HI991300 • HI991301

Waterproof
pH, EC, TDS & Temperature Meter
with Advanced Features



INSTRUCTION MANUAL

HANNA instruments

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 that no damage has occurred during shipping. Notify your nearest Hanna Instruments Customer Service Center if damage is observed.

Each HI991300 is delivered in a rugged carrying case and is supplied with:

- HI12883 pH/EC/TDS probe with built-in temperature sensor, DIN connector and 1m (3.3') cable
- HI70004 pH 4.01 buffer (1 sachet)
- HI70007 pH 7.01 buffer (1 sachet)
- HI70031 1413 µS/cm conductivity standard (1 sachet)
- HI70032 1382 mg/L (ppm) TDS calibration solution (1 sachet)
- HI700601 pH and ORP electrode cleaning solution (2 sachets)
- 100 mL beaker (1 pc.)
- 1.5V AAA alkaline batteries
- Instrument quality certificate
- Electrode quality certificate
- Instruction manual

Each HI991301 is delivered in a rugged carrying case and is supplied with:

- HI12883 pH/EC/TDS probe with built-in temperature sensor, DIN connector and 1m (3.3') cable
- HI70004 pH 4.01 buffer (1 sachet)
- HI70007 pH 7.01 buffer (1 sachet)
- HI70030 12880 µS/cm conductivity standard (1 sachet)
- HI70038 6.44 g/L (ppt) TDS calibration solution (1 sachet)
- HI700601 pH and ORP electrode cleaning solution (2 sachets)
- 100 mL beaker (1 pc.)
- 1.5V AAA alkaline batteries
- Instrument quality certificate
- Electrode quality certificate
- Instruction manual

Note: Save all packing material until you are sure that the instrument works correctly. Any damaged or defective item must be returned in its original packing material with the supplied accessories.

GENERAL DESCRIPTION AND INTENDED USE

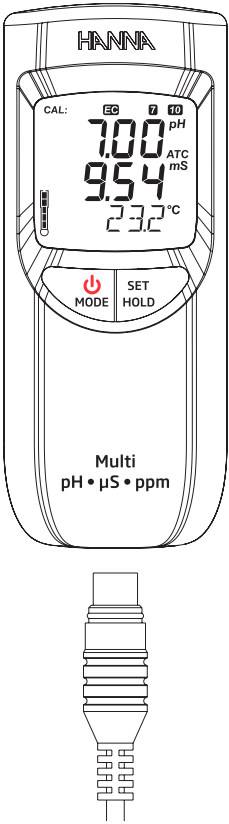
The HI991300 and HI991301 are lightweight, portable pH, conductivity (or total dissolved solids) and temperature meters for portable applications requiring both pH and conductivity (or TDS) measurement. To increase conductivity accuracy, two models are available, with different conductivity ranges, for applications from purified to brackish waters.

The HI991300 and HI991301 feature a two button operation system and are simple to use. All operations and settings are made through these two buttons. They have a waterproof and compact casing rated for IP67 conditions and a large three-line display. The meters have automatic pH calibration at one or two points and a single conductivity calibration. Other user selectable features include different TDS factors from 0.45 to 1.00, and a range of temperature coefficients (β) from 0.0 to 2.4% for better conductivity or TDS solution temperature compensation.

The supplied HI12883 multi-parameter probe, incorporates a dome shaped pH bulb rated from 0-13 pH, a single junction Ag/AgCl reference electrode with gelled electrolyte and a retractable cloth wick junction, a graphite EC/TDS cell, and a temperature sensor in one convenient, rugged polypropylene body. In addition, to ensure against interference from transient electrical noise to pH, a solid-state preamplifier is integrated into the probe. The probe is rated from 0 to 50°C.

MAIN FEATURES

- Simultaneous pH, EC or TDS and temperature measurements on a large three line LCD display
- Selectable temperature unit (°C or °F)
- pH electrode condition indicator
- mV of pH measurement for electrode check
- Last calibration points pH and EC
- HI12883 dedicated pH and EC probe with integrated temperature sensor
- Probe quick connect system
- Battery life indication and low battery detection
- Auto-off function
- Keystroke confirmation tone
- Waterproof casing IP67



