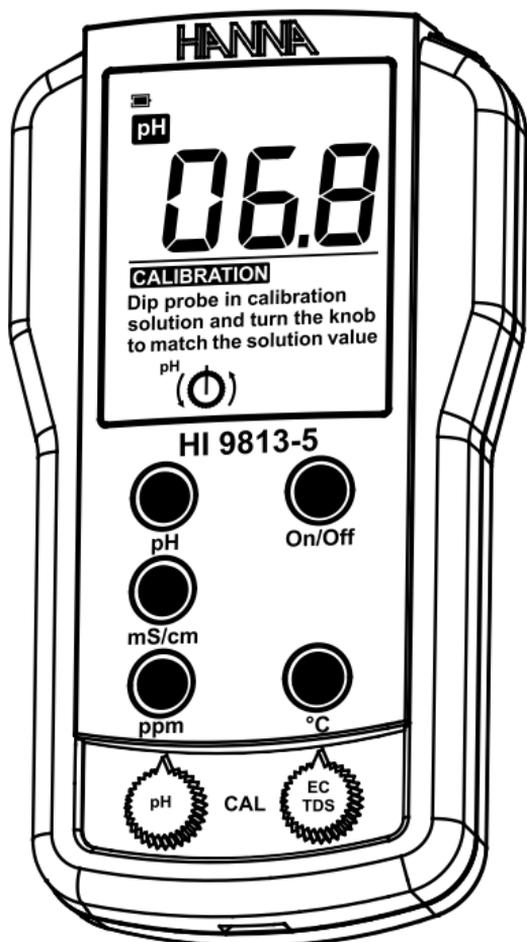


Instruction Manual

HI9813-5 & HI9813-6 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.

WARRANTY

HI9813-5 and **HI9813-6** 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 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 OF HI9813-5 | 4 |
| FUNCTIONAL DESCRIPTION OF HI9813-6 | 5 |
| SPECIFICATIONS | 6 |
| OPERATIONAL GUIDE | 7 |
| pH CALIBRATION | 9 |
| pH VALUES AT VARIOUS TEMPERATURES | 10 |
| EC/TDS CALIBRATION | 11 |
| BATTERY REPLACEMENT | 12 |
| PROBE MAINTENANCE | 12 |
| 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:

- Combination probe with 8-pin DIN connector & 1 m (3.3') cable:
- **HI1285-5**, pH/EC/TDS/°C probe, for **HI9813-5**
- **HI1285-6**, pH/EC/TDS/°C probe with CAL Check™ for **HI9813-6**
- **HI70007** pH7.01 sachet, 1 pc.
- **HI70031** 1413 $\mu\text{S}/\text{cm}$ (1.413 mS/cm) sachet, 1 pc.
- **HI70442** 1500 ppm sachet, 1 pc.
- **HI700661** cleaning solution sachet, 2 pcs.
- **HI50021** check solution sachet, 2 pcs. (for **HI9813-6** only)
- Instruction manual
- 1 x 9V alkaline battery.

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

GENERAL DESCRIPTION

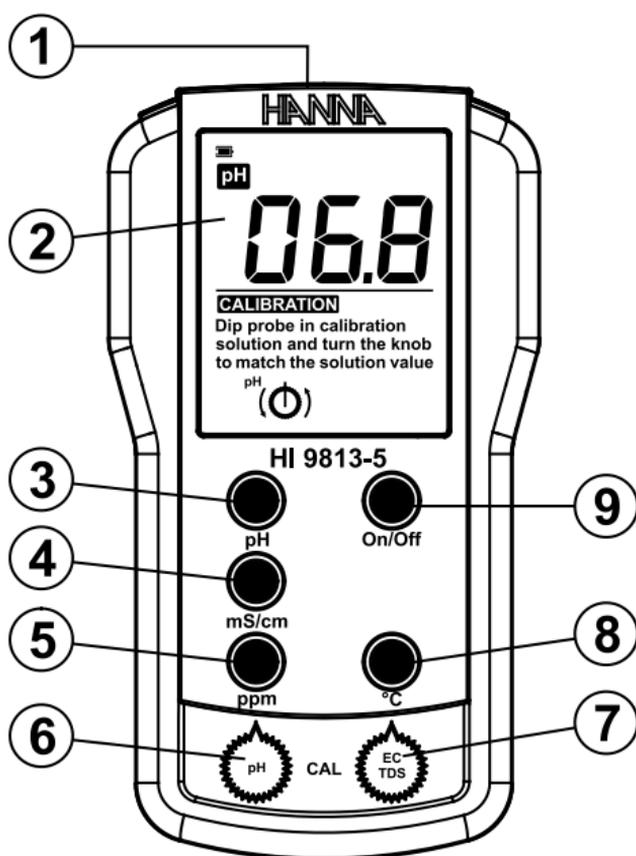
HI9813-5 and **HI9813-6** are complete, versatile and splash-proof portable combination meters designed with the utmost precision and simplicity. Both models provide measurements of pH, EC and TDS ranges, which can be easily selected using a membrane keypad on the front panel.

