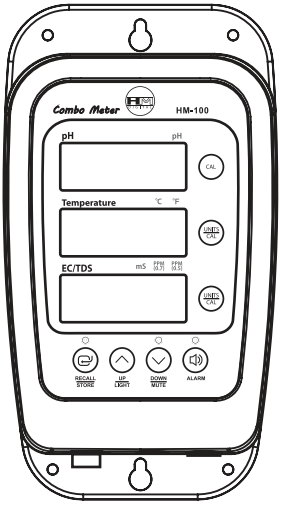
Instruction Manual



pH / EC / TDS / TEMP

Combo Meter

HM-100

HM DIGITAL®

1. Introduction

HM-100 is capable of displaying the pH, EC and temperature values at the same time. In addition, HM-100 is suitable in countinous monitoring of nutrient solution to control parameters important in plant growth, which makes it adequate equipment in hydroponics farming. Its application stretches from hydroponics to industrial and water quality areas.

2. Specification

1. Range
- pH: 0.1 - 14.0pH
- Temperature: 0.0 - 60.0 °C / 32.0 - 122.0 °F
- TDS: 0 - 9990ppm
- EC: 0 - 10.00mS

2. Resolution
- pH: 0.1pH
- Temperature: 0.1°C / 0.1°F
- TDS: 1ppm (0-999ppm) / 10ppm (1000-9990ppm)
- EC: 0.01mS (0-10.00mS)

3. Accuracy
- pH: ± 0.1pH
- Temperature: ± 1°C / ˚F
- EC/TDS: ±2%

4. Units
- pH: pH
- Temperature: °C / °F
- TDS: ppm 0.5 scale (NaCl) / 0.7 scale (442™)
- EC: mS

5. Automtic Temperature Compesation (ATC) range
- ATC: 0.0 - 60.0°C

6. Data store: Max. 6 data values

7. Alarm: LOW, HIGH. Assigned separately

9. Power: 5V/1A

10. Usage environment: 0 - 50°C / RH 80%

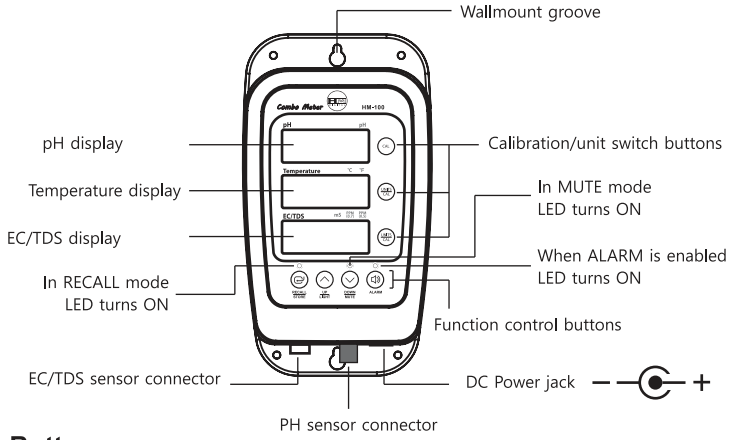
11. Sensor: Electroconductivity Sensor / Single juction Ag/AgCl pH sensor

12. Weight: 285g(excl. sensors / accessories)

3. Characteristics

- FND brightness can be adjusted in four different levels.
- Set HIGH and LOW values to determine alarm range. Alarm sounds while the value on the screen flashes to notify the user from a distance.
- Alarm sound can be turned ON/OFF.
- Store upto six measured values in device.
- User can select either 0.5 or 0.7 factor to display TDS (ppm).

