

GroLine

HI9814

pH, EC, TDS and Temperature
Meter with Quick Calibration



INSTRUCTION MANUAL

**Dear
Customer,**

Thank you for choosing a Hanna Instruments product. Please read this instruction manual carefully before using this meter.

This manual will provide you with the necessary information for correct use of this meter, as well as a precise idea of its versatility.

If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com or view our worldwide contact list at www.hannainst.com.

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PRELIMINARY EXAMINATION

Remove the instrument and accessories from the packaging and examine it carefully to make sure no damage has occurred during shipping. Notify your nearest Hanna Instruments Customer Service Center if damage is observed. Each HI9814 is delivered in a cardboard box and is supplied with:

- HI1285-7 pH/EC/TDS probe with built-in temperature sensor, DIN connector and 1m (3.3') cable
- HI50036 Quick calibration solution (3 sachets)
- HI700661 Cleaning solution for agriculture (3 sachets)
- 1.5V AAA alkaline batteries
- Instrument quality certificate
- Electrode quality certificate
- Instruction manual

Note: Save all packing material until you are sure that the meter functions correctly. All defective items must be returned in the original packing with the supplied accessories.

GENERAL DESCRIPTION AND INTENDED USE

HI9814 is a durable, portable pH, conductivity, total dissolved solids and temperature meter ideal for a wide range of measurements encountered in hydroponics, aquaponics or general agriculture applications. The HI9814 features a two button operation system and is simple to use. The housing is waterproof and IP67 rated, ideal for harsh, rugged conditions.

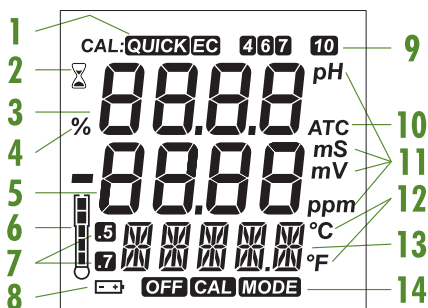
The supplied HI1285-7 multiparameter probe measures pH, EC/TDS, and temperature in one convenient, rugged probe. A preamplifier is integrated into the probe to protect the pH measurement from transient electrical noise. Sources of electrical noise include ballasts used in lighting and pumps to circulate water and nutrient solutions. Other user-selectable features include selectable TDS factors of 0.5 and 0.7 as well as auto-off to prolong battery life.

MAIN FEATURES

- Simultaneous pH, EC/TDS and temperature measurements on a large three line LCD display
- Automatic and simultaneous pH and EC calibration
- Selectable temperature unit
- pH electrode condition display
- mV of pH measurement for pH electrode check
- Last calibration points for pH and EC
- HI1285-7 dedicated pH/EC/TDS/temperature probe
- Probe quick connect system
- Battery life indication and low battery detection
- Auto-off function
- Keystroke confirmation tone
- Waterproof casing IP67

DISPLAY DESCRIPTION

- 1 Quick calibration tag
- 2 Stability indicator
- 3 Primary LCD
- 4 Battery percentage
- 5 Secondary LCD
- 6 Electrode condition indicator
- 7 TDS conversion factor
- 8 Low battery indicator
- 9 pH calibration buffer(s) used
- 10 Automatic Temperature Compensation indicator
- 11 Measurement unit
- 12 Temperature unit
- 13 Tertiary LCD
- 14 Meter modes indicator



