Accuracy (@25°C/77°F)	±0.4°C without probe error
Electrode		HI 1131B glass body pH electrode with BNC connector and 1 m (3.3') cable
Temperature Probe		HI 7662-M stainless steel temperature probe with 1 m (3.3') cable(included)
Environment		0 to 50°C (32 to 122°F); max 95% RH non-condensing
Power Supply		12 VDC adapter (included)
Dimensions		208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight		2200 g (77 oz.)

ORDERING INFORMATION

HI 84437-01 (115V) and **HI 84437-02** (230V) are supplied with HI 1131B pH electrode, HI 7662-M temperature probe, HI 84437-50 titrant solution (100 mL), HI 84437-55 pump calibration solution (100 mL), HI 7004M pH 4.01 buffer solution (230 mL), HI 7007M pH 7.01 buffer solution (230 mL), HI 70082M pH 8.20 buffer solution (230 mL), 100 mL beakers (2), tube set with dispensing tip, medium magnetic stir bars (2), 12 VDC adapter and instruction manual.

REAGENTS

HI 84437-50	Titrant solution, 100 mL
HI 84437-55	Pump calibration solution, 100 mL
HI 84437-70	Reagents kit (about 150 titrations)

SOLUTIONS

HI 7004M	pH 4.01 buffer solution, 230 mL
HI 7007M	pH 7.01 buffer solution, 230 mL
HI 70082M	pH 8.20 buffer solution, 230 mL
HI 70300M	Electrode storage solution, 230 mL
HI 7061M	Electrode cleaning solution, 230 mL
HI 7077M	Cleaning solution for oil and fats, 230 mL
HI 7071	Filling solution for HI 1131B, 30 mL (4)

OTHER ACCESSORIES

HI 70483T	Tube set with cap and tip for titrant bottle
HI 731319	Stir bar 25 x 7 mm (10)
HI 731342	2000 µL fixed volume pipette for automatic dosage
HI 731352	Tip for 2000 µL fixed volume pipette (4)

HI 84435

Titratable Acidity Mini Titrator and pH Meter for Mustard

- **No filtering, just mix and titrate**
- **Data logging**
  Log on demand up to 100 total samples
- **GLP features**
- **Eliminates subjective factors**
- **Can measure in % or g/L acetic acid**
- **Three point calibration**
- **Automatic pH temperature compensation**
- **Automatic "anytime" help**
- **Intuitive user interface**

All-in-One Mustard Titrator, pH Meter, pH Electrode and Magnetic Stirrer

FOODCARE line

The HI 84435 is an easy to use microprocessor-based automatic mini titrator and pH meter designed for quick and accurate analysis of titratable acidity in mustard. By eliminating subjective factors including color indicators, errors in mathematical calculations or erratic titrant additions from the measurement, the HI 84435 makes titratable acidity analysis precise. This instrument will quickly become a valuable tool for mustard analysis.

A clear and intuitive user interface allows users to navigate the HI 84435's menus and functions quickly. A HELP key located on the keypad aids in set-up, calibration status and troubleshooting.

Simply weigh the sample, dilute with water and press start. The HI 84435 automatically stirs the sample, starts pumps operation and titrates the sample to the endpoint.

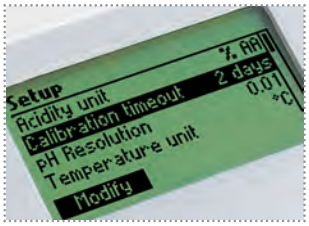
The instrument employs a powerful and effective built-in algorithm to analyze the pH response to determine the exact pH endpoint, then uses this to make the necessary calculations.

Titratable acidity determination is instantaneously displayed in the selected measurement unit on the display. The instrument is then immediately ready for the next analysis .

The HI 84435 employs a simple peristaltic pump to ensure the best accuracy and repeatability in measurements. To ensure the most consistent results, pump calibrations can be performed with the provided HANNA standard.

Clear, accurate measurements

Measurement results as well as electrode condition are clearly displayed on the LCD.



Set up configuration menu

Accessed from pH or Titration screens, this menu allows parameters such as date formats, measurement units and language selection to be configured quickly and easily.

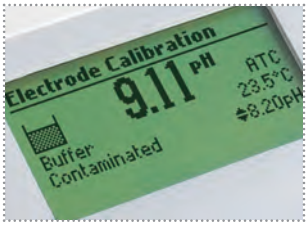
Log and recall data

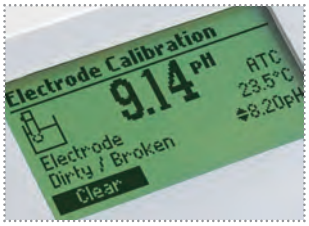
Measurements along with time and date can be stored and recalled at a later date.

