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Instruction Manual

HI 9124 HI 9125
Portable Waterproof pH Meters

HANNA instruments
www.hannainst.com

Manual abstract:

@@@@& Fax (02) 2758.683 Germany: Tel. (07851) 9129-0 · Fax (07851) 9129-99 Greece: Tel. (210) 823.5192 · Fax (210) 884.0210 Indonesia: Tel. (21) 4584.2941 · Fax (21) 4584.2942 Japan: Tel. (03) 3258.
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2983 Thailand: Tel. @@(01525) 850.855 · Fax (01525) 853.668 USA: Tel. @@h a n n a i n s t . c o m 28 1 Dear Customer, Thank you for choosing a Hanna Instruments product. Please read this instruction manual carefully before using the instruments. This manual will provide you with the necessary information for correct use of the instruments, as well as a precise idea of their versatility. If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com or turn to the back cover for our worldwide contact list.
These instruments are in compliance with directives. RECOMMENDATIONS FOR USERS Before using these products, make sure they are entirely suitable for the environment in which they are used. Operation of these instruments in residential areas could cause unacceptable interferences to radio and TV equipment, requiring the operator to follow all necessary steps to correct interferences. The glass bulb at the end of the pH electrode is sensitive to electrostatic discharges. Avoid touching this glass bulb at all times.
During operation, ESD wrist straps should be worn to avoid possible damage to the electrode by electrostatic discharges. Any variation introduced by the user to the supplied equipment may degrade the instruments' EMC performance. To avoid electrical shock, do not use these instruments when voltages at the measurement surface exceed 24 VAC or 60 VDC. To avoid damage or burns, do not perform any measurement in microwave ovens. HI 9124 & HI 9125 are guaranteed for two years against defects in workmanship and materials when used for their intended purpose and maintained according to instructions. Electrodes and probes are guaranteed for six months. This warranty is limited to repair or replacement free of charge. Damage due to accidents, misuse, tampering or lack of prescribed maintenance is not covered. If service is required, contact the dealer from whom you purchased the instruments. If under warranty, report the model number, date of purchase, serial number and the nature of the problem. If the repair is not covered by the warranty, you will be notified of the charges incurred. If the instruments are to be returned to Hanna Instruments, first obtain a Returned Goods Authorization number from the Technical Service department and then send it with shipping costs prepaid. When shipping any instrument, make sure it is properly packed for complete protection. WARRANTY WARRANTY TABLE OF CONTENTS WARRANTY ..

.. 22 2 Hanna Instruments reserves the right to modify the design, construction and appearance of its products without advance notice. 27 HI 1413B Glass-body, single junction, flat tip, Viscolene, non-refillable, combination pH electrode. Use: surface measurement.
12 mm 0.5" PRELIMINARY EXAMINATION Remove the instrument from the packing material and examine it to make sure that no damage has occurred during shipping. If there is any damage, notify your dealer or the nearest Hanna Customer Service Center. Each meter is supplied with: · HI 1230B combination double-junction, gel pH electrode · HI 7662 stainless steel temperature probe with 1 m (3.3") cable · pH 4.01 & pH 7.01 buffer solutions, 20 mL sachet · 100 mL plastic beaker · 4 x 1.2 AAA rechargeable batteries (inside the instrument) · HI 710044 inductive recharger with power adapter · Instruction manual · Rugged carrying case Note: Save all packing material until you are sure that the instrument functions correctly. All defective items must be returned

in the original packing with the supplied accessories. HI 1413 110 mm 4.