SPECIFICATIONS

Range*	-2.00 to 16.00 pH ±825 mV (pH-mV) 0.00 to 6.00 mS/cm (EC) ** 0 to 3000 ppm (0.5 CF)/0 to 3990 ppm (0.7 CF) -5.0 to 105.0 °C / 23.0 to 221.0 °F
Resolution	0.01 pH 1 mV (pH-mV) 0.01 mS/cm 10 ppm (mg/L) 0.1 °C / 0.1 °F
Accuracy @ 25°C / 77°F	±0.02 pH ±1 mV (pH-mV) ±2% F.S. ±2% F.S. ±0.5 °C / ±1.0 °F
Temperature compensation	pH - Automatic EC - Automatic, with $\beta = 1.9\%/^{\circ}\text{C}$
pH calibration	Automatic, 1 or 2 point, with: pH 4.01; pH 7.01; pH 10.01 - one-point calibration using quick calibration solution
EC calibration	Automatic, one-point at 1.41 mS/cm or 5.00 mS/cm - one-point calibration using quick calibration solution
TDS conversion factor	0.5 (500 ppm) or 0.7 (700 ppm)
Probe (included)	H11285-7 pH/EC/TDS/temperature sensor, DIN connector and 1 m (3.3') cable
Battery type / life	1.5V AAA (3 pcs.) approx. 600 hours of continuous use
Auto-off	user selectable: after 8 min, 60 min or disabled
Environment	0 to 50 °C (32 to 122 °F) RH max. 100%
Meter dimensions	154 x 63 x 30 mm (6.1 x 2.5 x 1.2")
Weight (with batteries)	196 g (6.91 oz.)
Casing ingress protection rating	IP67

*the pH range is limited from 0 to 13 pH and the temperature range from 0 to 50 °C (32 to 122 °F) using H11285-7 probe.

**mS/cm is displayed as mS on the display.

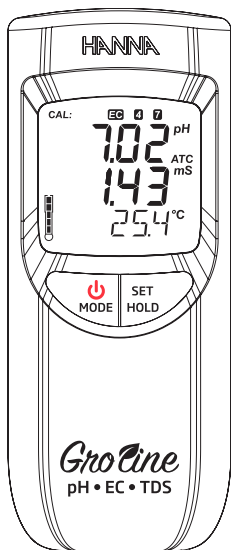
***TDS conversion factor: $1000 \mu\text{S}/\text{cm} = 500 \text{ ppm}$ with 0.5 CF.

OPERATIONAL GUIDE


Each meter is supplied with batteries. Before using the meter for the first time, open the battery compartment and insert batteries, observing the polarity (see “Battery Replacement”).

CONNECTING THE PROBE

With the meter turned off, connect the HI1285-7 probe to the DIN socket on the bottom of the meter by aligning the pins and pushing in the plug firmly. Remove the protective cap from the probe before taking any measurements.



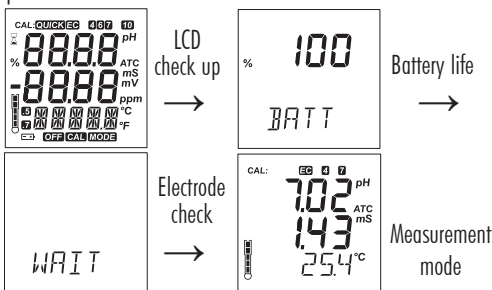
TURNING THE METER ON

To turn the meter ON, press the  button on the front of the meter. If it does not turn on, make sure that the batteries are properly installed in their place.



The meter is provided with an active acoustic signal when a key is pressed.

At start-up the meter displays all LCD segments for a few seconds, followed by the percentage indication of the remaining battery life, displaying "WAIT" until electrode check is in process then the meter enters the normal measurement mode.




Note: The meter detects the presence and the type of the probe at its input.

- If the probe is not connected the message "NO" "PROBE" appears alternatively on the tertiary LCD.
- If the probe is not compatible "WRONG" "PROBE" message appears alternatively on the third LCD line with "---" blinking on the first LCD line.


Note: A HI12943 pH probe may be used on this meter but conductivity reading will not be displayed. "---" and "NoEC" message will be displayed.

- If the readings are out of range, the nearest range limits are displayed blinking (e.g. -2.00 pH -5.0 °C).


ENTERING CALIBRATION MODE

Press and hold the  button until "POWER" and **OFF** tag is replaced by "QUICK" **CAL** tag if quick calibration is selected from setup menu, or "PH STD" **CAL** tag or "EC STD" **CAL** tag if standard calibration is selected from setup menu. Release the button.

ENTERING SETUP MODE


From a measurement screen press and hold  button until "STD" and **CAL** tag is replaced by "SETUP" and **MODE** tag. Release the button.

