25 years
Tradition :: Quality :: Value

HI 221 & HI 223

Calibration Check™ pH Meters

HANNA® instruments

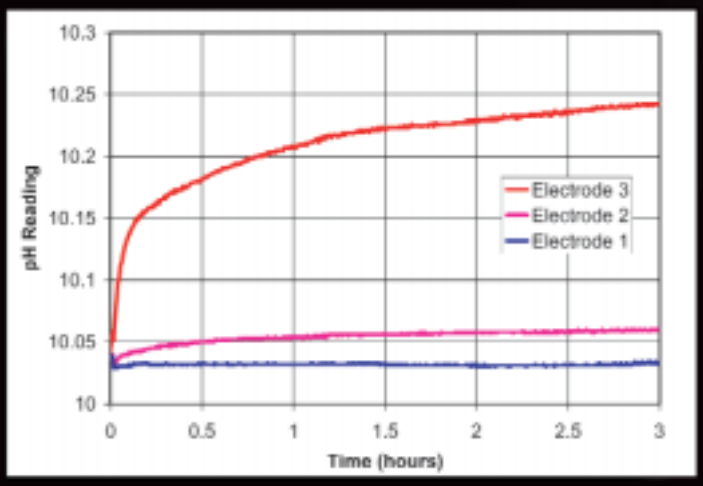
hannainst.com

ISO 9001 CERTIFIED

Calibration Check™ pH Meters

A pH electrode, when it is properly manufactured and is kept clean, will retain its physical characteristics for a long time. A common problem associated with pH measurements is the use of a pH electrode that has not been properly cleaned. This is very important because during calibration the instrument assumes that the electrode used is clean, and the standardization curve created during the calibration process will remain the same until the next calibration. pH meters on the market today will allow an offset of approximately ± 60 mV. The deviation from 0 mV is not unusual; in fact, it represents the true characteristics of the pH electrode. The deviation from 0 mV becomes a problem if it is the result of calibrating a dirty electrode. Figure A below shows that the pH measured by a dirty electrode changes over a period of time. This results from the residue on the pH electrode bulb dissolving into the solution and the electrode gradually returning close to its true characteristics. The resulting pH measurements, based upon the calibration of a dirty electrode, will then be incorrect. Hanna's HI 221 and HI 223 compare the characteristics of the pH electrode from one calibration to the next. In cases of large variances in electrode condition that can only be the result of a dirty electrode, these meters alert the user that the electrode needs to be properly cleaned prior to the calibration process.

Figure A



Electrode 1 was properly cleaned prior to calibration. Electrodes 2 and 3 were not.

GLP

In addition to storing calibration data, the instruments can be programmed to give an alarm when a new calibration is required

Log-On-Demand

Both instruments have a "Log-On-Demand" function to record 100 (HI 221) or 500 (HI 223) readings.

Recall

Readings logged with the HI 221 & HI 223 can be recalled at a later time.

How Calibration Check™ Works

HI 221 and **HI 223** are able to detect if the calibration buffer solution is contaminated.

When a pH electrode is dirty, it has a slow response time & unstable reading. **HI 221** and **HI 223** warn the user in the event a dirty electrode has been used.

Calibration Check™ Features

:: Enhanced Calibration Messages
During calibration, the user is warned if one or more parameters are not suitable to perform an accurate calibration.

:: Electrode Condition on LCD Display
Determined from the electrode offset and slope.

:: Electrode Response Time on LCD Display
Determined from electrode performance during calibration.

:: Calibration Alarm Time Out
Can be programmed from 1 to 7 days or can be disabled.

Other HI 221 & HI 223 features:

:: Logging up to 500 Samples
:: Last Calibration Date & Data
:: Instrument ID Number
:: Real Time Clock
:: PC Interface