Calibration reminder

When calibration is required or due, users are reminded on screen.

The HI 84435 can also display when pump and electrode calibration was last performed.





Calibration warnings

For the most accurate performance, The HI 84435 warns users if there are errors in the calibration process. HI 84435 pinpoints the problem and displays the appropriate error message taking the guesswork out diagnosing errors such as dirty or broken electrodes or contaminated buffers.

Other calibration warnings include: wrong buffer temperature, wrong slope (high and low) and wrong buffer.

SPECIFICATIONS		HI 84435
Titrator	Titratable Acidity Range	g/100 g as acetic acid : 0.25 - 6.00% AA g/L (ppt) as acetic acid : 2.5 - 60.0 g/L (ppt) AA
	Resolution	0.01% AA 0.1 g/L (ppt) AA
	Accuracy (@25°C/77°F)	5% of reading
	Titration Method	acid-base titration
	Principle	endpoint titration, 7.50 pH
	Pump Debit	0.5 mL/min
	Stirring Speed	700 rpm
	Logging Data	up to 50 samples
pH Meter	Range	-2.0 to 16.0 pH / -2.00 to 16.00 pH
	Resolution	0.1 pH / 0.01 pH
	Accuracy (@25°C/77°F)	±0.01 pH
	Calibration	one, two or three calibration points; three available buffers (4.01; 7.01; 8.20)
	Temperature Compensation	manual or automatic from -20 to 120°C (-4 to 248°F)
	Logging Data	up to 50 samples
Temperature	Range	-20.0 to 120.0°C (-4.0 to 248.0°F)
	Resolution	0.1°C
	Accuracy (@25°C/77°F)	±0.4°C without probe error
Electrode		HI 1131B glass body pH electrode with BNC connector and 1 m (3.3') cable
Temperature Probe		HI 7662-M stainless steel temperature probe with 1 m (3.3') cable(included)
Environment		0 to 50°C (32 to 122°F); max 95% RH non-condensing
Power Supply		12 VDC adapter (included)
Dimensions		208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight		2200 g (77 oz.)

ORDERING INFORMATION

HI 84435-01 (115V) and **HI 84435-02** (230V) is supplied with HI 1131B pH electrode, HI 7662-M temperature probe, HI 84435-50 titrant solution (100 mL), HI 84435-55 pump calibration solution (100 mL), HI 7004M pH 4.01 buffer solution (230 mL), HI 7007M pH 7.01 buffer solution (230 mL), HI 70082M pH 8.20 buffer solution (230 mL), 100 mL beakers (2), tube set with dispensing tip, medium magnetic stir bars (2), 12 VDC adapter and instruction manual.

REAGENTS

HI 84435-50	Titrant solution (100 mL)
HI 84435-55	Pump calibration solution (100 mL)
HI 84435-70	Reagents kit (about 150 titrations)

SOLUTIONS

HI 7004M	pH 4.01 buffer solution, 230 mL
HI 7007M	pH 7.01 buffer solution, 230 mL
HI 70082M	pH 8.20 buffer solution, 230 mL
HI 70300M	Electrode storage solution, 230 mL
HI 7061M	Electrode cleaning solution, 230 mL
HI 7071	Filling solution for HI 1131B, 30 mL (4)

OTHER ACCESSORIES

HI 70483T	Tube set with cap and tip for titrant bottle
HI 731319	Stir bar 25 x 7 mm (10)
HI 731342	2000 µL fixed volume pipette for automatic dosage
HI 731352	Tip for 2000 µL fixed volume pipette (4)

HI 84434

Titratable Acidity Mini Titrator and pH Meter for Vinegar

- **Data logging**
  Log on demand up to 100 total samples
- **GLP features**
- **Eliminates subjective factors**
- **Can measure in % or g/L acetic acid**
- **Three point calibration**
- **Automatic pH temperature compensation**
- **Automatic "anytime" help**
- **Intuitive user interface**

All-in-One Vinegar Titrator, pH Meter, pH Electrode and Magnetic Stirrer

The HI 84434 is an easy to use automatic mini titrator and pH meter designed for the quick and accurate analysis of total titratable acidity in vinegar. By eliminating subjective factors including color indicators, errors in mathematical calculations or erratic titrant additions from the measurement, the HI 84434 makes total titratable acidity analysis precise. This will quickly become a valuable analysis tool of vinegar.

A clear and intuitive user interface allows users to navigate the HI 84434's menus and functions quickly. A HELP key located on the keypad aids in set-up, calibration status and troubleshooting.

By simply pressing the START key, the HI 84434 automatically starts pump operation and titrates the sample to the endpoint.

