



HI 84533

Formol Number Mini Titrator
for Wine and Fruit Juice Analysis



HANNA[®]
instruments



Piston Driven Pump with Dynamic Dosing

The HI 84533 incorporates dynamic dosing to provide precision titrant delivery. Dynamic dosing adjusts the amount of titrant dosed as the end point is approached for increased accuracy in end point detection.

Piston Burette

Piston burettes provide an exceptionally reliable titrant delivery. This highly accurate dosing method is attained by combining a pulse controlled step motor with a 5 mL polypropylene syringe. The rigid and stable body of our syringe allows for less frequent pump calibration. Users no longer have to account for the changing elasticity of tubing associated with peristaltic pumps.

More About Dynamic Dosing

With the integration of our piston burette, our titrator can adjust the volume and frequency of titrant dosed based on relative mV changes in the testing solution. This titrant delivery system is known as dynamic dosing, where titrant is delivered in larger doses at the start of the titration and smaller doses near the end point. These differences in dosing volume and frequency result in a faster titration without sacrificing accuracy. With larger doses in the beginning of the titration, the speed of the titration is increased, where smaller doses near the end point allow for more time for the titrant and analyte to react. Smaller doses also prevent the over titration of a sample and a more accurate determination of titrant volume used.

pH Electrode

The HI 84533 is supplied with the HI 1131B refillable, double junction, combination pH electrode. By design, the HI 1131B has a spherical tip for use in aqueous or liquid solutions. This versatile electrode provides a wide surface of contact with a sample and is ideal for any general acid or base titration in the beverage or agricultural industry.

HI 84533 Mini Titrator for Wine & Fruit Juice Applications

- **Piston Driven pump with Dynamic Dosing**

This piston driven dosing pump incorporates dynamic dosing to provide highly accurate, repeatable results.

- **CAL CHECK™**

CAL CHECK alerts users to potential problems during calibration such as contaminated buffers or dirty/broken electrodes.

- **pH/mV Meter**

In addition to automatic titration, the HI 84533 can also be used as a pH/mV meter.

- **Log-on-Demand**

Log data up to 400 samples (200 for titration; 200 for pH/mV).

- **Graphic Mode/Exportable Data**

Displays in-depth data on titration, which can then be stored and exported to either a USB drive or PC using the USB connection.

- **Automatic Stirrer Speed Control**

Maintains stirrer speed at approximately 600 rpm regardless of viscosity of solution.

- **GLP Feature**

The HI 84533 includes a GLP Feature that allows users to view calibration data for the pH electrode and dosing pump.

- **Easy to use interface**

User intuitive design with large keys and easy to navigate screens.

- **pH Electrode**

The HI 84533 is supplied with the HI 1131B electrode. This versatile electrode can measure all types of fruit juices and wines.



Easy to Use, Fast and Affordable All-in-one Solution

The HI 84533 is an easy to use, fast and affordable mini automatic titrator designed for the rapid and accurate determination of formol number in wines or fruit juices. This new generation of mini automatic titrator improves upon the titrant delivery system and measuring ranges for increased accuracy compared to previous models. This meter reflects Hanna's years of experience as a manufacturer of analytical instruments.

The HI 84533 incorporates a precise piston dosing system which allows for a highly accurate determination of the amount of titrant used. It is also capable of dynamic dosing, making testing both faster and more accurate. A pump calibration performed with the supplied Hanna standard help assure the accuracy of the measurement.

This mini titrator includes a user adjustable programmed analysis method designed for formol number analysis. It employs a powerful and effective algorithm to analyze the pH response to determine the exact pH end point, then uses this algorithm to perform the necessary calculations.

This mini-titrator is also designed to be used as a benchtop pH/mV meter. As a pH meter, it has many features of a professional grade benchtop including automatic calibration up to 3 points with 4 available buffers, a 0.01 pH resolution, accuracy of +/- 0.01 pH, automatic temperature compensation and comprehensive GLP Data. The GLP data includes date, time, offset, slope, and buffers used for calibration. Accuracy is always ensured with Hanna's unique Cal-Check feature, which analyzes the response of the electrode during the calibration process. Based on electrode response in the buffer, indicators are displayed on screen to alert the user of potential problems during calibration. These indicators include Buffer Contaminated, Electrode Dirty / Broken, and overall probe condition as a percentage that is based on both the offset and slope characteristic of the electrode.