3" ORP ELECTRODES HI 3131B Glass-body, refillable, combination platinum ORP electrode. Use: titration. 12 mm 0.5" HI 3131 150 mm 5.9" "S" VERSION HI 3230B Plastic-body (PEI), gel-filled, combination platinum ORP electrode. Use: general purpose. 12 mm 0.5" HI 3230 120 mm 4.7" GENERAL DESCRIPTION The HI 9124 and HI 9125 are state-of-the-art waterproof, heavyduty pH meters designed to provide laboratory results and accuracy under harsh industrial conditions. A large dual-level LCD, with clear indications related to the electrode and instrument status, pH and temperature displayed simultaneously, GENERAL DESCRIPTION and user friendly graphic symbols during calibration.
The pH calibration procedure is automatic with 5 memorized buffers (4.01, 6.86, 7.01, 9.18 and 10.
01), buffer recognition and automatic temperature compensation. The HI 9125 can be used with ORP (Oxidation Reduction Potential) electrodes. mV measurements automatically change from 0.1 to 1 mV resolution when the reading reaches 700 mV. "S" VERSION HI 4430B Plastic-body (PEI), gel-filled, combination gold ORP electrode.
Use: general purpose. 12 mm 0.5" HI 4430 120 mm 4.7" "S" VERSION Consult the Hanna General Catalog for a complete and wide selection of electrodes. OTHER ACCESSORIES HI 710044 Inductive recharger HI 721317 Rugged carrying case HI 740157 Plastic electrode refilling pipet (20 pcs) HI 76405 Electrode holder HI 7662 Temperature probe with 1 m (3.3') screened cable HI 8427 pH and ORP electrode simulator with 1 m (3.3') coaxial cable ending in female BNC connectors HI 931001 pH and ORP electrode simulator with LCD and 1 m (3.3') coaxial cable ending in female BNC connectors 26 3 FUNCTIONAL DESCRIPTION FC 100B Plastic-body (PVDF), double junction, refillable, combination pH electrode. Use: general purpose for food industry. 12 mm 0.

5" FC 100 120 mm 4.7" FC 200B Plastic-body (PVDF), open junction, conic, Viscolene, non-refillable, combination pH electrode. Use: meat & cheese. 6 mm 0.25" FC 200 75 mm 2.95" FC 210B Glass-body, double junction, conic, Viscolene, non-refillable, combination pH electrode. Use: milk, yogurt. 12 mm 0.5" FC 210 120 mm 4.7" 1) Temperature probe socket.
2) BNC electrode connector. 3) Liquid Crystal Display (LCD).

4) RANGE key, to select pH or mV (HI 9125 only). 5) ON/OFF key, to turn the meter ON and OFF. 6) CAL key, to enter or exit calibration mode. 7) SETUP/CFM key, to enter SETUP mode or to confirm calibration. 8) MR key, to recall stored value from memory. 9) MEM key, to store reading in memory. 10) and keys, for manual temperature setting, or selecting pH buffer value. 11) Secondary display. 12) Primary display. FC 220B Glass-body, triple-ceramic, single junction, refillable, combination pH electrode. Use: food processing. 9.5mm DIA 0.37" 12 mm 0.5" FC 220 120 mm 4.7" FC 911B Plastic-body (PVDF), double junction, refillable with built-in amplifier, combination pH electrode. Use: very high humidity. 12 mm 0.

5" FC 911 110 mm 4.3" 4 25 HI 1330B Glass-body, semimicro, single junction, refillable, combination pH electrode. Use: laboratory, vials. 5mm DIA 0.2" 5mm 0.2" SPECIFICATIONS -2.00 to 16.00 p H RANGE ±699.9 mV / ±1999 mV (HI 9125 only) -20.0 to 120. 0 °C (-4.0 to 248.0 °F) 0.01 p H RE SOL UTION 0.1 mV / 1 mV (HI 9125 only) 0. 1 °C (0.1 °F) ±0.01 p H ACCURACY @ 20 ºC / 68 ºF ±0.2 mV / ±1 mV (HI 9125 only) ±0.4 °C (±0. 8 °F) (exclud ing p rob e error) ±0.02 p H Typ ica l E MC D evia tion ±0.2 mV / ±1 mV (HI 9125 only) ±0.4 °C (±0.8 °F) p H Ca lib ra tion 1 or 2-p oint, with 5 memorized b uffers (4.01, 6.86, 7.01, 9.18, 10.01) ±1 p H From 80 to 108% Automa tic, from -20.

