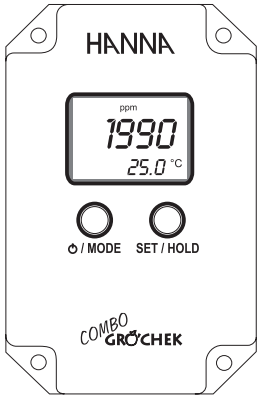
Instruction Manual

COMBO GROCHEK

(HI 991404 - HI 991405)



HANNA instruments

www.hannainst.com

WARRANTY

HI 991404 and **HI 991405** are **warranted for two years** against defects in workmanship and materials when used for their intended purpose and maintained according to instructions. **The probes are warranted for six months**. This warranty is limited to repair or replacement free of charge.

Damages due to accident, misuse, tampering or lack of prescribed maintenance are not covered.

If service is required, contact the dealer from whom you purchased the instrument. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. 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 Customer Service department and then send it with shipment costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

Dear Customer,

Thank you for choosing a Hanna product.

This manual will provide you with the necessary information for a correct operation.

If you need additional technical information, do not hesitate to e-mail us at **tech@hannainst.com**.

These instruments are in compliance with the CE directives.

PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully. If any damage has occurred during shipment, notify your dealer or the nearest Hanna Service Center.

The meters are supplied with:

- **HI 1293D** pH electrode and **HI 7630** fixed EC probe
- pH 4.01 and 7.01 buffer solutions (20 mL each)
- 1413 µS/cm calibration solution (20 mL), for **HI 991404**
- 12.88 mS/cm calibration solution (20 mL), for **HI 991405**
- 12 Vdc power adapter and instructions

Note: Conserve all packing material until the instrument has been observed to function correctly. Any defective item must be returned in its original packing.

GENERAL DESCRIPTION

HI 991404 and **HI 991405** have been designed for continuous, high accuracy pH, EC/TDS and temperature measurements.

These indicators continuously monitor the three most important nutrient parameters in hydroponics, greenhouses and horticultural applications with a single instrument.

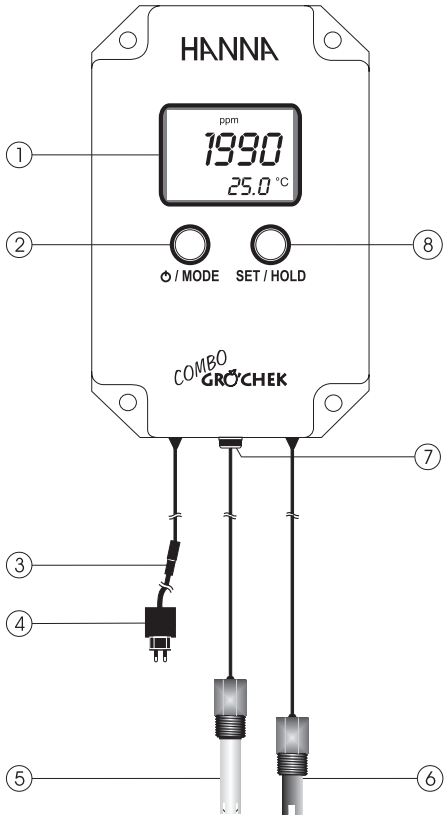
These micro-processor based meters feature a large, dual level, backlit LCD to give instantaneous readings of pH, EC or TDS and temperature, even from a distance.

Calibration and temperature compensation are automatic, while the TDS conversion factor and temperature coefficient are user adjustable for application-specific measurements.

The **HI 1293D** advanced, non-clogging double-junction pH electrode and the rugged conductivity probe will withstand even the most aggressive environments.

The instruments are powered by a 12 Vdc transformer and are easy to install and use.

