



HI 84531

Total Alkalinity Mini Titrator for Water Analysis



 **HANNA**[®]
instruments



Piston Driven Pump with Dynamic Dosing

The HI 84531 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 endpoint. 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.

HI 1131B pH Electrode

The HI 84531 is supplied with a 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/base titration in the water industry.

HI 84531 Mini Titrator for Water 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 84531 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 84531 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 84531 is supplied with the HI 1131B electrode. This versatile electrode can measure all types of water.



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

The HI 84531 is a dedicated mini titrator and pH meter designed for low to high levels of alkalinity. It performs a potentiometric titration with a pH electrode to determine total titratable alkalinity and strong alkalinity in water. A titrant is slowly added to the sample while the pH and temperature are carefully monitored. The software analyzes the resulting titration curve and calculates the volume of titrant required to reach the endpoint. The user can choose either to measure strong alkalinity with a 8.3 pH endpoint (known as phenolphthalein alkalinity) or total alkalinity with a 4.5 pH endpoint (known as bromocresol green alkalinity).

The dispensed titrant volume is used to automatically calculate the alkalinity, which can be displayed in mg/L or meq/L as CaCO₃. Titrations are conducted using the low range titrant HI 84531-50 (30 to 400 mg/L as CaCO₃) or the high range titrant HI 84531-51 (300 to 4000 mg/L as CaCO₃).

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 84531 is used as a pH meter but also an accurate titration since the endpoint is determined by a set pH value.

Why Total Alkalinity is So Important

Water alkalinity is an expression of the capacity of water to neutralize an acid. It is calculated by determining the amount of acid required to adjust the pH by titrating to a fixed endpoint. A titration to pH 8.3 is considered Strong Alkalinity (SA), and in natural waters, represents the sum of carbonate (CO₃⁻²) and hydroxide (OH⁻) present. A titration to pH 4.5 represents Total Alkalinity (TA), and is the sum of strong alkalinity plus bicarbonate (HCO₃⁻). The results are expressed as mg/L or meq/L as CaCO₃. Other compounds can contribute to alkalinity including phosphates, borates, silicates or organic acids. Water with low alkalinity will have a low buffering capacity and will take very little acid to change its pH. Water with high alkalinity will be buffered and require more acid to change the pH.

In drinking water treatment, alkalinity is monitored due to the relationship with calcium (Ca⁺²) and magnesium (Mg⁺²) hardness. Water with high alkalinity will typically have high amounts of calcium and magnesium. In wastewater treatment, a level of alkalinity is required to neutralize the acid produced during the nitrification of ammonia/ammonium (NH₃/NH₄⁺) to Nitrite (NO₂⁻) then Nitrate (NO₃⁻²). For every 1.0 mg of ammonia converted to nitrate, 7.14 milligrams (mg) CaCO₃ equivalents are consumed. In denitrification, alkalinity is produced by the conversion of nitrate to nitrogen gas (N₂) at a rate of 3.57 mg CaCO₃ equivalents per mg of nitrate-nitrogen. The alkalinity must be monitored to maintain adequate levels which help maintain the pH of the process.

In industrial water treatment, maintaining the alkalinity is important in order to prevent the pH from becoming acidic which would be corrosive to cooling towers and heat exchangers. But having too high of alkalinity can result in scaling reducing the efficiency of the system.

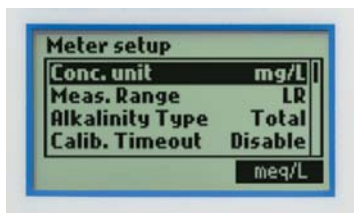
The Hanna HI 84531 follows Standard Methods for the Examination of Water and Wastewater method 2320b and EPA method 310.1.



All-in-One

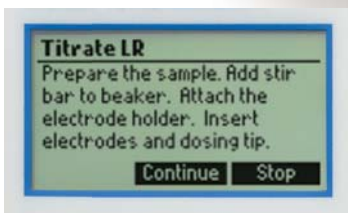
Water Titrator, pH Meter, Electrode and Magnetic Stirrer in one package

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.