4. Exterior information



5. Buttons

CAL	Press 2 secs to enter “pH Calibration mode”
°C/°F CAL	Short press to switch Temperature units / Press 2 secs to enter “Temp. Calibration mode”
mS/TDS CAL	Short press to switch EC/TDS units / Press 2 secs to enter “EC/TDS Calibration mode”
RECALL STORE	Short press to enter “RECALL mode” / Cancel when in “Calibration” or “Setting mode” Press 2 secs to store measured value (max. 6)
UP LIGHT	Press 2 secs to change FND brightness level (4 levels) In “Calibration” or “Setting mode”, acts as the [UP] button.
DOWN MUTE	Press 2 secs to mute the alarm (the LED above the button turns ON) In “Calibration” or “Setting mode”, acts as the [DOWN] button.
ALARM	Short press to switch the alarm ON/OFF (When the alarm is ON, the LED turns ON) Press 2 secs to enter “Alarm setting mode”

6. pH calibration and maintenance

6-1 pH calibration

- Prepare the 7.0pH, 4.0pH, 10.0pH standard solutions.
- The order of calibration is always from 7.0pH to 4.0pH to 10.0pH.
- Immerse the pH and EC/TDS sensors in the standard solution for a few minutes to stabilize the sensor readings before proceeding to calibration (EC/TDS sensor reads the temperature)

1) Turn ON the device and put the pH and EC/TDS sensors in 7.0pH solution to adapt for a few minutes.
2) Press the [CAL] button for 2 secs.
3) “7PH” flashes on the pH screen. If the calibration point is not “7PH”, press the [UP] and [DOWN] to switch the calibration point to either “4PH” or “10PH” according to the calibration solution.
4) Short press the [CAL] button to confirm when the calibration point is selected.
5) “C-CA-CAL” is displayed repeatedly in the calibration process and in completion, “End” flashes and exits back to normal mode. (Takes up to 60 seconds)
6) Repeat the process for both 4.0pH and 10.0pH.

Note) ‘rE-’ / ‘try’ flashes 2~3 times if there is a problem with the solution or the sensor.

6-2 pH maintenance

- Lifespan of a pH electrode depends on the usage and maintenance.
- Inside of the a glass pH electrode is filled with KCl solution and the same for the sensor cap. After use, the sensor should be stored with the sensor cap closed to maximize its lifespan. pH store solution can be purchased separately.
- A pH electrode needs to be drenched in KCl solution at all time. If not, the lifespan of the sensor diminishes considerably. In case of dried pH sensor, immerse the pH electrode in KCl solution for at least 2 hours before use.
- For accurate and stable pH measurements, on a regular basis calibrate the sensor before tests.
- Wash the sensor electrode with tap water when testing different solution right after a measurement.

6-3 Precaution

- Do not leave the sensor in direct sunlight or high temperature environment.
- Do not touch or grab the glass tip of the pH sensor.
- When used in hot solution for a long period of time, sensor deformity may be caused and shortens the sensor lifespan.
- Strong acid/alkaline solution and very high/low temperature solutions may shorten the sensor lifespan.
- Replace the sensor when the reading is unstable or takes a long time to display.
- Be cautious when wiping the sensor with a dry cotton. Static electricity slows the sensor response time.

7. EC/TDS calibration

- Prepare the standard solution before the calibration.
  Solution below 50ppm is too low for calibration. Recommended to proceed with calibration solution higher than 50ppm.
- EC/TDS can be calibrated in mS, ppm(0.5) and ppm(0.7). Largely used calibration unit however is ppm(0.5). Instruction illustrates the calibration method assuming the user is calibrating with ppm(0.5) unit.
  Note) 1.00mS(1000uS) is approx. 500ppm(0.5) or 700ppm(0.7).

1) Prepare the 1000ppm solution
2) Set the unit of EC/TDS by short pressing the [UNITS/CAL] button next to the EC/TDS screen to ppm(0.5).
3) Immerse the EC/TDS sensor to adapt to solution temperature. Shake the sensor to eliminate any air bubbles trapped by the sensor pin.
4) When the temperature is stabilized, press the [UNITS/CAL] next to the EC/TDS screen for 2 secs.
5) Currently measured value on the EC/TDS screen blinks.
6) Adjust the value to 1000ppm by using the [UP] and [DOWN] buttons.
7) Short press the [UNITS/CAL] button to calibrate.
8) “C-CA-CAL” is displayed repeatedly and “End” flashes when the calibration process is completed.