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

- **HI9813-5** is a pH/EC/TDS meter designed for simplicity of use in taking pH, mS/cm , ppm and temperature in the °C scale measurements. Suited for hydroponics, greenhouses, farming and ground water applications.
- **HI9813-6** is the most advanced model, including the CAL Check™ feature, which allows the user to easily check the probe calibration status at any time.

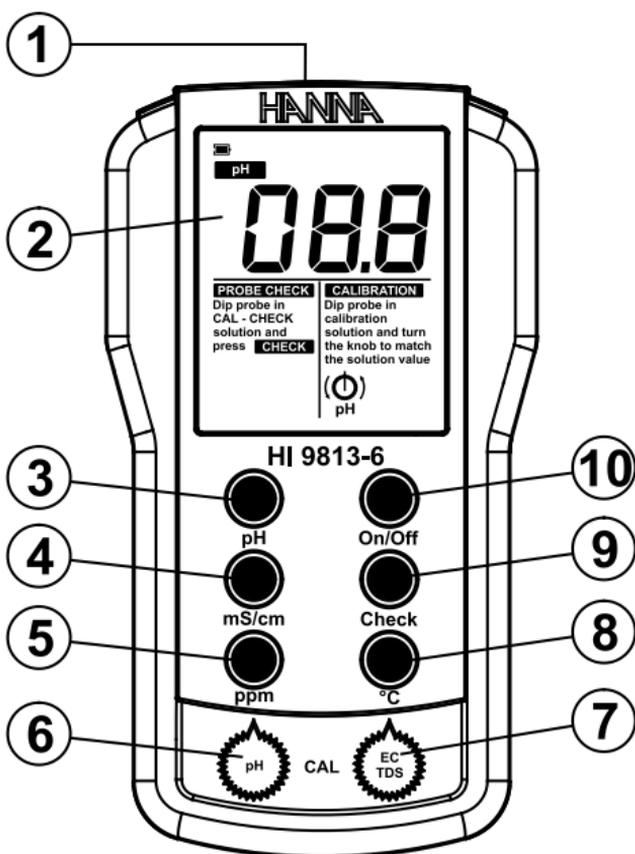
All rights are reserved. Reproduction in whole or in part is prohibited without the written consent of the copyright owner.

FUNCTIONAL DESCRIPTION OF HI9813-5



- 1) 8-pin DIN connector for probe
- 2) Liquid Crystal Display
- 3) pH range selection key
- 4) mS/cm (EC) range selection key
- 5) ppm (TDS) selection key
- 6) pH offset calibration knob
- 7) EC/TDS calibration knob
- 8) °C (Temperature) selection key
- 9) On/Off key

FUNCTIONAL DESCRIPTION OF HI9813-6



- 1) 8-pin DIN connector for probe
- 2) Liquid Crystal Display
- 3) pH range selection key
- 4) mS/cm (EC) range selection key
- 5) ppm (TDS) range selection key
- 6) pH offset calibration knob
- 7) EC/TDS calibration knob
- 8) °C (Temperature) selection key
- 9) Check key
- 10) On/Off key

SPECIFICATIONS

| | |
|--|---|
| Range | 0.0 to 14.0 pH 0.00 to 4.00 mS/cm 0 to 1999 ppm 0.0 to 70.0 °C |
| Resolution | 0.1 pH 0.01 mS/cm 1 ppm 0.1 °C |
| Accuracy (@ 20 °C/68 °F) | ±0.1 pH ±2% f.s. mS/cm ±2% f.s. ppm ±0.5 °C |
| Typical EMC Deviation | ±0.1 pH ±2% f.s. mS/cm ±2% f.s. ppm ±0.5 °C |
| Conversion Factor | variable, 0.56 to 0.78 = 1 μ S/cm (according with TDS442 curve) |
| pH Calibration | Manual, 1-point through offset trimmer |
| EC/TDS Calibration | Manual, 1-point through slope trimmer |
| EC/TDS Tempera- ture Compensation | with $\beta = 2\%/^{\circ}\text{C}$ |
| Probe (included) | HI1285-5 for HI9813-5 HI1285-6 for HI9813-6 |
| Battery Type | 1 x 9V alkaline |
| Battery Life | |
| Environment | |
| Dimensions | |
| Weight | 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 probe 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.