The Cal-Check function not only ensures an accurate pH reading when the HI 84533 is used as a pH meter but also an accurate titration since the end point is determined by a set pH value.

Why Formol Number is So Important

The amino-acid content and other nitrogen compounds in fruit juices and wines are expressed as total assimilable nitrogen and is determined by the formol method using an acid-base titration. The formol number (also known as formol index) is a parameter used for evaluation of the quality of fruit juices and wines.

In wines, the concentration of alpha amino acid in grapes change as a function of maturity and crop load (yield to vine size ratio). The concentration increases with fruit maturation and decreases with crop load. In the fermentation of wine, there is a minimum amount of amino acid and other nitrogen compounds (eg: 150-200 mg/L of yeast assimilable nitrogen) that has to be present in the must/juice. Too low of an amount will result in a stuck fermentation in which there is not enough nitrogen for the yeast to thrive. Because of the importance of nitrogen in fermentation, it is desirable to determine the nitrogen concentration before fermentation.

In fruit juices, the formol nitrogen number is one of the basic parameters measured to determine quality. Depending on the type of fruit the number can increase or decrease with maturity. In orange and grapefruit juice, lower values are observed when the fruit is not suitably mature or there has been frost damage. In pineapple juice, a low number could be indicative of over-dilution with water or a disproportionate amount of the core was used. To determine the adulteration of fruit juices, the formol number along with the chromatography characterization of amino acids can be used.



All-in-One

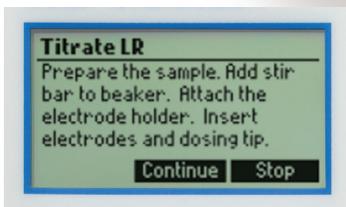
Wine & Fruit Juice Titrator, pH Meter, Electrode and Magnetic Stirrer in one package

Features



Setup Screens

The LCD features an easy to use setup screen that allows the user to change measuring range, time, date, language and more.

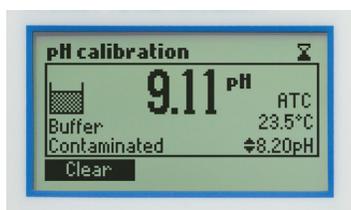


Tutorial and HELP Screens

Accessing the tutorial menu provides helpful information during calibration and titration.

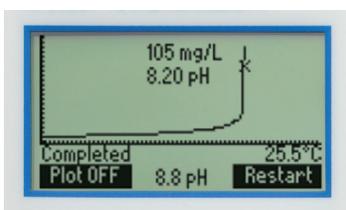
Rear USB Outputs

For PC connection and to export data to a USB drive



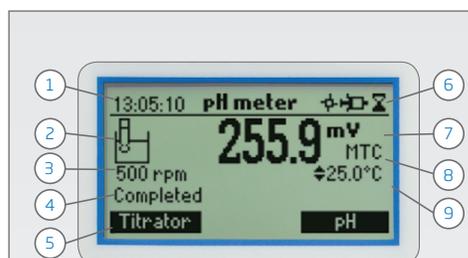
CAL CHECK™

CAL CHECK is a Hanna exclusive process for checking the condition of electrodes which helps keep measurements accurate.



Titration Curve Displayed On Screen

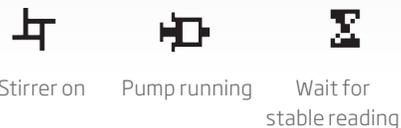
The HI 84533 offers real time graphing of the titration curve on the LCD.



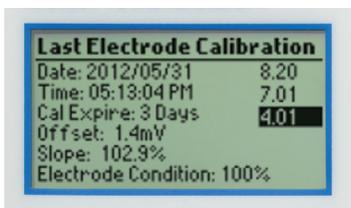
Display

- 1) Current time and instrument mode information (pH meter or Titrator)
- 2) Procedural indicators
- 3) Stirrer speed
- 4) Instrument status
- 5) Virtual option keys
- 6) Stirrer and icon status

During the instrument's operation a set of information are displayed on the LCD. Displayed icons:

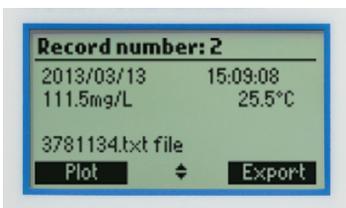


- 7) Main reading information
- 8) pH temperature compensation mode (Manual or Automatic)
- 9) Temperature reading



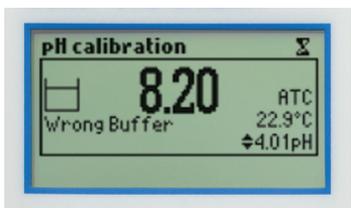
GLP

The GLP feature records electrode and pump calibration data to help keep measurements accurate and reliable.