Note 1) If “Err” is displayed instead of “End” at the end of calibration.
- The sensor pins are stained/dirty.
- EC of the standard solution exceeds the actual calibration range.
- Sensor connection is unstable.
- Temperature continously changes/inconsistent when calibrating.

Note 2) “oor” means the reading exceeded the measurable range.

8. Temperature calibration

- Thermistor is located in the EC/TDS sensor.
- It is recommended to calibrate temperature in conjunction with the standard reference thermistor.
- Possible temperature calibration range is 10~50°C (50~122°F).
- If calibrating with 25.0°C solution;

1. Immerse the EC/TDS sensor to the solution used for calibration.
2. Wait until the reading stabilizes.
3. After the reading stabilizes, press the [UNITS/CAL] button next to the temperature display for 2 secs.
4. Temperature reading blinks on the screen. Use the [UP], [DOWN] buttons to set 25.0°C.
5. Short press the [UNITS/CAL] button. “C-CA-CAL” repeatedly flashes.
6. “End” flashes when completed.

Note 1) Calibrate your thermistor in solution, not in air.
Note 2) “oor” means the reading exceeded the measurable range.

⚠ **FOR BEST RESULT, ALWAYS RESET TEMPERATURE BEFORE CALIBRATING TEMPERATURE.**
The meter may exprience inaccurate calibration if procedure is done without a temperature reset.

9. Setting the alarm

• If the reading value is out of the HIGH and LOW range, alarm sounds and the reading value on the display flashes. Hence the user is notified even from a distant position.

9-1 ON/OFF the alarm function

• Press the [ALARM] button shortly. LED above the button turns ON and the alarm function is enabled.
Pressing the button again for a short time will deactivate the alarm function.

9-2 ON/OFF the alarm sound (Mute function)

• Press the [DOWN/MUTE] button for 2 secs. LED above the button turns ON and mutes the Alarm. In this mode, alarm will not sound even if the reading value is out of range.
Pressing the [DOWN/MUTE] button for 2 secs again with disable the mute function.

9-3 Setting the alarm

1. Press the [ALARM] button for 2 secs.
2. “AL-H” is displayed on each screen. HIGH value is set in this mode.
3. Press the [CAL] to set alarm value for PH. Previously set alarm value or the default value will flash on the pH screen.
4. Change the set value by using the [UP] and [DOWN] buttons.
5. Press the [UNITS/CAL] button to set alarm value for Temperature. Use [UP] and [DOWN] buttons to change the set value.
6. Press the [UNITS/CAL] button to change alarm value for EC/TDS. Again, use [UP] and [DOWN] buttons to change the set value.
7. Press the [ALARM] button to switch to AL-L mode. LOW value is set in this mode.
8. “AL-L” is displayed on each screen.
9. Repeat 3-6 to set LOW values.
10. When completed, Press the [ALARM] button again to save the changes.
11. "SAVE" flashes on each screen and the values are saved.
12. To activate the alarm function, Press the [ALARM] button to note the LED above the [ALARM] button is turned ON.

9-4 Default alarm setting

• Alarm has a default setting value.
EC/TDS alarm set value shifts according to the unit factor. By changing the alarm set value in one unit, the set value is converted according to the unit factor and shifts the alarm set values for rest of the EC/TDS units.

Alarm Setting Default Values

pH		HI	7.0pH	Temp - ℃		HI	30.0℃	Temp - ℉		HI	80.0℉
		LO	4.0pH			LO	15.0℃			LO	60.0℉
EC	mS	HI	7.00mS	TDS	ppm 0.5	HI	3000ppm	TDS	ppm 0.7	HI	5000ppm
		LO	1.00mS			LO	500ppm			LO	500ppm

10. STORE and RECALL

10-1 STORE

• STORE function allows the user to store up to 6 measured values for each parameter.
• Data is stored from Data No.1 to No.6 consecutively and 7th data will save as 6th as it displaces the previous data while erasing data No.1.