The instrument employs a powerful and effective built-in algorithm to analyze the pH response to determine the exact pH endpoint, then uses this to make the necessary calculations.

The titratable acidity determination is instantaneously displayed in the selected measurement unit on the large display. The instrument is then immediately ready for the next analysis .

The HI 84434 employs a simple peristaltic pump to ensure the best accuracy and repeatability in measurements. To ensure the most consistent results, pump calibrations can be performed with the provided HANNA standard.

The HI 84434 has two operating options:

1) pH measurement using the meter in pH mode.
2) Titratable acidity determination by titration of the vinegar samples with sodium hydroxide solution to 8.2 pH (determined by potentiometric method).

HANNA instruments

With Great Products, Come Great Results™

Clear, accurate measurements

Measurement results as well as electrode condition are clearly displayed on the LCD.

Set Up configuration menu

Accessed from pH or Titration screens, this menu allows parameters such as date formats, measurement units and language selection to be configured quickly and easily.

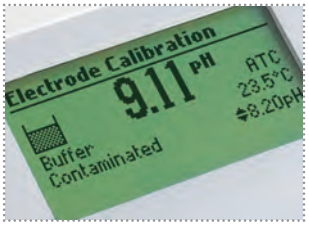
Log and recall data

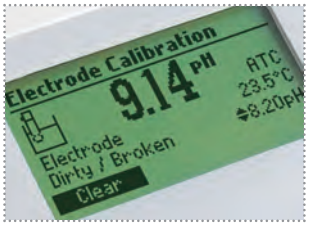
Measurements along with time and date can be stored and recalled at a later date.

Calibration reminder

When calibration is required or due, users are reminded on screen.

The HI 84434 can also display when pump and electrode calibration was last performed.





Calibration warnings

For the most accurate performance, The HI 84434 warns users if there are errors in the calibration process. HI 84434 pinpoints the problem and displays the appropriate error message taking the guesswork out diagnosing errors such as dirty or broken electrodes or contaminated buffers.

Other calibration warnings include: wrong buffer temperature, wrong slope (high and low) and wrong buffer.

SPECIFICATIONS		HI 84434
Titrator	Titratable Acidity Range	g/100 mL as acetic acid: 1.5 – 15% AA g/L (ppt) as acetic acid: 15 – 150 g/L (ppt) AA
	Resolution	0.1% AA 1 g/L (ppt) AA
	Accuracy (@25°C/77°F)	5% of reading
	Titration Method	acid-base titration (total acidity / strong acidity)
	Principle	endpoint titration: 8.20 pH
	Pump Debit	0.5 mL/min
	Stirring Speed	600 rpm
	Logging Data	up to 50 samples
pH Meter	Range	-2.0 to 16.0 pH / -2.00 to 16.00 pH
	Resolution	0.1 pH / 0.01 pH
	Accuracy (@25°C/77°F)	±0.01 pH
	Calibration	one, two or three calibration points; three available buffers (4.01; 7.01; 8.20)
	Temperature Compensation	manual or automatic from -20 to 120°C (-4 to 248°F)
	Logging Data	up to 50 samples
Temperature	Range	-20.0 to 120.0°C (-4.0 to 248.0°F)
	Resolution	0.1°C
	Accuracy (@25°C/77°F)	±0.4°C without probe error
Electrode		HI 1131B glass body pH electrode with BNC connector and 1 m (3.3') cable
Temperature Probe		HI 7662-M stainless steel temperature probe with 1 m (3.3') cable(included)
Environment		0 to 50°C (32 to 122°F); max 95% RH non-condensing
Power Supply		12 VDC adapter (included)
Dimensions		208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight		2200 g (77 oz.)

ORDERING INFORMATION

HI 84434-01 (115V) and **HI 84434-02** (230V) is supplied with HI 1131B pH electrode, HI 7662-M temperature probe, HI 84434-50 titrant solution (100 mL), HI 84434-55 pump calibration solution (100 mL), HI 7004M pH 4.01 buffer solution (230 mL), HI 7007M pH 7.01 buffer solution (230 mL), HI 70082M pH 8.20 buffer solution (230 mL), 100 mL beakers (2), tube set with dispensing tip, medium magnetic stir bars (2), 12 VDC adapter and instruction manual.

REAGENTS

HI 84434-50	Titrant solution, 100 mL
HI 84434-55	Pump calibration solution, 100 mL
HI 84434-70	Reagents kit (about 150 titrations)

SOLUTIONS

HI 7004M	pH 4.01 buffer solution, 230 mL
HI 7007M	pH 7.01 buffer solution, 230 mL
HI 70082M	pH 8.20 buffer solution, 230 mL
HI 70300M	Electrode storage solution, 230 mL
HI 7061M	Electrode cleaning solution, 230 mL
HI 7071	Filling solution for HI 1131B, 30 mL (4)

OTHER ACCESSORIES

HI 70483T	Tube set with cap and tip for titrant bottle
HI 731319	Stir bar 25 x 7 mm (10)
HI 731342	2000 µL fixed volume pipette for automatic dosage
HI 731352	Tip for 2000 µL fixed volume pipette (4)
HI 731341	1000 µL fixed volume pipette for automatic dosage
HI 731351	Tip for 1000 µL fixed volume pipette (25)

HI 84433

Formol Number Mini Titrator and pH Meter for Wines and Fruit Juices

- **Data logging**
  Log on demand up to 100 total samples
- **GLP features**
- **Eliminates subjective factors**
- **Can measure in units of meq/L, meq% or mg/L**
- **Three point calibration**
- **Automatic pH temperature compensation**
- **Automatic "anytime" help**
- **Intuitive user interface**

All-in-One
Formal Number Titrator, pH Meter, pH Electrode and Magnetic Stirrer

WINE line

The HI 84433 is an easy to use automatic mini titrator and pH meter designed for the rapid and accurate determination of formol number in wines or fruit juices. By eliminating subjective factors including color indicators, errors in mathematical calculations or erratic titrant additions from the measurement, the HI 84433 makes formol number determination precise.

A clear and intuitive user interface allows users to navigate the HI 84433's menus and functions quickly. A HELP key located on the keypad aids in set-up, calibration status and troubleshooting.

After an initial sample prep, the HI 84433 starts pump operation and titrates the sample to the endpoint. This instrument employs a powerful and effective algorithm to analyze the pH response to determine the exact pH endpoint, then uses this algorithm to make the necessary calculations.

The formol number determination is instantaneously displayed in selected measurement units on the large dot matrix display. The instrument is ready for the next analysis immediately.

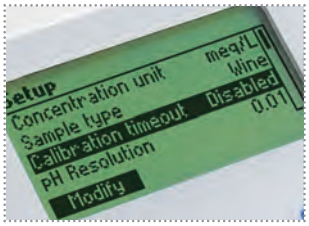
The HI 84433 employs a simple peristaltic pump to ensure the best accuracy and repeatability in measurements. To ensure the most consistent results, pump calibrations can be performed with the provided HANNA standard.

The HI 84433 has two operating options:

1) pH measurement using the meter in pH mode.
2) Formol number determination by titration of wines and fruit juice samples with sodium hydroxide solution to an 8.2 pH endpoint. (Note: sample step prep required)

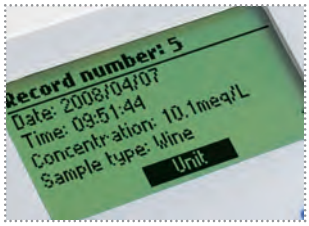
Clear, accurate measurements

Measurement results as well as electrode condition are clearly displayed on the LCD.



Setup configuration menu

Accessed from pH or Titration screens, this menu allows parameters such as date formats, measurement units and language selection to be configured quickly and easily.



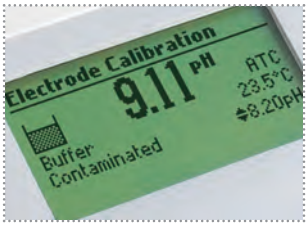
Log and recall data

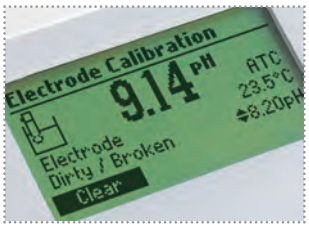
Measurements along with time and date can be stored and recalled at a later date.

Calibration reminder

When calibration is required or due, users are reminded on screen.

The HI 84433 can also display when pump and electrode calibration was last performed.





Calibration warnings

For the most accurate performance, The HI 84433 warns users if there are errors in the calibration process. HI 84433 pinpoints the problem and displays the appropriate error message. This takes the guesswork out of diagnosing errors such as dirty or broken electrodes or contaminated buffers.

Other calibration warnings include: wrong buffer temperature, wrong slope (high and low) and wrong buffer.