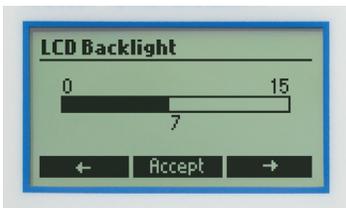
Log and Recall data

The HI 84533 can log up to 400 samples (200 for titration results; 200 for mV/pH) and recall or export data to a USB stick or PC.



Procedure Warnings

Users are warned if there is an error in procedures such as the use of a wrong buffer.



Adjustable Backlit LCD

The HI 84533 offers a backlit LCD with adjustable brightness levels. This ensures that the LCD is always easy to read.

Specifications

HI 84533 - Formol Number

Titration

Range	Low Range: meq/L 2.14 to 28.57 as N meq% 0.21 to 2.85 as N mg/L 30.0 to 400.0 as N	High Range: meq/L 21.7 to 71.4 as N meq% 2.14 to 7.14 as N mg/L 300 to 1000 as N
Resolution	Low Range: 0.01 meq/L; 0.01 meq%; 0.1 mg/L High Range: 0.1 meq/L; 0.01 meq%; 1 mg/L	
Accuracy (@25°C/77°F)	3% of reading or ± 0.1 mg/L	
Sample Volume	Low Range: 10 mL; High Range: 5 mL	
Method	Acid-base titration	
Principle	Endpoint 8.20 pH (selectable from 8.0 - 8.30 pH)	
Pump speed	10 mL/min	
Stirring Speed	600 rpm	
Logging Data	up to 200 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	1, 2, or 3 calibration points; 4 available buffers (4.01; 7.01; 8.20; 10.01)
Temperature Compensation	manual or automatic from -20 to 120°C (-4 to 248°F)
Logging Data	Up to 200 samples (pH or mV)

mV Meter

Range	-2000.0 to 2000.0 mV
Resolution	0.1 mV
Accuracy	± 1.0 mV
Logged Data	Up to 200 samples (pH or mV)

Temperature

Range	-20.0 to 120.0°C (-4.0 to 248.0°F)
Resolution	0.1°C
Accuracy	±0.4°C without probe error

Additional Specifications

pH Electrode	HI 1131B glass body, refillable, with 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)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	12 VDC adapter (included)
Dimensions	235 x 200 x 150 mm (9.2 x 7.9 x 5.9")
Weight	1.9 kg (67.0 oz.)

Accessories

Reagents

HI 84533-50	Titration Solution (230 mL)
HI 84533-55	Pump Calibration Standard (120 mL)
HI 84533-58	Formol Base Reagent (230 mL)
HI 84533-59	pH Adjustment Reagent (30 mL)
HI 84533-60	Additional Reagent (30 mL)

pH Calibration Solutions

HI 7004M	Buffer solution pH 4.01 (230 mL)
HI 7007M	Buffer solution pH 7.01 (230 mL)
HI 70082M	Buffer solution pH 8.20 (230 mL)
HI 7010M	Buffer solution pH 10.01 (230 mL)

Electrode Fill and Storage Solutions

HI 7082	Electrode fill solution (4 x 30 mL)
HI 70300L	Electrode storage solution (500 mL)

Electrode Cleaning Solution

HI 70635M	Cleaning solution for wine deposits (500 mL)
HI 70636M	Cleaning solution for wine stains (500 mL)

Electrodes

HI 1131B	pH Electrode
HI 7662-T	Temperature probe

Other Accessories

HI 70500	Tube set with cap for titrant bottle, tip and valve
HI 71005/8	115 Vac to 12 Vdc, 800 mA
HI 71006/8	230 Vac to 12 Vdc, 800 mA
HI 731319	Stir bar, 25 x 7 mm (10 pcs.)
HI 740036P	100 mL Beaker (10 pcs.)
HI 740236	5 mL Syringe for minititrator
HI 920013	PC Connection Cable

Ordering Information

HI 84533-01 (115V) and HI 84533-02 (230V) are supplied with:

