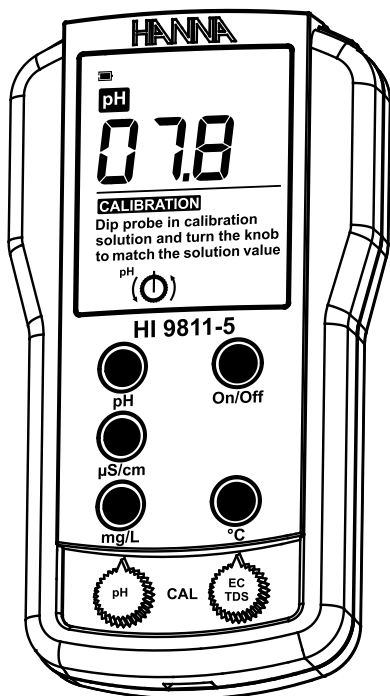


# Instruction Manual

---

## HI9811-5 Portable pH/EC/TDS/°C Meters



Dear Customer,

Thank you for choosing a Hanna Instruments product.

Please read this instruction manual carefully before using the meter. This manual will provide you with the necessary information for correct use of the instrument, 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](mailto:tech@hannainst.com).

## WARRANTY

**HI9811-5** is 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 your local Hanna Instruments Office.

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 instrument 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 instrument, make sure it is properly packed for complete protection.

## TABLE OF CONTENTS

WARRANTY .....	2
PRELIMINARY EXAMINATION .....	3
GENERAL DESCRIPTION .....	3
FUNCTIONAL DESCRIPTION .....	4
SPECIFICATIONS .....	5
OPERATIONAL GUIDE .....	6
pH CALIBRATION .....	8
pH VALUES AT VARIOUS TEMPERATURES .....	10
EC/TDS CALIBRATION .....	11
EC/TDS CONVERSION FACTOR .....	11
BATTERY REPLACEMENT .....	12
PROBE MAINTENANCE .....	13
ACCESSORIES .....	14

## PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully to make sure that no damage has occurred during shipment. If noticeable damage is found, please contact your local Hanna Instruments Office.

Each meter is supplied with:

- **HI1285-5**, pH/EC/TDS/°C combination probe with 8-pin DIN connector and 1 m (3.3') cable
- **HI70007**, pH7.01 sachet, 1 pc.
- **HI70031**, 1413  $\mu\text{S}/\text{cm}$  sachet, 1 pc.
- **HI70032**, 1382 ppm (mg/L) sachet, 1 pc.
- **HI700661** cleaning solution sachet, 2 pcs.
- Instruction manual
- 1 x 9V alkaline battery.

**Note:** Save all packing material until you are sure that the instrument functions correctly. Any defective item must be returned in the original packing together with the supplied accessories.

## GENERAL DESCRIPTION

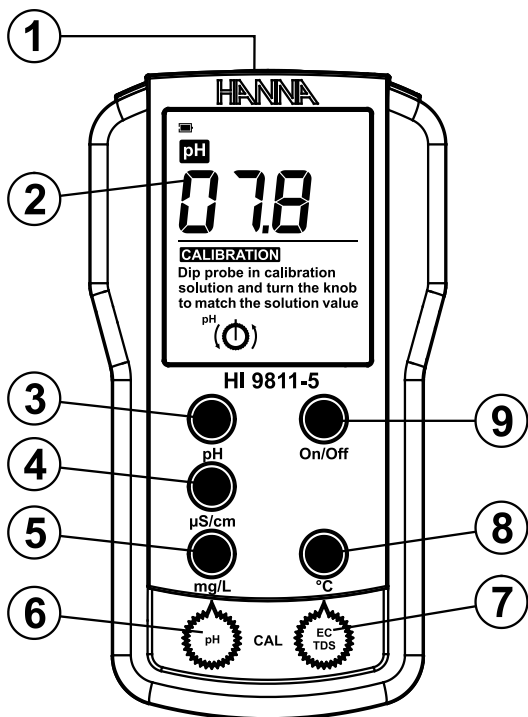
**HI9811-5** is the complete, versatile, with a large LCD and splash-proof portable combination meter designed with the utmost precision and simplicity. The instrument provides measurements for pH, EC and TDS ranges, which are easily selectable through the keypad on the front panel.

Conductivity measurements are automatically compensated for temperature changes with a built-in temperature sensor. The temperature coefficient is fixed at 2%/°C.

**HI9811-5** is a pH/EC/TDS meter designed for simplicity of use in taking pH,  $\mu\text{S}/\text{cm}$ , mg/L and temperature measurements. Suited for hydroponics, greenhouses, farming and ground water applications.

*All rights are reserved. Reproduction in whole or in part is prohibited without the written consent of the copyright owner.*

## FUNCTIONAL DESCRIPTION



- 1) 8-pin DIN connector for probe
- 2) Liquid Crystal Display
- 3) pH range selection key
- 4)  $\mu\text{S}/\text{cm}$  (EC) range selection key
- 5) mg/L (TDS) selection key
- 6) pH offset calibration knob
- 7) EC/TDS calibration knob
- 8)  $^{\circ}\text{C}$  (Temperature) selection key
- 9) On/Off key

## SPECIFICATIONS

<b>Range</b>	0.0 to 14.0 pH 0 to 6000 $\mu\text{S}/\text{cm}$ 0 to 3000 mg/L (ppm) 0.0 to 70.0 °C
<b>Resolution</b>	0.1 pH 10 $\mu\text{S}/\text{cm}$ 10 mg/L (ppm) 0.1 °C
<b>Accuracy (@ 20 °C/68 °F)</b>	$\pm 0.1$ pH $\pm 2\%$ f.s. $\mu\text{S}/\text{cm}$ $\pm 2\%$ f.s. mg/L (ppm) $\pm 0.5$ °C
<b>Typical EMC Deviation</b>	$\pm 0.1$ pH $\pm 2\%$ f.s. $\mu\text{S}/\text{cm}$ $\pm 2\%$ f.s. mg/L (ppm) $\pm 0.5$ °C
<b>Conversion Factor</b>	0.5
<b>pH Calibration</b>	Manual, 1-point through offset trimmer
<b>EC/TDS Calibration</b>	Manual, 1-point through slope trimmer
<b>EC/TDS Temperature Compensation</b>	Automatic from 0 to 70 °C (32 to 158 °F) with $b=2\%/^{\circ}\text{C}$
<b>Probe (included)</b>	HI1285-5
<b>Battery Type</b>	1 x 9V alkaline
<b>Battery Life</b>	Approx. 450 hours of continuous use
<b>Environment</b>	0 to 50 °C (32 to 122 °F) 100% RH
<b>Dimensions</b>	145 x 80 x 36 mm (5.7 x 3.1 x 1.4")
<b>Weight</b>	230 g (8.1 oz.)

# OPERATIONAL GUIDE

## INITIAL PREPARATION

Each meter is supplied complete with a 9V battery. Remove the battery compartment cover on the back of the meter and install the battery while observing its polarity.

Connect the probe to the DIN socket on the top of the meter by aligning the pins with the socket and pushing in the plug.

Always remove the electrode protective cap before taking any measurements or calibrating, and stir briefly the electrode in tap water to remove the storage solution. Make sure the meter has been calibrated before taking any measurements.

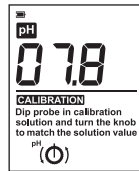
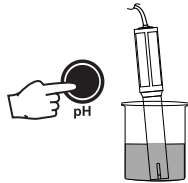
Turn the meter on by pressing the **On/Off** key.



## TAKING pH MEASUREMENTS

If the probe has been left dry, soak the tip in **HI70300** storage solution for 30 minutes to reactivate it.

- To take a pH measurement simply submerge the tip (4 cm/ 1½") of the probe into the sample to be tested.
- Select the pH mode.
- Stir briefly and wait a couple of minutes for the reading to adjust and stabilize. The display shows the pH value.
- If measurements are taken in different samples successively, it is recommended to rinse (clean) the probe thoroughly to eliminate cross-contamination. After cleaning, it is recommended to rinse the probe with some of the next sample to be measured.



## TAKING EC/TDS MEASUREMENTS

- Immerse the tip of the probe (4 cm/ 1½") into the sample to be tested. If possible, use plastic beakers or containers to minimize any EMC interference.
- Tap the probe lightly on the bottom of the beaker to remove any air bubbles which may be trapped inside the tip.



- Select the appropriate measurement range (EC or TDS).

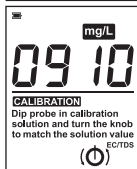


- Wait a couple of minutes for the temperature sensor to reach thermal equilibrium. The display will then show the measurement automatically temperature compensated for temperature with the appropriate indication among the following:

“ $\mu\text{S}$ ” symbol indicates the meter is in EC mode;

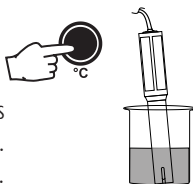


“ $\text{mg/L}$ ” symbol indicates the meter is in TDS mode.