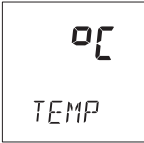

TURNING THE METER OFF



While in measurement mode, press the  button. "POWER" and **OFF** tag will appear. Release the button.



METER SETUP




Setup mode allows configuration of parameters: Temperature unit, Auto-off, Calibration type, Beep confirmation tone, pH Resolution, pH calibration information and TDS conversion factor.



- “TEMP” is displayed on the tertiary LCD line with the current temperature unit (e.g. “TEMP °C”), for °C/°F selection, use the **SET** button. After the temperature unit has been selected, press  to confirm and to enter the “A-OFF” selection.



- Use the **SET** button, to cycle through the auto-off choices: 8 minutes (“8”, default value), 60 minutes (“60”) or disabled (“---”). Press  to confirm and to enter the calibration type selection.


- **CAL** tag is displayed. Use the **SET** button to choose from “STD” (standard calibration) or “QUICK” (one-point quick calibration). Press  to confirm and to enter the “BEEP” selection.


- To switch the beep tone ON or OFF, press the **SET** button; press  to confirm and to enter electrode calibration information “INFO” selection.


- To switch the electrode condition indicator on the LCD ON or OFF, press the **SET** button; press  to exit setup options; Change the set with the **SET** button, then press  to confirm and to enter TDS conversion factor “CONV”.


- “CONV” is displayed on the tertiary LCD line with the current TDS factor (e.g. “0.50”), for selecting, “0.70” TDS factor use the **SET** button. Press  to confirm and to return to normal mode.



pH MEASUREMENT

Make sure the meter has been calibrated before use.

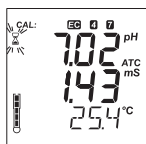
If the probe is dry, soak it in **HI70300** storage solution for a minimum of 30 minutes to reactivate it.

If soiled, clean the electrode by soaking in cleaning solution for 20 minutes, then rinse the tip and soak in storage solution at least 30 minutes before use. Rinse the electrode off well and shake off excess droplets. Recalibrate before using. Submerge the probe in the sample to be tested while stirring it gently. Wait until the ⌚ tag on the LCD disappears. The LCD displays the pH value (automatically compensated for temperature) on the primary LCD, the EC, TDS or pH-mV value on the secondary LCD, while the third LCD line displays the sample temperature.

If measurements are taken in different samples successively rinse the probe tip thoroughly in distilled or deionized water to eliminate cross-

contamination. For better accuracy, frequent calibration of the pH sensor with the meter is recommended. In addition, the meter must be recalibrated:

- whenever the pH electrode is replaced.
- after testing aggressive chemicals.
- when high accuracy is required.
- at least once a month.
- after cleaning the probe.



SECOND LINE MEASUREMENT

While in measurement mode, press the **SET** button to scroll between EC, TDS or mV of pH measurement on the secondary LCD.

EC MEASUREMENT

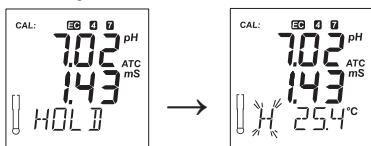
Rinse the probe tip off with lots of clean water to remove storage solution, buffers or samples. Shake off any droplets that remained. Place the probe in the sample to be tested. Use plastic beakers or containers to minimize any electromagnetic interference. Tap the probe lightly on the bottom of the container to remove air bubbles that may be trapped inside the tip.

Wait for a few minutes for the temperature sensor to reach thermal equilibrium, when the ⌚ tag disappears.

The LCD displays the EC or TDS value (automatically compensated for temperature) on the secondary LCD, while the tertiary LCD displays the sample temperature.

FREEZING MEASUREMENT VALUES

While in measurement mode, press and hold the **SET** button until **"HOLD"** appears on the tertiary LCD line for 1 second. The measurement reading will be frozen on the LCD with **"H"** blinking.

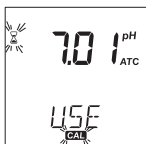


Press any button to resume active measurements.