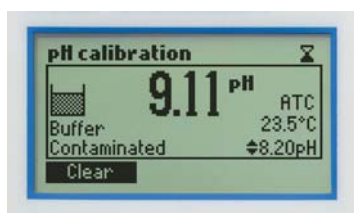


Tutorial and HELP Screens

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



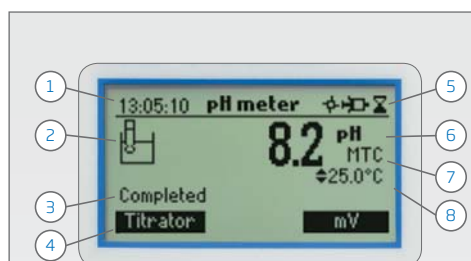
CAL CHECK™

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



Titration Curve Displayed On Screen

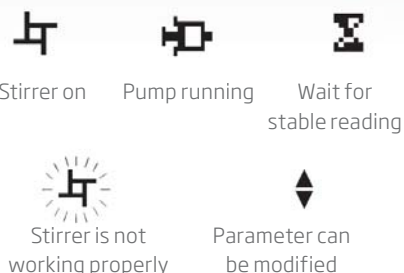
The HI 84531 offers real time graphing of the titration curve on the LCD.



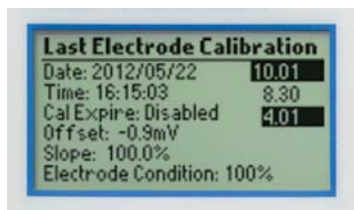
Display

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

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

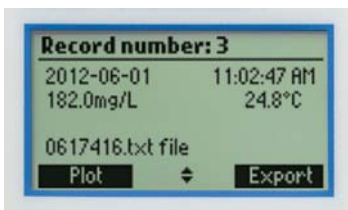


- 6) Main reading information
- 7) pH temperature compensation mode (Manual or Automatic)
- 8) Temperature reading



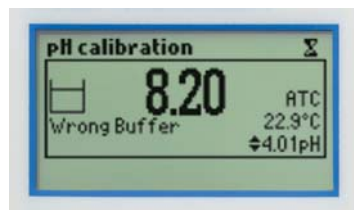
GLP

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



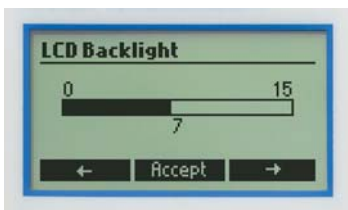
Log and Recall data

The HI 84531 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 84531 offers a backlit LCD with adjustable brightness levels. This ensures that the LCD is always easy to read.

Specifications

HI 84531 - Total Alkalinity

Titrator

Range	Low Range: 50 mL sample 30.0 - 400.0 mg/L as CaCO ₃ 0.6 - 8.0 meq/L as CaCO ₃ High Range: 50 mL sample 300 - 4000 mg/L as CaCO ₃ 6.0 - 80.0 meq/L as CaCO ₃
Resolution	Low Range: 0.1 mg/L; 0.1 meq/L High Range: 1 mg/L; 1 meq/L
Accuracy (@25°C/77°F)	Low Range: 3% of reading or ± 1 mg/L, whichever is greater High Range 3% of reading or ± 10 mg/L, whichever is greater
Method	acid-base titration (total alkalinity / strong alkalinity)
Principle	end point titration : 4.50 pH / 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, 8.30, 10.01)
Temperature Compensation	manual or automatic from -20 to 120°C (-4 to 248°F)
Logging Data	Up to 200 samples (pH and 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 84531-50	Titrant Solution for Low Range (120 mL)
HI 84531-51	Titrant Solution for High Range (120 mL)
HI 84531-55	Pump Calibration Standard for Low Range and High Range (230 mL)

pH Calibration Solutions

HI 7004M	Buffer solution pH 4.01 (230 mL)
HI 7007M	Buffer solution pH 7.01 (230 mL)
HI 70083M	Buffer solution pH 8.30 (230 mL)
HI 7010M	Buffer solution pH 10.01 (230 mL)

Electrode Fill and Storage Solutions

HI 70300L	Electrode storage solution (500 mL)
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Electrode Cleaning Solution

HI 7082	Electrode fill solution (4 x 30 mL)
HI 7061M	Electrode Cleaning Solution (230 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 84531-01 (115V) and HI 84531-02 (230V) are supplied with:



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