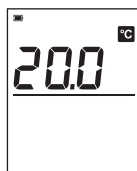


## TAKING TEMPERATURE MEASUREMENTS

- Submerge the tip (4 cm/ 1½”) of the probe into the sample to be tested.
- Select the °C mode.
- Stir briefly and wait a couple of minutes for the reading to adjust and stabilize. The display shows the temperature value.

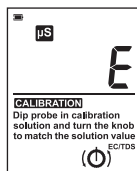


**Notes:** • If the display shows only a “E” on the right side of the LCD, the reading is out of range.



- It is recommended to clean often the probe with **HI700661** Cleaning Solution.

- After measurements have been completed, the instrument should be switched off, and the probe cleaned and covered with the protective cap.



## pH CALIBRATION

For greatest accuracy, frequent calibration of the instrument is recommended. The instrument should be recalibrated for pH:

- Whenever the electrode is replaced.
- At least once a month.
- After testing aggressive chemicals.
- Where extreme accuracy is required.

### PREPARATION

Pour small quantities of pH7.01 (**HI7007**) or pH4.01 (**HI7004**) or pH10.01 (**HI7010**) solution into a clean beaker.

To obtain accurate readings, use pH7.01 (**HI7007**) if you are going to measure neutral or close to neutral samples, pH4.01 (**HI7004**) if you are going to measure acidic samples or pH10.01 (**HI7010**) for alkaline measurements.

If you need to calibrate to NIST standards, use pH6.86 (**HI7006**) instead of pH7.01 and pH9.18 (**HI7009**) instead of pH10.01.

### PROCEDURE

- Connect the probe and switch the meter on, then press the **pH** key to display pH measurement.
- Remove the protective cap from the probe, rinse and immerse it in the buffer and stir gently. Wait a couple of minutes for the reading to stabilize.
- Take the temperature of the buffer solution, e.g. "10.0 °C", as follow:  
Select the °C mode and read the displayed value.
- Adjust the pH calibration knob until the LCD shows the pH value at the above temperature (see the pH versus temperature chart).
- The pH calibration is now complete.





- Notes:**
- The probe should be submerged approximately 4 cm (1½") into the solution. The thermometer has to be close to the probe.
  - If turning the knob the needed value can not be reached, clean the probe (see the "Probe Maintenance" section). If also after the probe cleaning the value can not be reached, replace the probe.

## pH VALUES AT VARIOUS TEMPERATURES

For temperature compensation during calibration, please refer to the following chart.

TEMP		pH VALUES				
°C	°F	4.01	6.86	7.01	9.18	10.01
0	32	4.01	6.98	7.13	9.46	10.32
5	41	4.00	6.95	7.10	9.39	10.24
10	50	4.00	6.92	7.07	9.33	10.18
15	59	4.00	6.90	7.05	9.27	10.12
20	68	4.00	6.88	7.03	9.22	10.06
25	77	4.01	6.86	7.01	9.18	10.01
30	86	4.02	6.85	7.00	9.14	9.96
35	95	4.03	6.84	6.99	9.11	9.92
40	104	4.04	6.84	6.98	9.07	9.88
45	113	4.05	6.83	6.98	9.04	9.85
50	122	4.06	6.83	6.98	9.01	9.82
55	131	4.08	6.84	6.98	8.99	9.79
60	140	4.09	6.84	6.98	8.97	9.77
65	149	4.11	6.84	6.99	8.95	9.76
70	158	4.12	6.85	6.99	8.93	9.75

For instance, if the buffer temperature is 25 °C, the display should show pH4.0 or 7.0 or 10.0.

If the buffer temperature is 10 °C, the display should show pH4.0 or 7.0 or 10.1.

## EC/TDS CALIBRATION

### Accessories needed:

- Use **HI70031** (1413  $\mu\text{S}/\text{cm}$ ) EC calibration solution or **HI70032** (1382 ppm, or mg/L) TDS calibration solution.

**Note:** The conversion between EC and TDS is made by a built-in circuit, hence it is requested to calibrate the meter only in EC or TDS range. The other range is thus automatically calibrated.

### PROCEDURE

- Pour approximately 4 cm (1½") of a conductivity calibration solution (e.g. **HI70031**) into a beaker. If possible, use plastic beaker to minimize any EMC interference.
- Immerse the probe in the solution.
- Wait for a couple of minutes for thermal equilibrium to be reached.
- Tap the probe on the bottom, then shake it lightly while rotating to make sure no air bubbles remain trapped inside the probe.
- Press the  $\mu\text{S}/\text{cm}$  (or mg/L) key.
- Turn the EC/TDS calibration knob until the display shows the EC or TDS reading at 25 °C.