FUNCTIONAL DESCRIPTION



1. Liquid Crystal Display
2. ON/OFF/MODE button
3. Power supply connector
4. 12 VDC power adapter
5. **HI 1293D** pH-electrode with differential input, pipe thread 1/2" NPT
6. EC/TDS/Temperature probe, pipe thread 1/2" NPT (works also as matching pin for pH-electrode)
7. DIN connector
8. SET/HOLD button

SPECIFICATIONS

Range	0.0 to 14.0 pH / 0.0 to 60.0°C / 32.0 to 122.0°F 0 to 3999 µS/cm / 0 to 2000 ppm (**HI 991404**) 0.00 to 20.00 mS/cm / 0.00 to 10.00 ppt (**HI 991405**)
Resolution	0.1 pH / 0.1°C / 0.1°F 1 µS/cm / 1 ppm (**HI 991404**) 0.01 mS/cm / 0.01 ppt (**HI 991405**)
Accuracy (@20°C/68°F)	±0.1 pH / ±0.5°C / ±1°F / ±2% FS for EC/TDS
Typical EMC Deviation	±0.1 pH / ±1°C / ±2°F / ±2.5 FS for EC/TDS
Temperature Compensation	Automatic, with β adjustable from 0.0 to 2.4%/°C for EC/TDS
TDS Factor	Adjustable form 0.45 to 1.00 (CONV)
Probes	**HI 1293D** pH electrode (included) **HI 7630** conductivity probe (fixed)
pH Calibration	Automatic, 1 or 2 point with auto-buffer recognition
EC/TDS Calibration	Automatic, 1 point
Power Supply	12 Vdc power adapter (included)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions / Weight	160 x 105 x 31 mm (6.2x4.1x1.2") / 190 g (6.7 oz.)

Recommendations for Users

Before using this product, make sure that it is entirely suitable for the environment in which it is used.

Operation of this instrument in residential areas could cause unacceptable interferences to radio and TV equipment.

The glass bulb at the end of the 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 instrument's EMC performance.

To avoid electrical shock, do not use this instrument when voltages at the measurement surface exceed 24 Vac or 60 Vdc.

To avoid damages or burns, do not perform any measurement in microwave ovens.

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OPERATIONAL GUIDE

Preliminary operations

Connect the pH electrode to the meter.
Connect the 12 Vdc adapter to the meter and to the mains; the display will lit. Press and hold the MODE button for 2-3 seconds. All the used segments on the LCD will be visible for a few seconds.

To change the temperature unit

To change the temperature unit (from °C to °F), from measurement mode, press and hold the MODE button until "TEMP" and the current temperature unit are displayed on the lower LCD (E.g. TEMP °C).
Use the SET/HOLD button to change the temperature unit, and then press MODE button twice to return to normal measurement mode.

To freeze the display

Press and hold the SET/HOLD button for 2-3 seconds, until "HOLD" appears on the secondary display.
Press either button to return to normal mode.

Taking measurements

Select the pH, EC or TDS mode with the SET/HOLD button.

Immerse the probes in the solution to be tested. In order to ensure better accuracy, probes should not touch or stand close to the walls or bottom of the sample vessel.

The pH, EC or TDS value automatically compensated for temperature is shown on the primary LCD while the secondary LCD shows the temperature of the sample.

Measurements should be taken when the stability symbol on the top left of the LCD disappears.

IMPORTANT NOTE

Measurements have to be taken with both pH electrode and conductivity/temperature probe (also working as matching pin) immersed in the same vessel.

To change the TDS conversion factor (CONV) and the temperature compensation coefficient β (BETA)

- From measurement mode, press and hold the MODE button until "TEMP" and the current temperature unit are displayed on the lower LCD (E.g. TEMP °C).
- Press the MODE button again to show the current conversion factor (E.g. 0.50 CONV).
- Use the SET/HOLD button to change the conversion factor.
- Press the MODE button to show the current temperature coefficient (E.g. 2.1 BETA).
- Use the SET/HOLD button to change the value.
- Press MODE to return to normal measuring mode.

To turn the meter off

Press the MODE button while in normal measurement mode. "OFF" will appear on the lower part of the display. Release the button. The display still lits, until the power supply is connected.

Notes:

- Before taking any measurement make sure the meter has been calibrated.
- To clear a previous calibration, press the MODE button after entering the calibration mode. The lower LCD will display "ESC" for 1 second and the meter will return to normal measurement mode. The "CAL" symbol on the LCD will disappear. The meter will be reset to the default calibration.
- If measurements are taken in different samples successively, rinse the probes thoroughly to eliminate cross-contamination; and after cleaning, rinse the probes with some of the sample to be measured.

pH ELECTRODE MAINTENANCE

- When not in use, rinse the electrode with water and store it with a few drops of **HI 70300** storage solution in the protective cap.
  NEVER USE DISTILLED OR DEIONIZED WATER FOR STORAGE PURPOSES.
- If the electrode has been left dry, soak in a storage or pH 7 solution for at least one hour to reactivate it.
- To prolong the life of the pH electrode, it is recommended to clean it monthly by immersing it in the **HI 7061** cleaning solution for half an hour. Afterwards, rinse it thoroughly with tap water and recalibrate the meter.