SPECIFICATIONS		HI 84433
Titrator	Range	meq/L as N: 2.5 – 50.0 meq/L meq% as N: 0.25 – 5.00 meq% mg/L (ppm) as N: 70 – 1400 mg/L (ppm)
	Resolution	0.1 meq/L 0.01 meq% 1 mg/L (ppm)
	Accuracy (@25°C/77°F)	5% of reading
	Titration Method	acid-base titration
	Principle	endpoint titration: 8.20 pH
	Pump Debit	0.5 mL/min
	Stirring Speed	600 rpm
	Logging Data	up to 50 samples
pH Meter	Range	-2.0 to 16.0 pH / -2.00 to 16.00 pH
	Resolution	0.1 pH / 0.01 pH
	Accuracy (@25°C/77°F)	±0.01 pH
	Calibration	one, two or three calibration points; three available buffers (4.01; 7.01; 8.20)
	Temperature Compensation	manual or automatic from -20 to 120°C (-4 to 248°F)
	Logging Data	up to 50 samples
Temperature	Range	-20.0 to 120.0°C (-4.0 to 248.0°F)
	Resolution	0.1°C
	Accuracy (@25°C/77°F)	±0.4°C without probe error
Electrode		HI 1131B glass body pH electrode with BNC connector and 1 m (3.3') cable
Temperature Probe		HI 7662-M stainless steel temperature probe with 1 m (3.3') cable(included)
Environment		0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply		12 VDC adapter (included)
Dimensions		208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight		2200 g (77 oz.)

ORDERING INFORMATION

HI 84433-01 (115V) and **HI 84433-02** (230V) are supplied with HI 1131B pH electrode, HI 7662-M temperature probe, HI 84433-50 low concentration titrant solution (100 mL), HI 84433-51 pH adjustment solution (100 mL), HI 84433-55 pump calibration solution (100 mL), HI 84433-60 Formol base reagent (100 mL), HI 70004 pH 4.01 buffer solution sachets (2), HI 70007 pH 7.01 buffer solution sachets (2), HI 700082 pH 8.20 buffer solution sachets (2), 100 mL beakers (2), tube set with dispensing tip (2), magnetic stir bars, medium (2), 12 VDC adapter and instruction manual.

REAGENTS

HI 84433-50	Titrant solution, low concentration, 100 mL
HI 84433-51	pH adjustment solution, 100 mL
HI 84433-55	Pump calibration solution, 100 mL
HI 84433-58	Additional reagent, 30 mL
HI 84433-60	Formol base reagent, 230 mL
HI 84433-70	Reagents kit

SOLUTIONS

HI 7004M	pH 4.01 buffer solution, 230 mL
HI 7007M	pH 7.01 buffer solution, 230 mL
HI 70082M	pH 8.20 buffer solution, 230 mL
HI 70300M	Electrode storage solution, 230 mL
HI 7061M	Electrode cleaning solution, 230 mL
HI 731312	Red wine decolorization kit (25 pcs)

OTHER ACCESSORIES

HI 70483T	Tube set, cap and tip for titrant bottle
HI 731319	Stir bar 25 x 7 mm (10)
HI 731342	2000 µL fixed volume pipette for automatic dosage
HI 731341	1000 µL fixed volume pipette for automatic dosage

HI 84100

Sulfur Dioxide Mini Titrator for Wine Analysis

- **Compact unit**
- **Results in minutes**
- **Simple to operate**

The HI 84100 is a low-cost, easy to use, microprocessor-based automatic titrator that incorporates a simple and reliable peristaltic pump which ensures high dosing repeatability. Pump calibrations, performed with the provided HANNA standards, assure the accuracy of the instrument.

The instrument includes a pre-programmed analysis method designed for free and total sulfur dioxide measurements for wine analysis. The HI 84100 uses a powerful algorithm which analyzes the shape of the electrode response in order to determine when the titration reaction has reached completion.

ORDERING INFORMATION

HI 84100-01 (115V) and **HI 84100-02** (230V) are supplied with HI 3148B/50 ORP probe, reagent set for 20 titrations, 50 mL beakers (2), 20 mL beakers (2), scissors, tube set with cap, stir bar, power cable, electrode refill solution (30 mL), 1 mL syringe, wine deposits cleaning solution sachets (2), wine stain cleaning solution sachets (2), power cable and instructions.

PROBES

HI 3148B/50	Glass body ORP Probe with BNC connector and 50 cm (1.6') cable

SOLUTIONS

HI 70300L	Electrode storage solution, (500 mL)
HI 70635	Cleaning solution for wine deposits, 500 mL
HI 70636	Cleaning solution for wine stains, 500 mL
HI 731312	Red wine decolorization kit (25 pcs)

REAGENTS

HI 84100-50	Titrant solution, 100 mL
HI 84100-51	Alkaline reagent, 500 mL
HI 84100-52	Acid reagent for total SO_2 determination, 500 mL
HI 84100-53	Acid reagent for free SO_2 determination, 500 mL
HI 84100-54	SO_2 stabilizer reagent, 25 pieces
HI 84100-55	SO_2 calibration standard, 500 mL

ACCESSORIES

HI 70483T	Complete tubing kit with cap for titrant bottle and tip
HI 731319	Stir bar (5)
HI 740036P	50 mL beaker (10)
HI 740037P	20 mL beaker (10)

The HI 84100 offers the possibility to test free or total SO_2 in all the wines including the red ones, that are difficult to test with manual methods because the color changes are hardly seen.