0 to 120.0 °C (-4.0 to 248.0 °F) or ma nua l, without temp era ture p rob e HI 1230B (includ ed) HI 7662 (includ ed) 1012 ohms 4 x 1.2V AAA size (recha rg ea b le b a tteries) a p p rox. 200 hours of continuous use User selecta b le: 20 minutes or d isa b led 191.5x71.6x36 mm (7.5x2.8x1. 4") 425 g (15 oz.) 0 50 °C (32 122 °F) ma x RH 100% 2 yea rs HI 1330 120 mm 4.7" "S" VERSION HI 1331B Glass-body, semimicro, single junction, refillable, combination pH electrode. Use: flasks. 8 mm 0. 3" 7.5mm DIA 0.29" HI 1331 210 mm 8.25" "S" VERSION HI 1230B Plastic-body (PEI), double junction, gel-filled, combination pH electrode. Use: general, field. 12 mm 0.5" HI 1230 120 mm 4.7" "S" VERSION HI 2031B Glass-body, semimicro, conic, refillable, combination pH electrode. Use: semisolid products. 6 mm 0.25" Offset Ca lib ra tion Slop e Ca lib ra tion Temp era ture Comp ensa tion p H E lectrod e HI 2031 75 mm 2.95" Temp era ture Prob e Inp ut Imp ed a nce Ba ttery Typ e & L ife "S" VERSION HI 1332B Plastic-body (PEI), double junction, refillable, combination pH electrode. Use: general purpose. 12 mm 0.5" Auto-off D imensions HI 1332 120 mm 4.

7" Weig ht (meter only) E nvironment Wa rra nty "S" VERSION 24 5 OPERATIONAL GUIDE INITIAL PREPARATION The meter is supplied with rechargeable batteries (located inside the meter - see page 14 for details). To prepare the instrument for use, connect the pH electrode and the temperature probe to the BNC and temperature sockets on the top of the instrument. The temperature probe can be used independently to take temperature measurements, or it can be used in conjunction with the pH electrode to utilize Automatic Temperature Compensation (ATC) mode. If the probe is disconnected, temperature can also be set manually with the UP and DOWN arrow keys. Turn the instrument ON by pressing ON/OFF. At start-up the display will show the battery percentage and then all LCD segments while the instrument performs a self check (or as long as the button is held). pH ELECTRODES All electrodes part numbers ending in B are supplied with a BNC connector and 1 m (3.3') cable, as shown below: HI 1043B Glass-body, double junction, refillable, combination pH electrode. Use: strong acid/alkali. 9. 5mm DIA 0.37" 12 mm 0.5" HI 1043 120 mm 4.7" "S" VERSION HI 1053B Glass-body, triple ceramic, conic shape, refillable, combination pH electrode. Use: emulsions. 12 mm 0.5" HI 1053 120 mm 4.7" "S" VERSION The meter automatically enters measurement mode. After measurement switrode as possible and wait for a few minutes. If manual temperature compensation is desired the temperature probe must be disconnected from the instrument. The display will show the default temperature of 25 °C, or the last temperature set with the "°C" (or "°F") indicator blinking. The temperature can now be adjusted with the UP and DOWN arrow keys. ORP MEASUREMENTS (HI 9125 only) To perform ORP measurements, connect an optional ORP electrode (see "Accessories" section) to the meter and turn it ON. @@@@@@@@@@@PROBLEM D irty pH electrode. SOLUTION The electrode needs to be cleaned. Follow the cleaning procedure on page 20. Clean the electrode. Refill with fresh electrolyte (refillable electrodes only). Check cable and connector. Make sure the electrode is connected.