SPECIFICATIONS

HI991300	
Range*	-2.00 to 16.00 pH / -2.0 to 16.0 pH ±825 mV (pH-mV) 0 to 3999 µS/cm** 0 to 2000 ppm -5.0 to 105.0 °C / 23.0 to 221.0 °F
Resolution	0.01 pH / 0.1 pH 1 mV 1 µS/cm 1 ppm (mg/L) 0.1 °C / 0.1 °F
Accuracy @ 25°C/77°F	±0.02 pH / ±0.1 pH ±1 mV (pH-mV) ±2% F.S. (EC/TDS) ±0.5 °C / ±1.0 °F Temperature
Temperature compensation	pH - Automatic EC/TDS - Automatic, with β selectable from 0.0 to 2.4 %/ °C (0.1 increments)
pH calibration	Automatic, 1 or 2 points choice between 2 sets of buffers (standard: 4.01, 7.01, 10.01 pH or NIST: 4.01, 6.86, 9.18 pH)
EC/TDS calibration	Automatic, one-point at 1413 µS/cm or 1382 ppm (CONV=0.5) or 1500 ppm (CONV=0.7)
TDS conversion factor	Selectable from 0.45 to 1.00 (0.01 increments)
Probe (included)	HI12883 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 HI12883 is limited to be used from 0 to 13 pH and from 0 to 50 °C (32 to 122 °F)

** LCD displays µS for µS/cm

SPECIFICATIONS

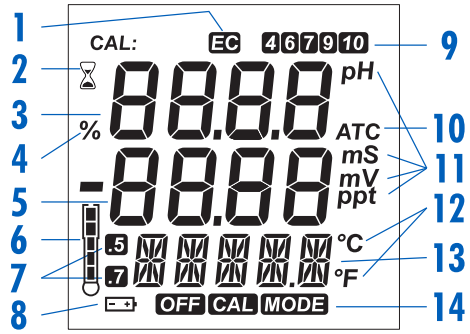
HI991301	
Range*	-2.00 to 16.00 pH / -2.0 to 16.0 pH ±825 mV (pH-mV) 0.00 to 20.00 mS/cm** 0.00 to 10.00 ppt -5.0 to 105.0 °C / 23.0 to 221.0 °F
Resolution	0.01 pH / 0.1 pH 1 mV 0.01 mS/cm 0.01 ppt (g/L) 0.1 °C / 0.1 °F
Accuracy @ 25°C/77°F	±0.02 pH / ±0.1 pH ±1 mV (pH-mV) ±2% F.S. (EC/TDS) ±0.5 °C / ±1.0 °F Temperature
Temperature compensation	pH - Automatic EC/TDS - Automatic, with β selectable from 0.0 to 2.4 %/ °C (0.1 increments)
pH calibration	Automatic, 1 or 2 points choice between 2 sets of buffers (standard: 4.01, 7.01, 10.01 or NIST: 4.01, 6.86, 9.18)
EC/TDS calibration	Automatic, one-point at 12.88 mS/cm or 6.44 ppt (CONV=0.5) or 9.02 ppt (CONV=0.7)
TDS conversion factor	Selectable from 0.45 to 1.00 (0.01 increments)
Probe (included)	HI12883 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 HI12883 is limited to be used from 0 to 13 pH and from 0 to 50 °C (32 to 122 °F)

** LCD displays mS for mS/cm

DISPLAY DESCRIPTION

1 EC 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



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 ELECTRODE

With the meter turned off, connect the HI12883 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.

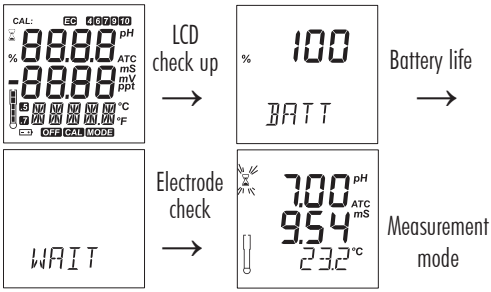
TURNING THE METER ON



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 tertiary LCD line with "---" blinking on the first LCD line.*

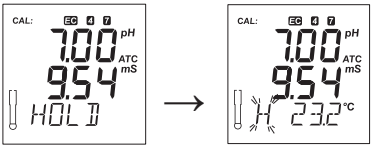
- *Compatible pH probe: HI12963, HI12943, HI10483 pH probes and HI763003 EC probe. If one of the probes is detected "**NoEC**" message is displayed or if HI763003 is connected "**NopH**" message is displayed at start-up and "---" message is displayed on the secondary LCD for the pH probes or on the primary LCD for the EC probe.*
- *If the readings are out of range, the nearest range limits are displayed blinking (e.g. -2.00 pH -5.0 °C).*

SELECTING MEASUREMENT RANGE

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

FREEZING MEASUREMENT VALUES

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



Press any button to resume active measurements.