SPECIFICATIONS	HI 84100
Range	0 to 400 ppm of SO_2
Resolution	1 ppm
Accuracy (@25°C/77°F)	5% of reading or ±1 ppm
Method	Ripper titrimetric method
Principle	equivalence point redox titration
Sample Volume	50 mL
ORP Electrode	HI 3148B/50 glass body ORP probe with BNC connector 50 cm (1.6') cable (included)
Pump Dosing	0.5 mL/min
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Power Supply	115V/230 VAC; 50-60Hz; 10VA
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight	2200 g (77.6 oz.)

Titratable Total Acidity Mini Titrator for Wine Analysis

- **Compact unit**
- **Results in minutes**
- **Simple to operate**

The HI 84102 is a low cost, easy to use, microprocessor-based automatic titrator that features a simple and yet accurate peristaltic pump to ensure the best accuracy and repeatability. By performing pump calibration with the provided HANNA standards, instrument accuracy is assured. The HI 84102 includes a preprogrammed analysis method designed for Total Titratable Acidity measurements on wine.

The instrument has a powerful and effective built-in algorithm to analyze the shape of the pH electrode response and to determine the reaction completion. The HI 84102 performs automatic analysis by performing all the necessary calculations. By simply pressing the START/STOP button, the instrument will automatically make the titration up to the end point. The result is immediately displayed in convenient units, then the instrument is ready for another titration.

SPECIFICATIONS	HI 84102
Range	0.0 to 25.0 g/L (ppt) of tartaric acid
Resolution	0.1 g/L (ppt)
Accuracy (@25°C/77°F)	5% of reading
Method	acid-base titration method
Principle	endpoint titration
pH Calibration	one point in selected endpoint: 7.00 pH or 8.20 pH
Sample Volume	2 mL
Temperature Compensation	automatic from 0.0 to 100.0°C
pH Electrode	HI 1048B glass body pH electrode with CPS™ technology, BNC connector and 1 m (3.3') cable (included)
Temperature Probe	HI 7662-T stainless steel temperature probe with 1 m (3.3') cable (included)
Pump Dosing	0.5 mL/min
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	115V/230 VAC; 50-60Hz; 10VA
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight	2200 g (77.6 oz.)

ORDERING INFORMATION

HI 84102-01 (115V) and **HI 84102-02** (230V) are supplied with HI 1048B pH electrode, HI 7662-T temperature probe, reagent set for 20 titrations, 2000 µL automatic pipette, plastic tips for 2000 µL automatic pipette (2), 50 mL beakers (2), tube set with cap, stir bar, refill solution (30 mL), 1 mL syringe, wine deposits cleaning solution sachets (2), wine stain cleaning solution sachets (2), power cable and instruction manual.

ELECTRODES

HI 1048B	Glass body pH Electrode with CPS™ technology, BNC connector and 1 m (3.3') cable
HI 7662-T	Temperature Probe

SOLUTIONS

HI 70300L	Electrode storage solution, 500 mL
HI 70635	Cleaning solution for wine deposits, 500 mL
HI 70636	Cleaning solution for wine stains, 500 mL
HI 731312	Red wine decolorization kit (25 pcs)
HI 84102-50	Titrant solution, 100 mL
HI 84102-55	Calibration standard, 100 mL
HI 84102-60	Buffer solution 1, pH 7.00, 500 mL
HI 84102-61	Buffer solution 2, pH 8.20, 500 mL

ACCESSORIES

HI 70483T	Complete tubing kit with cap for titrant bottle and tip
HI 731316	Stir bar (5)
HI 731342	Automatic pipette 2000 µL
HI 731352	2000 µL automatic pipette tips (4)
HI 740036P	Beaker 50 mL (10)

HI 83540

Alcohol in Wine Mini Titrator

About the instrument

- Backlit LCD with user-friendly interface
- Log and recall data
- USB connection - PC compatible
- GLP features
- Calibration data reminders
- Built-in magnetic stirrer
- Twist-on electrode holder
- Automatic (ATC), manual (MTC) or no temperature compensation (NoTC)

About the Measurement

- Exclusive HANNA patent pending conductimetric known addition procedure
- Fast results: tests in less than 5 minutes
- No sample preparation required
- Low cost
- Better than 1.0% accuracy
- Not dangerous, no need for toxic reagents
- Automatic sugar compensation: fixed, by wine type, and by sugar concentration
- No barometric pressure dependency

Method for alcohol determination

With this instrument, alcohol determination is made using a new, state of the art method. The wine sample is measured before and after the HANNA reagent is added. The difference between measurements is used to calculate the alcohol content.