Check that the sample is within measurable range. Soak electrode in HI 70300 storage solution for at least 30 minutes. Check cable and connector. Replace temperature probe. @@Low electrolyte level (refillable electrodes only). Reading out of range. D isplay shows blinking full scale value. @@@@@@Meter does not work with temperature probe. D isplay shows blinking battery symbol. Meter fails to calibrate or gives faulty readings. @@Meter shuts off. Broken temperature probe. Broken temperature probe. Wrong temperature probe. @@E E PROM error. @@@@@@@@@@@@@@@@NEVER STORE THE ELECTRODE IN DISTILLED OR DEIONIZED WATER. PERIODIC MAINTENANCE Inspect electrode and cable. The cable must be intact. No cracks should be seen on the electrode stem or bulb. If any scratches or cracks are present, replace the electrode. Rinse off any salt deposits with water. Connectors must be perfectly clean and dry. @@Allow the electrode to stand upright for 1 hour. Follow the Storage Procedure above. @@@@· Inorganic Soak in Hanna HI 7074 Inorganic CleaningSolution for 15 min. · Oil/grease Rinse with Hanna HI 7077 Oil & Fat Cleaning Solution for 1 min. IMPORTANT: After performing any of the cleaning procedures, rinse the electrode thoroughly with distilled water and soak it in HI 70300 Storage Solution for at least 1 hour before taking measurements. p H CALIBRATION It is recommended to calibrate the instrument frequently, especially if high accuracy is required. The pH range should be recalibrated: · Whenever the pH electrode or temperature probe is replaced. · At least once a week.

· After testing aggressive chemicals. · When extreme accuracy is required. PREPARATION Pour a small quantity of buffer solution into clean beakers. For accurate calibration use two beakers for each buffer solution, the first one for rinsing the electrode and the second one for calibration. PROCEDURE In order to perform pH calibration: · Make sure that the meter is in the pH mode (HI 9125 only).

· Remove the protective cap and rinse the electrode with some of the buffer solution to be used for the first calibration point. There is a choice of 5 memorized buffers: 4.01, 6.86, 7.01, 9.
18 and 10.01 pH. TWO-POINT CALIBRATION · Press the CAL key. The "CAL" and " " indicators will be displayed. The secondary LCD will display buffer "7.
01". If a different calibration buffer is desired (e.g. "6.86"), use the UP and DOWN arrow keys to change the displayed value.
or · Submerge the electrode approx. 4 cm (1½") into the solution, place the temperature probe as close as possible to the electrode and stir gently. 20 9 · The LCD will flash the "WAIT NOT READY" message. ELECTRODE CONDITIONING & MAINTENANCE · Once the reading is stable, if it is not close to the selected buffer, "WRONG " and "WRONG " will blink alternatively; if it is close to the selected buffer the display will change to "READY" and blinking "CFM". · Press the CFM key to confirm the calibration: the meter stores the offset calibration point. The calibrated reading is then displayed on the primary LCD while the secondary LCD will show the second buffer to be used for calibration (pH 4.01). Not present in gel electrodes. PREPARATION PROCEDURE Remove the electrode protective cap. DO NOT BE ALARMED IF ANY SALT DEPOSITS ARE PRESENT.