CALIBRATIONS

pH CALIBRATION

Select calibration type **"STD"** **CAL** from **SETUP**. Place the sensor into the first calibration buffer. If performing a two-point calibration, use pH 7.01 buffer first. The meter will enter the calibration mode, displaying **"pH 7.01 USE"** **CAL** and ⌚ tag blinking.



SINGLE-POINT CALIBRATION

1. Place the probe in any buffer from the selected buffer set. The meter will automatically recognize the buffer value.
2. If the buffer is not recognized or the calibration offset is out of the accepted range **"---- WRONG"** is displayed.
3. If the buffer is recognized **"REC"** is displayed then **"WAIT"** until the calibration is accepted.

If using pH 7.01, after acceptance of the buffer press any key to exit. The **"SAVE"** message is displayed and the meter returns to pH measurement mode.

If using pH 4.01 or 10.01 buffer the **"SAVE"** message is displayed and meter returns to pH measurement mode.

TWO-POINT CALIBRATION

Proceed with steps 1 through 3 under single-point calibration using 7.01 pH buffer first. Then follow the steps below:


The “**pH 4.01 USE**” message is then displayed. Place the probe in the second calibration buffer (pH 4.01 or 10.01). When the second buffer is accepted, the LCD will display “**SAVE**” for 1 second and the meter will return to the normal measurement mode.

If the buffer is not recognized or the slope is out of accepted range “--- **WRONG**” is displayed. Change the buffer, clean the electrode or press any key to exit calibration.

For better accuracy it is always recommended to carry out a two-point calibration.

After the calibration procedure has been completed, the **CAL** tag is turned on together with the calibrated points.

Exiting calibration and resetting default values

After entering the calibration mode and before the first point is accepted, it is possible to quit the procedure and return to the last calibration data by pressing the  button. The LCD displays “**ESC**” for 1 second and the meter returns to normal mode.

To reset the default values and clear a previous calibration, press the **SET** button after entering the calibration mode and before the first point is accepted.

The LCD displays “**CLEAR**” for 1 second, the meter resets to the default calibration and the **CAL** tag with the calibrated points on the LCD disappears.

QUICK CALIBRATION FOR pH AND EC

Select calibration type “**QUICK**” from meter setup. Enter calibration mode. Immerse the probe in the **HI50036** calibration solution. When the standard value is recognized and stability is reached the meter automatically accepts the calibration. The LCD will display “**SAVE**” for 1 second and return to normal measurement mode. If the standard is not recognized or the slope is out of accepted range “--- **WRONG**” is displayed. Change the calibration solution, clean the electrode or press any key to exit calibration. When the calibration procedure is completed, the **QUICK**, **EC** and **6** tags are turned on.

pH ELECTRODE CONDITION

The display is provided with a probe icon (unless the feature is disabled from setup) which indicates the pH electrode status after calibration. The “condition” remains active for

12 hours (unless the batteries are removed).

The electrode condition is evaluated only if the current pH calibration has two points.



With 1 bar it is recommended to clean the electrode and recalibrate. If there is still only 1 bar or 1 bar blinking, replace the probe.

Sensor check

The electrode was specially designed to detect the broken electrode based on a shifted ISO potential value. Setting the meter to pH-mV range the user can check the sensor status at any time. The electrode quality can be checked by measuring the offset value in pH 4.01 buffer (25°C/77°F) and reading the mV value that should be between 10mV to 50mV. If this reading is outside of this range the electrode is considered “poor”. The slope value of the sensor is the difference between readings in pH 7.01 and in pH 4.01 buffers. When the slope reaches the value of about 150 mV, the electrode is considered “very poor”. When “poor” or “very poor”, it is recommended to replace it with a new one.

Note: To ensure reliable readings, the electrode must be cleaned with cleaning solution and then hydrated in storage solution for a minimum of 30 minutes before calibrating the probe.