## EC/TDS CONVERSION FACTOR

The TDS value in aqueous solutions is directly proportional to the conductivity. The ratio between the two parameters depends on the solution. **HI9811-5** model has a fixed conversion factor set to 0.5. This means that 1  $\mu\text{S}/\text{cm}$  is equal to 0.5 mg/L of TDS.

## BATTERY REPLACEMENT

The meters is powered by a 9V battery that is located on the rear of the instrument.

When battery symbol is empty a low battery condition is indicated.



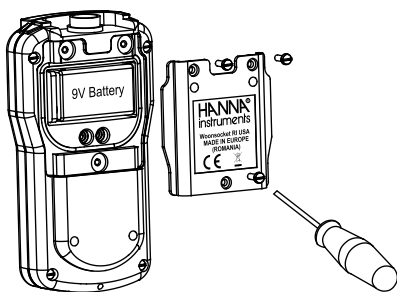
When the low battery indication appears, only a few hours of working time remains.

It is recommended to replace the battery immediately.

When the battery level is so low that it may cause unreliable measurements, the meter turns off.

Battery replacement must only take place in a nonhazardous area using a 9V alkaline battery.

Unscrew the three screws on the rear of the meter, remove the battery compartment cover and replace the 9V battery with a new one while observing its polarity.



Make sure the battery contacts are tight and secure before replacing the cover.

## PROBE MAINTENANCE

### PERIODIC MAINTENANCE

Inspect the probe and the cable. The cable used for the connection to the meter must be intact and there must be no points of broken insulation on the cable or cracks on the probe stem or bulb.

Connector must be perfectly clean and dry. If any scratches or cracks are present, replace the electrode. Rinse off any salt deposits with water.

### CLEANING PROCEDURE

For better accuracy in measurements and to ensure a good performance of the probe, a frequent cleaning is recommended.

For this purpose, soak it in Hanna Instruments **HI700661** Cleaning Solution for 5 minutes.

- Notes:**
- For particular dirt (as for example protein, oil or grease) see the “Accessories” section for Hanna Instruments specific solutions.
  - After cleaning the probe, it is recommended to recalibrate the meter. If it is not possible to calibrate, the probe has to be replaced with a new one.
  - For field applications, it is always recommended to keep a spare probe handy. When anomalies are not resolved with simple maintenance, change the probe and recalibrate the meter.

## ACCESSORIES

### PROBES

- HI1285-0** Combination, amplified pH/EC/TDS probe with built-in temperature sensor, 8-pin DIN connector and 1 m (3.3') cable
- HI1285-5** Combination, amplified pH/EC/TDS/temperature probe with built-in temperature sensor, 8-pin DIN connector and 1 m (3.3') cable

### pH BUFFER SOLUTIONS

- HI7004L** pH4.01 buffer solution, 500 mL bottle
- HI7006L** pH6.86 buffer solution, 500 mL bottle
- HI7007L** pH7.01 buffer solution, 500 mL bottle
- HI7009L** pH9.18 buffer solution, 500 mL bottle
- HI7010L** pH10.01 buffer solution, 500 mL bottle

### CONDUCTIVITY & TDS CALIBRATION SOLUTIONS

- HI7031L** 1413  $\mu\text{S}/\text{cm}$  solution, 500 mL bottle
- HI7032L** 1382 ppm (mg/L) solution, 500 mL bottle

### OTHER SOLUTIONS

- HI700661P** Cleaning Solution, 20 mL sachet (25 pcs.)
- HI70300L** Storage Solution, 500 mL bottle
- HI7073L** Protein Cleaning Solution, 500 mL bottle
- HI7074L** Inorganic Cleaning Solution, 500 mL bottle
- HI7077L** Oil & Fat Cleaning Solution, 500 mL bottle

### OTHER ACCESSORIES

- HI710007** Shockproof rubber boot, blue
- HI710008** Shockproof rubber boot, orange
- HI710050** Blue protective case

## 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 meters' performance. For yours and the meter's safety do not use or store the meter in hazardous environments.

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



### **World Headquarters**

Hanna Instruments Inc.  
Highland Industrial Park  
584 Park East Drive  
Woonsocket, RI 02895 USA  
[www.hannainst.com](http://www.hannainst.com)

### **Local Office**

Hanna Instruments Inc.  
Highland Industrial Park  
584 Park East Drive  
Woonsocket, RI 02895 USA  
Phone: 800.426.6287  
Fax: 401.765.7575  
e-mail: [tech@hannainst.com](mailto:tech@hannainst.com)