CALIBRATION

pH calibration buffer set

- From pH measurement mode, press and hold the MODE button until "TEMP" and the current temperature unit are displayed on the lower LCD (E.g. TEMP °C).
- Press the MODE button again to show the current buffer set: "pH 7.01 BUFF" for standard set (for pH 4.01/7.01/10.01) or "pH 6.86 BUFF" for NIST buffer (pH 4.01/6.86/9.18).
- Press the SET/HOLD button to change the buffer value.
- Press MODE to return to normal measuring mode.

pH calibration procedure

From pH measurement mode, press and hold the MODE button until "CAL" is displayed on the lower LCD. Release the button. The LCD will display "pH 7.01 USE" (or "pH 6.86 USE" if you have selected the NIST buffer set). The CAL tag blinks on the LCD.

- For a **single-point pH calibration**, place the electrode and the probe in any buffer from the selected buffer set (e.g. pH 7.01, pH 4.01 or pH 10.01). The meter will recognize the buffer value automatically.
  If using pH 4.01 or pH 10.01, the meter will display "OK" for 1 second and then return to measurement mode.
  If using pH 7.01, after recognition of the buffer the meter will ask for pH 4.01 as second calibration point. Press the MODE button to return to measurement mode or, if desired, proceed with the 2 point calibration as explained below.

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

- For a **two-point pH calibration**, place the electrode and the probe in pH 7.01 (or 6.86 if you have selected the NIST buffer set). The meter will recognize the buffer value and then display pH 4.01 USE.
  Rinse the electrode thoroughly and immerse it in the second buffer solution (pH 4.01 or 10.01, or, if using NIST, pH 4.01 or 9.18). When the second buffer is recognized, the LCD will display "OK" for 1 second and the meter will return to normal measurement mode.

Note: For storing calibration data in the non-volatile memory, turn the meter OFF and then ON again through the MODE button.

The CAL symbol on the LCD means that the meter is calibrated.

EC calibration procedure

- From EC measurement mode, press and hold the MODE button until "CAL" is displayed on the lower LCD.
- Release the button and immerse the probe in the proper calibration solution: **HI 70031** (1413 µS/cm) for **HI 991404** and **HI 70030** (12.88 mS/cm) for **HI 991405**.
- Once the calibration has been automatically performed, the LCD will display "OK" for 1 second and the meter will return to normal measurement mode.
- **Since there is a known relationship between EC and TDS readings, it is not necessary to calibrate the TDS range.**

Note: For storing calibration data in the non-volatile memory, turn the meter OFF and then ON again through the MODE button.

The CAL symbol on the LCD means that the meter is calibrated.

ACCESSORIES

HI 1293D	Spare pH electrode with differential input & DIN
HI 7630 (*)	Conductivity probe with built-in temperature sensor (also working as matching pin)
HI 7004M	pH 4.01 solution, 230 mL bottle
HI 7006M	pH 6.86 solution, 230 mL bottle
HI 7007M	pH 7.01 solution, 230 mL bottle
HI 7009M	pH 9.18 solution, 230 mL bottle
HI 7010M	pH 10.01 solution, 230 mL bottle
HI 7030M	12.88 mS/cm solution, 230 mL bottle
HI 7031M	1413 µS/cm solution, 230 mL bottle
HI 7032M	1382 ppm solution, 230 mL bottle
HI 7038M	6.44 ppt solution, 230 mL bottle
HI 70442M	1500 ppm solution, 230 mL bottle
HI 7061M	Electrode cleaning solution, 230 mL bottle
HI 70300M	Electrode storage solution, 230 mL bottle
HI 710005	115 Vac/12 Vdc power adapter, US plug
HI 710006	230 Vac/12 Vdc power adapter, European plug

(*) To be replaced by authorized technical personnel only.