ENTERING CALIBRATION MODE

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

ENTERING SETUP MODE

Press and hold ⏻ button until "**EC STD**" and **CAL** tag is replaced by "**SETUP**" and **MODE** tag. Release the button.

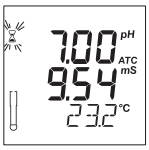
TURNING THE METER OFF

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

pH MEASUREMENT & CALIBRATION

Make sure the meter has been calibrated before use.

If the probe is dry, soak it in HI70300 storage solution for 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.



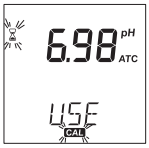
Rinse the electrode well and shake off excess droplets. Recalibrate before using. Submerge the probe in the sample to be tested while stirring it gently. Wait until the ⌛ tag on the LCD disappears.

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 tertiary 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:

a) whenever the pH electrode is replaced.
b) after testing aggressive chemicals.
c) when high accuracy is required.
d) at least once a month.
e) after cleaning the sensor.

pH calibration

Select calibration type "**STD**" **CAL**. Place the sensor into the first calibration buffer. If performing a two-point calibration, use pH 7.01 (pH 6.86 for NIST) buffer first.



The meter will enter the calibration mode, displaying "**pH 7.01 USE**" **CAL** and ⌛ tag blinking (or "**pH 6.86 USE**" for NIST). Follow directions for single and two-point calibration below:

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 (or pH 6.86 for NIST), 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 (or pH 9.18 for NIST) buffer the "**SAVE**" message is displayed and the meter returns to pH measurement mode.

Two-point calibration

Proceed with steps 1 through 3 under single-point calibration using 7.01 pH (pH 6.86 for NIST) buffer first. Then follow 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, or, if using NIST, pH 4.01 or 9.18). 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**" 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**" with the calibrated points on the LCD disappears.

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.



5 bars: excellent condition
4 bars: very good condition
3 bars: good condition
2 bars: fair condition
1 bar: poor condition
1 bar blinking: very poor condition

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

Sensor check

Setting the meter to pH-mV range the user can check the sensor status at any time. The offset value is the reading in pH 7.01 buffer (@ 25 °C/77 °F). If this reading is outside the range ±30 mV, the electrode is considered "very 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 MEASUREMENT AND CALIBRATION

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 beaker or 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 third line LCD displays the sample temperature.

EC calibration

Before calibration, rinse the sensor tip with a heavy stream of purified water then shake excess water from the probe. Select calibration type "**EC STD**" **CAL**. The meter enters the calibration mode and "**µS 1.41 USE**" (HI991300) or "**mS 12.88 USE**" (HI991301) is displayed with **CAL** tag blinking. Immerse the probe in 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 or the reading 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 "**CAL**" and **EC** is displayed.

Note: - β should be set to 1.9 during calibration.

- There is a known relationship between the EC and TDS readings, it is not necessary to calibrate the meter in TDS. The meter will allow a calibration in TDS using HI70032 or HI70038 TDS calibration solution.

Exiting calibration and resetting default values

After entering the calibration mode and before the 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 point is accepted.

The LCD displays "**CLEAR**" for 1 second, the meter resets to the default calibration and the "**CAL**" and **EC** on the LCD disappear.

METER SETUP

Setup mode allows the selection of the Temperature unit, Auto-off, Beep confirmation tone, the type of pH buffer set, the pH Resolution, enable/disable calibration information display, temperature compensation factor for EC and TDS conversion factor. To enter Setup mode press and hold ⏻ button until "**EC STD**" and **CAL** tag is replaced by "**SETUP**" and **MODE** tag. Release the button.



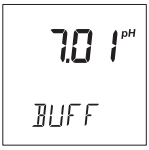
- "**TEMP**" is displayed on the third LCD line with the current temperature unit (e.g. "**TEMP °C**"), for °C/°F selection, use the **SET** button. After the temperature unit has been selected, press ⏻ to confirm and to enter the "**A-OFF**" selection.



- Use the **SET** button, to navigate through the auto-off choices: 8 minutes (**"8"**, default value), 60 minutes (**"60"**) or disabled (**"---"**). 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 the calibration buffer selection "**pH 7.01 BUFF**".



- To change the buffer set, the meter will show the current buffer set: "**pH 7.01 BUFF**" (for standard buffer set: 4.01/7.01/10.01) or "**pH 6.86 BUFF**" (for NIST buffer set: 4.01/6.86/9.18). Change the set with the **SET** button. Press ⏻ to confirm and to enter pH resolution selection "**RESOL**".