Until now, the determination of alcohol in wine required wine makers to invest in expensive gas chromatography or HPLC equipment, or to use alternate methods such as ebulliometry or hydrometry which are time consuming. HANNA's new HI 83540 alcohol determination analyzer uses a patent pending conductimetric known addition procedure that allows wine makers to accurately determine alcohol concentration in minutes. The basis for this invention is that the change of electric conductivity (EC) of a wine after the addition depends on the amount of alcohol. The complex software of the instrument performs all the necessary calculations and adjustments, providing the user with a direct readout of alcohol in % volume on the graphic LCD.

In addition to the HI 83540's logging, storage and recall features, readings can be transferred to a PC for further analysis and storage via USB.

Significance of use

Alcohol content is a critical parameter in the analysis of wine, representing the first and most important criteria for classifying the wine into quality classes.

From a qualitative point of view, alcohol concentration has an important role in the conservation of a wine over time.

From a sensory point of view, alcohol content influences the power, warmth and sweetness of a wine. Lower alcoholic concentrations tend to taste sweeter.

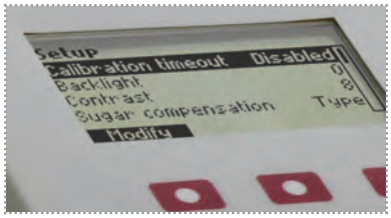
The HI 83540 meter measures the alcohol content in wine simply and accurately, displaying the results directly in % v/v units.

Sugar content:

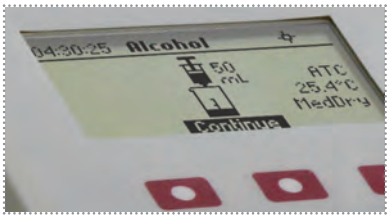
Sugar has a direct effect on the concentration of alcohol in wine. For this reason, HI 83540 features a built-in algorithm for sugar content compensation. There are three types of sugar content compensation: fixed sugar compensation (the same compensation for all wine types); specific wine type sugar compensation and sugar content compensation (compensation made when the sugar content of a wine is known).

LCD Display Examples

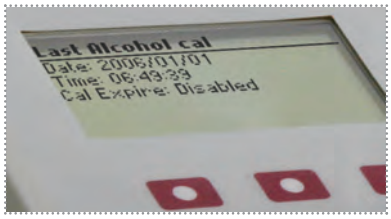
Fast, easy measurements



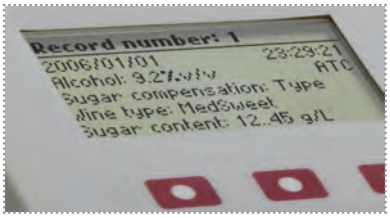
Setup



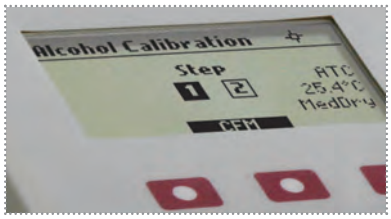
Sample preparation



GLP



Recall



Alcohol calibration

Easy Measurements

Step 1

Fill the beaker with the wine sample

Step 2

Add HI 83540-50 standard solution

Step 3

Read the results

SPECIFICATIONS		HI 83540
Range		0.0 to 25.0 %v/v
Resolution		0.1 %v/v
Accuracy (@25°C/77°F)	Fixed Sugar Compensation	0.7 %v/v for dry and medium-dry wines (less than 12 g/L (ppt) sugar)
	Type Sugar Compensation	dry range: 0.4 %v/v (less than 4 g/L (ppt) sugar) medium-dry range: 0.4 %v/v (4 g/L (ppt)..12 g/L sugar) medium-sweet range: 0.8 %v/v (12 g/L (ppt)..45 g/L sugar) sweet range: 0.8 %v/v (45 g/L (ppt)..180 g/L sugar)
	Sugar Content Compensation	dry range: 0.2 %v/v (less than 4 g/L (ppt) sugar) medium-dry range: 0.2 %v/v (4 g/L (ppt)..12 g/L sugar) medium-sweet range: 0.4 %v/v (12 g/L (ppt)..45 g/L sugar) sweet range: 0.4 %v/v (45 g/L (ppt)..180 g/L sugar)
Sample volume		60 mL
Temperature Compensation		5-35 °C (41 to 95 °F)
Electrode		HI 76315 alcohol probe
Stirring Speed		900 rpm
Environment		0 to 50 °C (32 to 122 °F); max 95% RH non-condensing
Power Supply		12 VDC adapter (included)
Dimensions		208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight		2200 g (77.6 oz.)