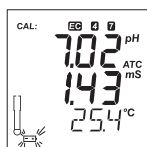
EC CALIBRATION

Rinse the tip off and shake excess droplets from the probe. Select calibration type “EC STD” **CAL**. The meter enters the calibration mode and “1.41 USE” is displayed with **CAL** tag blinking. Immerse the probe in 1.41 mS/cm or 5.00 mS/cm calibration solution. If the standard value is recognized “REC” is displayed then “WAIT” until the calibration is accepted. The LCD will display “SAVE” for 1 second and return to normal measurement mode. If the standard is not recognized “--- WRONG” is displayed.

Change the standard, clean the electrode or press any key to exit calibration. After the calibration procedure has been completed, the **EC** tag is turned on.

BATTERY REPLACEMENT

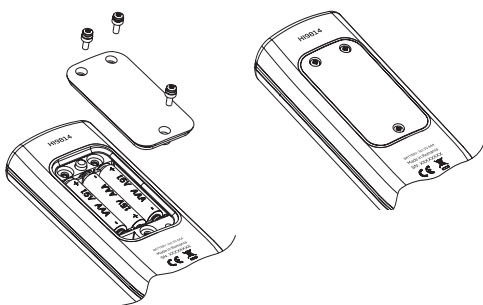
When the remaining battery life is less than 10% the battery tag blinks on the display to warn the user.



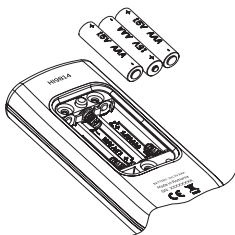
Battery Error Prevention System (BEPS)

If the battery is too weak (“0%”) the display shows “bAtt”, “DEAD” for a few seconds then the meter powers off. Immediately replace the batteries with new ones.

The batteries are accessed by opening the battery cover on the back of the instrument. Remove protective boot if present.



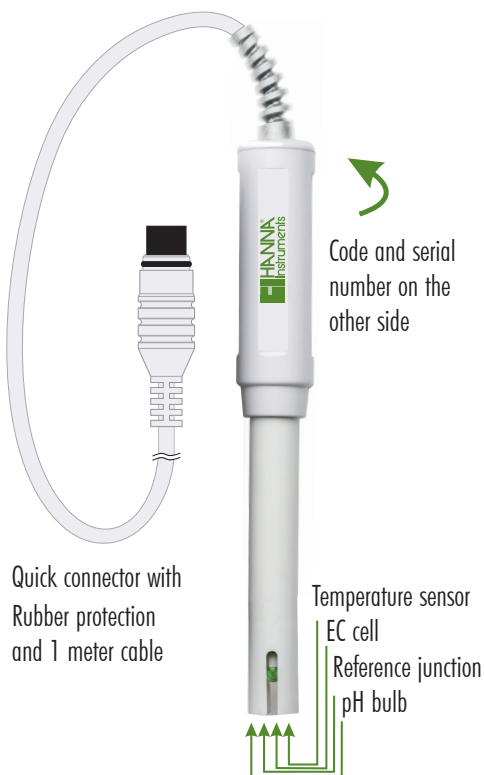
Replace the three 1.5V AAA alkaline batteries located in the battery compartment, observing the indicated polarity.



Replace the battery cover making sure that the gasket is in place.

ACCESSORIES

HI1285-7	pH/conductivity probe with built-in temperature sensor, DIN connector and 1 m (3.3') cable
HI12943	pH probe with built-in temperature sensor, DIN connector and 1 m (3.3') cable
HI50036P	Quick calibration solution, 20 mL sachets (25 pcs.)
HI5036-012	Quick calibration solution, 120 mL
HI5036-023	Quick calibration solution, 230 mL
HI5036-050	Quick calibration solution, 500 mL
HI7004-023	GroLine pH 4.01 calibration buffer, 230 mL
HI7007-023	GroLine pH 7.01 calibration buffer, 230 mL
HI7010-023	GroLine pH 10.01 calibration buffer, 230 mL
HI7031-023	GroLine 1413 $\mu\text{S}/\text{cm}$ conductivity standard, 230 mL
HI7039-023	GroLine 5000 $\mu\text{S}/\text{cm}$ conductivity standard, 230 mL
HI70061G	GroLine general purpose cleaning solution, 20 mL sachets (25 pcs.)
HI700661P	General purpose cleaning solution for agriculture, 20 mL sachets (25 pcs.)
HI7061-050	GroLine general purpose cleaning solution, 500 mL
HI7061-023	GroLine general purpose cleaning solution, 230 mL
HI7061-012	GroLine general purpose cleaning solution, 120 mL
HI710143	Green carrying case for HI9814 portable meter
HI710030	Green silicon rubber boot
HI76405	Electrode holder with steel base (HI12943 only)