1. Check the currently displayed value.
2. Press the [RECALL/STORE] for 2 secs.
3. “SAVE” will flash on each parameter screen.

10-2 RECALL

• RECALL function will display data set saved with STORE function.
• Shows the most recent data first.

1. Short press the [RECALL/STORE] button to enter RECALL mode. LED above the button turns ON.
2. Firstly the word “dAtA” and the sequence number is displayed for 1 sec. Sequentially the saved data set of the corresponding sequence number is displayed. If there are more than 2 data sets, the user can switch between the stored data by pressing the [UP] and [DOWN] buttons.
3. To exit back to Normal mode, short press the [RECALL/STORE] button.

11. Initialization

11-1 Alarm initialization

• To set the alarm setting back to default (refer to “Alarm Setting Dafault Values” on pg. 5).

1. Press the [ALARM] button for 2 secs. “AL-H” displayed on each screen.
2. Press the [UP]+[DOWN] simultaneously for 2 secs to initialize the set value for all alarms.
3. “CLr” flashes to notify initialization.

11-2 Calibration value initialization

• Each pH, Temp and EC/TDS calibration is initialized separately.

1. Press the button on the right of the parameter screen that the user desires to initialize (eg. the [CAL] button for pH) for 2 secs. Enters into Calibration mode.
2. Press the [UP]+[DOWN] buttons simultaneously for 2 secs.
3. “CLr” flashes and the calibration is initialized back to factory default setting.

11-3 STORE initialization

• To erase the entire saved data sets at one go.

1. Short press the [RECALL/STORE] button to enter “RECALL mode”.
2. Press the [UP]+[DOWN] simultaneously for 2 secs.
3. “CLr” flashes to notify the user the entire saved data sets are removed.

12. WARRANTY

1. HM-100: Three Year Limited Warranty
2. pH Probe: Six Month Limited Warranty
3. EC Probe: One Year Limited Warranty

The HM-100, manufactured by HM Digital, Inc.
("the Company") is warranted to the purchaser against defective materials and workmanship for three (3) years from the date of purchase.

From the date of purchase, pH probe is warranted for six (6) months and EC probe is warranted for one (1) year to the purchaser against defective materials and workmanship.

What is covered: Repair parts and labor, or replacement at the Company's option.
Transportation charges for repaired or new product to be returned to the purchaser.

What is not covered: Transportation charges for the defective product to be sent to the Company. Any consequential damages, incidental damages, or incidental expenses, including damages to property. This includes damages from abuse or improper maintenance such as tampering, wear and tear, water damage, or any other physical damage. The warranty does not cover water damage to the HM-100 or SP-P5 due to parts not securely closed. Products with any evidence of such damage will not be repaired or replaced.

To obtain warranty service, please contact 800.383.2777 or email Info@HMDigital.com to receive further instructions. Before sending the product back to us, please include the following below,

- •Your name
- •Address
- •Description of problem
- •Phone number
- •Proof of date of purchase

Implied Warranties: Any implied warranties, including implied warranties of merchantability and fitness for a particular purpose, are limited in duration to 1 year from date of purchase. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. To the extent any provision of this warranty is prohibited by federal and state law and cannot be preempted, it shall not be applicable. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.
NOTE: Warranties are product-specific. Third-party products and products deemed by HM Digital as "accessories" are not covered under warranty. Third-party products include, but are not limited to, batteries and fittings. Accessories include, but are not limited to batteries, lanyards and cases.

13. CONTACT INFORMATION

HM Digital, Inc. is a leading manufacturer of professional fluid testing instruments that tests for EC, TDS, pH, ORP, temperature and volume. Our products include handheld meters, in-line monitors, controllers, sensors, calibration solutions and more.

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- Deionization
- Distillation
- Food & Coffee Services
- Hydroponics
- Pools & Spas
- Pharmaceutical & Medical
- Reverse Osmosis
- Water Bottling
- Water Purification
- Water Treatment

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