This is normal with electrodes and they will disappear when rinsed with water. During transport tiny bubbles of air may have formed inside the glass bulb. The electrode cannot function properly under these conditions. These bubbles can be removed by "shaking down" the electrode as you would do with a glass thermometer. If the bulb and/or junction are dry, soak the electrode in HI 70300 Storage Solution for at least one hour. · After the first calibration point is confirmed, immerse the electrode into the second buffer (pH 4.01, 10.01 or 9.18) and stir gently. Choose pH 4.
01 for acidic samples, and pH 10.01 or 9.18 for alkaline solutions. · Submerge the electrode approx. 4 cm (1½") into the solution, place the temperature probe as close as possible to the electrode and stir gently.
· Select the second buffer value on the secondary display by pressing the UP and DOWN arrow keys. 10 19 TEMPERATURE CORRELATION FOR p H SENSITIVE GLASS The resistance of glass electrodes partially depends on the temperature. The lower the temperature, the higher the resistance. It takes more time for the reading to stabilize if the resistance is higher. In addition, the response time will suffer to a greater degree at temperatures below 25 °C. Since the resistance of the pH electrode is in the range of 50 200 Mohms, the current across the membrane is in the pico Ampere range. Large currents can disturb the calibration of the electrode for many hours. For these reasons high humidity environments, short circuits and static discharges can be detrimental to a stable pH reading. The pH electrode's life also depends on the temperature. If constantly used at high temperatures, the electrode life is drastically reduced. Typical Electrode Life Ambient Temperature 1 3 years 90 °C Less than 4 months 120 °C Less than 1 month Alkaline Error High concentrations of sodium ions interfere with readings in alkaline solutions. The pH at which the interference starts to be significant depends upon the composition of the glass. This interference is called alkaline error and causes the pH to be underestimated. Hanna's glass formulations have the indicated characteristics. Sodium Ion Correction for Glass at 20-25 °C Concentration pH Error 13.

00 0.10 0.1 Mol L-1 Na+ 13.50 0.14 14.00 0.20 12.50 0.10 13.00 0.
18 1.0 Mol L-1 Na+ 13.50 0.29 14.00 0.
40 18 · If the reading is not close to the selected buffer, "WRONG " and "WRONG " will blink alternatively; · If the reading is close to the selected buffer and the reading is stable, the "READY" symbol is displayed and the "CFM" symbol starts blinking on the LCD, asking for confirmation. · Press the CFM key: the value is stored in memory and the meter returns to normal mode. Note: The meter automatically skips the buffer used for the first calibration point to avoid erroneous procedure. A difference of at least 1.5 pH unit is required between the two buffers used for the offset and slope calibration: once calibrated at either pH 7.
01 or 6.86, the instrument automatically ignores the other value for the second point (same for pH 10.01 and 9.18). Note: During calibration, the secondary LCD shows the selected buffer value. For the HI 9125 model, it is possible to display the buffer temperature during calibration by pressing RANGE. Note: To clear a previous calibration and return to the default values, press CFM, then CAL after entering the calibration mode and before the first buffer is accepted. The LCD will show "CLr CAL" for one second, and then will return to normal mode. ONE-POINT CALIBRATION For optimum accuracy it is always recommended to perform a two-point calibration, but for a faster operation a single-point calibration can be used. pH 7.

01 or pH 6.86 (NIST) are normally used for this purpose, even though the meters can be calibrated with any of the 5 memorized calibration values. After calibrating the first point (see above), press the CAL key to end the calibration procedure. 11 p H BUFFER TEMPERATURE DEPENDENCE The temperature has an effect on pH. The calibration buffer solutions are affected by temperature changes to a lesser degree than normal solutions. During calibration the instrument will automatically calibrate to the pH value corresponding to the measured or set temperature. TEMP ºC 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 ºF 32 41 50 59 68 77 86 95 104 113 122 131 140 149 158 167 176 185 194 203 4. 01 4.01 4.00 4.
00 4.00 4.00 4.01 4.02 4.
03 4.04 4.05 4.06 4.08 4.
09 4.11 4.12 4.14 4.16 4.17 4.19 4.20 pH BUFFERS 6. 86 6.98 6.

95 6.92 6.90 6.88 6.86 6.85 6.84 6.84 6.83 6.83 6.
84 6.84 6.84 6.85 6.86 6.
87 6.87 6.88 6.89 7. 01 7.
13 7.10 7.07 7.05 7.03 7.01 7.00 6.99 6.98 6.98 6.

98 6.98 6.98 6.99 6.99 7.00 7.01 7.02 7.03 7.04 9.
18 9.46 9.39 9.33 9.27 9.
22 9.18 9.14 9.11 9.07 9.
04 9.01 8.99 8.97 8.95 8.93 8.91 8.89 8.87 8.85 8.