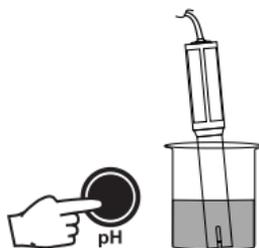
Turn the meter on by pressing the **On/Off** key.



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

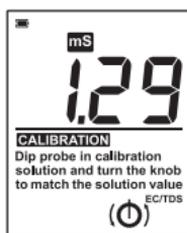
- Immerse the tip of the probe (4cm/1½") into the sample to be tested. If possible, use plastic beakers or containers to minimize any EMC interference.
- Tap the probe lightly on the bottom of the beaker to remove any air bubbles which may be trapped inside the tip.



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



- Wait for a couple of minutes for the temperature sensor to reach thermal equilibrium. The display then shows the measurement automatically compensated for temperature with the appropriate following indication: “mS” tag indicates the meter is in EC mode, while “ppm” tag indicates the meter is in TDS mode.



TAKING TEMPERATURE MEASUREMENTS

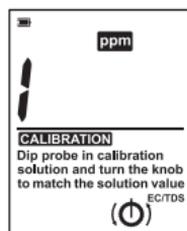
- Submerge the tip (4 cm/ 1½”) of the probe into the sample to be tested.
- Select the °C mode.



- 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 “1” on the far left hand side, 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.
- Whenever the CAL CHECK test fails (**HI9813-6** only).

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 located 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** ($1413 \mu\text{S}/\text{cm} = 1.413 \text{ mS}/\text{cm}$) EC calibration solution or **HI70442** (1500 ppm) 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 ($1\frac{1}{2}$ ") of a conductivity calibration solution (e.g. **HI7031**) 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 **mS/cm** (or **ppm**) key.
- Turn the EC/TDS calibration knob until the display shows the EC or TDS reading at 25°C .



BATTERY REPLACEMENT

These meters are 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.



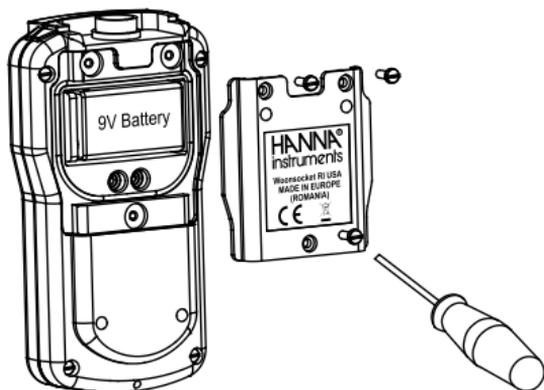
It is recommended to replace the battery immediately.

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.

Note: For particular dirt (as for example protein, oil or grease) see the “Accessories” section for Hanna Instruments specific solutions.

HI9813-6 only:

CAL Check™ FEATURE / CLEAN & CAL PROCEDURE

The unique CAL Check™ feature allows the user to check the meter calibration status at any time. Simply follow the below procedure for a quick and easy operation.

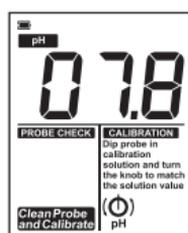
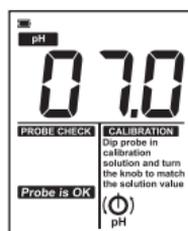
- Rinse the probe with water.
- Immerse the probe in the **HI50021** check solution.

Note: If the reading is around pH4.0, the probe is broken and has to be replaced.

- Press the **Check** key.
- If the meter is calibrated “**Probe is OK**” message is displayed.
- If cleaning is needed “**Clean Probe and Calibrate**” message is displayed:

1. immerse the probe in the **HI700661** cleaning solution (or in one of the available specific solutions - see “Accessories” section) for 5 minutes, then rinse it with tap water.
2. immerse again in the **HI50021** check solution and press the **CHECK** key.
3. if the message “**Probe is OK**” is displayed, the meter does not need calibration.
4. if the message “**Clean Probe and Calibrate**” is displayed again, calibration is needed (see “pH Calibration” section).

- Notes:**
- 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

- HI1285-5** Combination, amplified pH/EC/TDS/temperature probe with built-in temperature sensor, 8-pin DIN connector and 1 m (3.3') cable
- HI1285-6** Combination, amplified pH/EC/TDS/temperature probe with Cal-Check feature, 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
- HI7442L** 1500 ppm (mg/L) solution, 500 mL bottle

OTHER SOLUTIONS

- HI700661P** Cleaning solution, 20 mL sachet (25 pcs.)
- HI50021P** Check 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
- HI710022** 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

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