ELECTRODE MAINTENANCE

PREPARATION

- Remove the protective cap. Do not be alarmed if any salt deposits are present. Rinse probe tip with running water.
- Shake the electrode down as you would do with a clinical thermometer to eliminate any air bubbles inside the glass bulb.
- If the bulb and/or junction are dry, soak the electrode in HI70300 Storage Solution for a minimum of 30 minutes.
- Rinse well after removing the probe from storage solution. All storage solution must be removed from the EC electrodes to function properly. The storage solution is highly conductive.
- Calibrate probe before using.

STORAGE

- To minimize clogging and ensure a quick response time, the glass bulb and the junction should be kept moist and not allowed to dry.
- After use, rinse the probe and place inside the protective cap with a few drops of HI70300 Storage Solution.
- Follow PREPARATION above before taking measurements.

Note: Never store the electrode in distilled water.

PERIODIC MAINTENANCE

- Inspect the probe especially the pH bulb for any scratches or cracks. If any present, replace the probe.

CLEANING PROCEDURE

- Soak in Hanna HI7061 general cleaning solution or HI700661 general purpose cleaning solution for agriculture for 20 minutes. Rinse well and calibrate before using.

IMPORTANT: After performing any of the cleaning procedures rinse the electrode thoroughly with distilled water. Soak the electrode in HI70300 Storage Solution for 30 minutes. Rinse well. All storage solution must be removed from the EC probes to function properly. The storage solution is highly conductive. Calibrate probe before taking measurements.

TROUBLESHOOTING

Meter: Follow operating and calibration procedures from this instruction manual.

pH Electrode: Evaluate your pH electrodes performance by performing the SENSOR CHECK procedure found on page 13.

EC Cell: Rinse probe tip with copious amounts of tap water. Then rinse with deionized or distilled water. Shake off water droplets. Place tip in a fresh sample of conductivity (or TDS) standard. Observe reading on display. If the reading is close to the standard's value, recalibration should correct the value. If the value is drifting, inspect to see if matter is caught around the cell electrodes. Remove matter carefully, rinse well and repeat test. If the EC reading continues to drift, the probe should be replaced.

CERTIFICATION

All Hanna Instruments conform to the **CE European Directives**.



Disposal of Electrical & Electronic Equipment. The product should not be treated as household waste. Instead hand it over to the appropriate collection point for the recycling of electrical and electronic equipment which will conserve natural resources.

Disposal of waste batteries. This product contains batteries, do not dispose of them with other household waste. Hand them over to the appropriate collection point for recycling.

Ensuring proper product and battery disposal prevents potential negative consequences for the environment and human health. For more information, contact your city, your local household waste disposal service, the place of purchase or go to www.hannainst.com.



Recommendations for users

Before using this product, make sure it is entirely suitable for your specific application and for the environment in which it is used. Any variation introduced by the user to the supplied equipment may degrade the meter's performance. For yours and the meter's safety do not use or store the meter in hazardous environments.

Warranty

HI9814 is warranted for two years against defects in workmanship and materials when used for its intended purpose and maintained according to instructions. Electrodes and probes are warranted for a period of 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 your local Hanna Instruments Office. If under warranty, report the model number, date of purchase, serial number (see engraved on the back of the meter) 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 meter is 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 meter, make sure it is properly packed for complete protection.

Hanna Instruments reserves the right to modify the design, construction or appearance of its products without advance notice.

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