ORDERING INFORMATION

HI 83540-01 (115V) and **HI 83540-02** (230V) are supplied with HI 76315 alcohol probe, reagents set for 50 tests, 60 mL plastic syringe, 30 mL plastic syringe, 100 mL beaker, stir bar, 12 VDC adapter and Instruction manual.

PROBE

HI 76315	Alcohol probe

REQUIRED REAGENTS AND ACCESSORIES

HI 83540-50	Standard solution, 500 mL (3)
HI 731312	Red wine decolorization kit (25 pcs)
HI 83540-51	Electrode cleaning solution, 230 mL
HI 83540-55	Calibration solution, 230 mL
HI 731319	Stir bar (10)
HI 740035	Electrode holder and beaker
HI 740225	60 mL syringe
HI 740235	30 mL syringe bar
HI 92000	Windows compatible software

Titration Electrode

CODE	HI 76320D
Description	dual platinum electrode for amperometric titration
Reference	–
Amperometric Cell	platinum-platinum
Junction / Flow Rate	–
Electrolyte	–
Max Pressure	–
Range	T: 20 to 40°C (86 to 104°F)
Tip /Shape	2-pin platinum
Temperature Sensor	–
Amplifier	–
Body Material	glass
Cable	bipolar
Recommended Use	Chlorine titration ASTM D 1253-86

** Not for models with screw cap.

PLUG	
HI 76320D	BNC

Recommended Operating Temperature
20 to 40°C (86 to 104°F)

Reagents

HI 70401	Potassium hydrogen phthalate, 20 g
HI 70402	Tartaric acid, 20 g
HI 70403	Sodium thiosulfate penta hydrate, 20 g
HI 70404	KI powder packets, 100 packets
HI 70405	Glucose fructose standard, 20 g
HI 70406	Sodium chloride, 20 g
HI 70407	Potassium iodate, 20 g
HI 70408	Oxalic acid, 20 g
HI 70409	Potassium permanganate, 20 g
HI 70423	NaOH solution, 0.11N (N/9), 1 L
HI 70424	Amino-propanol buffer, 25 mL
HI 70425	Sulfuric acid (16%), 500 mL
HI 70426	Glyoxal, solution 40%, 100 mL
HI 70427	HNO_3 solution (1.5 M), 500 mL
HI 70428	NaOH solution (0.25 N), 1 L
HI 70429	$AgNO_3$ solution (0.05 M), 1L
HI 70432	Hydrogen Peroxide solution 3%, 25 mL
HI 70433	Stabilized iodine, 0.01N, 1L
HI 70434	Phosphoric acid (85%), 500 mL
HI 70435	NaOH solution (5 M), 500 mL
HI 70436	Deionized water, 3.78 L
HI 70437	Potassium Iodide concentrated (30%) solution, 500 mL
HI 70438	Tris buffer, 1L+3.5 mL
HI 70439	Sodium thiosulfate, 0.1 M, 1 L
HI 70440	Iodine stabilized, 0.02 N, 1 L
HI 70441	Iodine stabilized, 0.04 N, 1 L
HI 70443	Sulfuric acid 10%, 500 mL
HI 70444	Sulfuric acid 25%, 500 mL
HI 70445	Nitric acid solution, 1 M, 500 mL
HI 70446	Fehling solution A, 500 mL
HI 70447	Fehling solution B, 500 mL
HI 70448	$AgNO_3$ solution, 0.02 M, 1 L
HI 70449	EDTA solution, 0.02 M, 1 L
HI 70453	HCL solution, 0.02 N, 1 L
HI 70454	NaOH solution, 0.02 N, 1 L
HI 70455	NaOH solution (0.01 M), 1 L
HI 70456	NaOH solution (0.1 M), 1 L
HI 70457	NaOH solution (1 M), 1 L
HI 70458	H_2SO_4 solution (0.01 M), 1 L
HI 70459	H_2SO_4 solution (0.05 M), 1 L
HI 70462	HCL solution (0.01 M), 1 L
HI 70463	HCL solution (0.1 N), 1 L
HI 70464	HCL solution (1 N), 1 M
HI 70465	Reagent for hydrogen peroxide titration, 25 mL
HI 70466	Phenylarsine oxide standard solution, 500 mL
HI 70467	Acetate buffer pH 4, 230 mL
HI 70468	Potassium iodide powder for 100 tests
HI 70469	0.00188N iodine standard solution, 230 mL (4)
HI 70470	0.00564N phenylarsine oxide (PAO) standard solution, 500 mL
HI 70471	Calibration solution 0,00564N PAO, 500 mL
HI 70472	Phosphate buffer pH 7, 230 mL