- To change the pH measurement resolution between "**0.1**" and "**0.01**" use the **SET** button; then press ⏻ to confirm and to enter electrode calibration information "**INFO**" selection.

- To switch the electrode condition indicator ON or OFF on the LCD, press the **SET** button; press ⏻ to confirm and to enter temperature compensation factor "**BETA**".



- "**BETA**" is displayed on the third LCD line with the current temperature compensation factor (e.g. "**1.9**"), use **SET** button to modify the value. Press ⏻ to confirm and to enter TDS conversion factor "**CONV**".

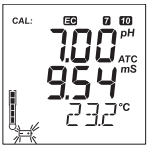


- "**CONV**" is displayed on the third LCD line with the current TDS factor (e.g. "**0.50**"), for selecting other value use the **SET** button. Press ⏻ to confirm and to return to normal mode.



BATTERY REPLACEMENT

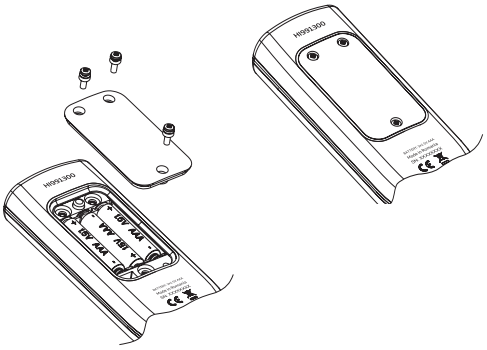
When the remaining battery life is less than 10% the battery tag blinks on the display to warn the user.



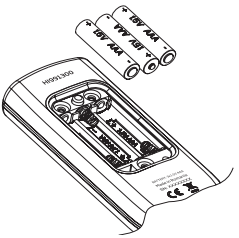
Battery Error Prevention System (BEPS)

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

HI12883	pH and Conductivity (EC & TDS) probe with built-in temperature sensor, DIN connector and 1 m (3.3') cable
HI7004M	pH 4.01 buffer solution, 230 mL
HI7006M	pH 6.86 buffer solution, 230 mL
HI7007M	pH 7.01 buffer solution, 230 mL
HI7009M	pH 9.18 buffer solution, 230 mL
HI7010M	pH 10.01 buffer solution, 230 mL
HI7030M	12880 µS/cm conductivity standard, 230 mL
HI7031M	1413 µS/cm conductivity standard, 230 mL
HI7032M	1382 mg/L (ppm) TDS calibration solution, 230 mL
HI70038P	6.44 g/L (ppt) TDS calibration solution, 20 mL sachets (25 pcs.)
HI70300M	Storage solution for pH and ORP electrodes, 230 mL
HI700601P	pH and ORP electrode cleaning solution, 20 mL sachet (25 pcs.)
HI710028	Orange silicon rubber boot
HI710142	Black carrying case for HI991XX portable instruments
HI77400P	Calibration kit (pH 4.01 and pH 7.01, 20 mL sachets, 5 pcs. each)


Code and serial number on the other side
Quick connector with Rubber protection, and 1 meter cable
Temperature sensor
pH bulb
Reference junction
EC/TDS cell

ELECTRODE MAINTENANCE

PREPARATION

• Remove the protective cap. Do not be alarmed if salt deposits are present. Rinse with water.
• Shake the electrode down as you would do with a clinical thermometer to eliminate any air bubbles inside the glass tip.
• If the glass tip and/or junction are dry, soak the electrode in HI70300 storage solution for a minimum of 30 minutes.
• Rinse with water.
• Calibrate before using.

STORAGE

• To ensure a quick response, the glass tip and the junction should be kept moist and not allowed to dry.
• Replace 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 electrode for any scratches or cracks. If any present, replace the electrode.

PERIODIC MAINTENANCE

• Soak in Hanna HI700601 pH and ORP electrode cleaning solution for approximately 20 minutes. Rinse with water. Soak in HI70300 storage solution for at least 30 minutes.
• Squirt the EC cell out with copious amounts of purified water so no salty solutions remain. Rinse pH section out also and calibrate before using. If the wick junction appears darkened, if may be pulled out a few mm and the soiled part cut off.
• Test: Perform Sensor check (see page 14).

CERTIFICATION

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

CE RoHS compliant

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

HI991300 and HI991301 are warranted for two years against defects in workmanship and materials when used for their 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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MAN991300

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