83 10. 01 10.32 10.24 10.18 10.12 10.06 10.01 9.96 9.92 9.
88 9.85 9.82 9.79 9.77 9.
76 9.75 9.74 9.74 9.74 9.
75 9.76 LCD MESSAGE GUIDE TAGS & SYMBOLS mode tags pH or mV measurement battery symbol calibration messages first or second calibration point temperature reading or pH buffer value available keys in accordance with the selected mode · Mode tags light up for indicating the corresponding active mode, and blink for warning the user. MEASURE on: measurement mode. CALIBRATION on: calibration mode has been entered. MEMORIZE on:

measurement stored in the internal memory and frozen on the display RECALL MEMORIZED on: stored value recalled. · Battery symbol blinking: low battery condition.

Batteries should be recharged. · Calibration messages. @@READY on: buffer has been recognized and reading is stable. @@12 17 Replace the rechargeable batteries only if necessary.

@@@@To enter the Menu mode, while in measurement mode, press and hold the SETUP key for about 5 seconds. Once the menu is entered, each parameter can be changed by using the arrow keys; then pressing the CFM key will confirm the value and scroll to the next parameter. 1. Acoustic signal: On (default) or Off · Insert four new 1.2V AAA 1000 mAh NiMH rechargeable batteries in the battery compartment while paying attention to the correct polarity. Make sure that the "Battery type" switch is in NiMH position. WARNING: Do not replace the rechargeable batteries with normal alkaline batteries. Never place an instrument with alkaline batteries on the recharger. The manufacturer will not assume any obligation for malfunctioning appeared as a result of using alkaline batteries. If for any reason it is necessary to use alkaline batteries, set the "Battery type" selection switch in the proper position, ALK.
2. Auto-off feature: 20 minutes (default) or disabled WARNING!!! PUT THE SWITCH IN ALK POSITION WHEN ALKALINE ARE USED! Ni-MH ALK Ni-MH ALK 3. Temperature measure unit: ºC (default) or ºF After setting the last parameter, pressing the CFM key will confirm the value and return to measurement mode. 16 13 m V CALIBRATION (HI 9125 only) HI 9125 has been precalibrated for mV range at the factory. For optimum accuracy, it is recommended to recalibrate the meter for mV readings at least once a year.
Contact your Dealer or the nearest Hanna Customer Service Center for more information. It is recommended to recharge the rechargeable batteries as soon as the display will flash the battery symbol. The meter is also provided with the BEPS (Battery Error Prevention System) feature which automatically turns the instrument off when the battery level is too low to ensure reliable readings. At start-up the display will show "0 batt" for few seconds, then the meter automatically turns off. TEMPERATURE CALIBRATION HI 9124 & HI 9125 have been precalibrated for temperature at the factory.
For optimum accuracy, it is recommended to recalibrate the meter for temperature at least once a year. Contact your Dealer or the nearest Hanna Customer Service Center for more information. BATTERIES RECHARCHING/REPLACEMENT The instrument is supplied with rechargeable batteries inside. First time you start working with the instrument or when the rechargeable batteries are changed with new ones, perform the following procedure: · Work with the instrument until the rechargeable batteries are fully discharged · Perform a complete charging cycle (about 16 hours). Repeat this procedure 3 times. At start-up the battery percentage is displayed. To recharge the rechargeable batteries, follow the next steps: · Connect the 12VDC power adapter to the main line and to the main line of the battery recharger. The recharger front LED will turn ON. · Place the instrument in the battery recharger case. · The complete charging process takes about 16 hours.

· The Changing LED is ON until the changing process is completed. If the batteries become weak, the display will flash the battery symbol to advise the user that there are approximately 25 hours of working time left. Notes: · As the charging process is performed at low current, the instrument can be left on the recharger more than 16 hours, without damaging the rechargeable batteries. · It is recommended to turn off the instrument while recharging the batteries. The measurements can be affected by the recharging process. · Batteries recharging must only take place in a non hazardous area, using the HI 710044 inductive recharger. 14 15 .