Specifications		HI 221	HI 223
Range	pH	-2.00 to 16.00	-2.00 to 16.00 or -2.000 to 16.000
	mV	±699.9; ±2000	±999.9; ±2000
	°C	-20.0 to 120.0	-20.0 to 120.0
Accuracy	pH	±0.01	±0.01; ±0.002
	mV	±0.2 (±699.9); ±1 (±2000)	±0.2 (±699.9); ±0.5 (±999.9); ±1 (±2000)
	°C	±0.4	±0.4
Resolution	pH	0.01	0.01; 0.001
	mV	0.1 (±699.9); 1 (±2000)	0.1 (±999.9 mV); 1 (±2000 mV)
	°C	0.1	0.1
Calibration Check		Yes	Yes
pH Calibration		Automatic 1 or 2 points (pH 1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45)	
Temperature Comp.		Manual (MTC) or Automatic (ATC) temperature compensation from -20.0 to 120.0°C	
pH electrode		**HI 1131P** glass body, single junction refillable cell, BNC + pin (included)	
Temperature probe		**HI 7669/2W** stainless steel probe (included)	
PC Interface		Opto-isolated RS232	
Logging		100 points	500 points
Input impedance		10^{12} ohm	
Power		12VDC adapter (included)	
Environment		0 to 50°C (32 to 122°F) 95% RH	
Dimensions		240 x 182 x 74 mm (9.4 x 7.1 x 2.9")	
Weight		1.1 Kg (2.5 lb.)	
Warranty		5 Years	

Ordering Information

HI 221 and **HI 223** are supplied complete with HI 1131P glass-body combination pH electrode with BNC connector + PIN and 1 m cable, HI 7669/2W stainless steel temperature probe, HI 76404 electrode holder, pH 4.01 and pH 7.01 calibration solutions, electrolyte solution, 12V DC adapter and instruction manual.

Electrodes

All electrodes part numbers ending in P are supplied with a BNC and PIN connector & 1 m (3.3') cable, as shown below:

HI 1043P Use: Strong acid/Alkali
Glass-body, double junction, refillable, combination pH electrode

HI 1053P Use: Emulsions
Glass-body, triple ceramic, refillable, combination pH electrode

HI 1083P Use: Biotechnology
Glass-body, open junction, refillable, combination pH electrode

HI 1131P Use: General Purpose
Glass-body, single junction, refillable, combination pH electrode

Solutions

pH Calibration Solutions

HI 70004P .....pH 4.01 Buffer Sachets @ 25°C, 20 mL, 25 pcs
HI 70007P .....pH 7.01 Buffer Sachets @ 25°C, 20 mL, 25 pcs
HI 70010P .....pH 10.01 Buffer Sachets @ 25°C, 20 mL, 25 pcs
HI 7001L .....pH 1.68 Buffer Solution @ 25°C, 500 mL
HI 7004L .....pH 4.01 Buffer Solution @ 25°C, 500 mL
HI 7004/1L .....pH 4.01 Buffer Solution @ 25°C, 1 L
HI 7004/1G .....pH 4.01 Buffer Solution @ 25°C, 1 US Gallon
HI 7006L .....pH 6.86 Buffer Solution @ 25°C, 500 mL
HI 7006/1L .....pH 6.86 Buffer Solution @ 25°C, 1 L
HI 7006/1G .....pH 6.86 Buffer Solution @ 25°C, 1 US Gallon
HI 7007L .....pH 7.01 Buffer Solution @ 25°C, 500 mL
HI 7007/1L .....pH 7.01 Buffer Solution @ 25°C, 1 L
HI 7007/1G .....pH 7.01 Buffer Solution @ 25°C, 1 US Gallon
HI 7009L .....pH 9.18 Buffer Solution @ 25°C, 500 mL
HI 7009/1L .....pH 9.18 Buffer Solution @ 25°C, 1 L
HI 7009/1G .....pH 9.18 Buffer Solution @ 25°C, 1 US Gallon
HI 7010L .....pH 10.01 Buffer Solution @ 25°C, 500 mL
HI 7010/1L .....pH 10.01 Buffer Solution @ 25°C, 1 L
HI 7010/1G .....pH 10.01 Buffer Solution @ 25°C, 1 US Gallon

Electrode Storage Solutions

HI 70300L .....Storage Solution, 460 mL

Electrode Cleaning Solutions

HI 70000P .....Electrode Rinse Sachets, 20 mL, 25 pcs
HI 7061L .....General Cleaning Solution, 460 mL
HI 7073L .....Protein Cleaning Solution, 460 mL
HI 7074L .....Inorganic Cleaning Solution, 460 mL
HI 7077L .....Oil & Fat Cleaning Solution, 460 mL

Electrolyte Solution for Electrode Refill

HI 7071 ..3.5M KCl + AgCl Electrolyte, 4 x 30 mL, for single junction electrodes
HI 7082 ...3.5M KCl Electrolyte, 4 x 30 mL, for double junction electrodes

Connectivity

Software

HI 92000 .....Windows® compatible software

Hardware

HI 920010 .....9-pin serial cable for PC

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