ΩE OMEGA™

User's Guide

ATC

PH

700

Temp 25.0℃

SET HOLD CAL

PWR

MODE UNIT

ADJ

ΩE OMEGA™

pH w/ATC

PHH444 Series

Handheld pH/mV Meter and pH Electrode Kit with Optional Data Logging Function

ΩΕ OMEGA™

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FEATURES

✓ Professional look design accurate portable meters with large LCD display, BNC connector.

✓ All electrodes with BNC connector compatible to any other electrodes.

✓ Hold function, low battery icon indicator, automatic power off in 15 minutes and may be disabled.

✓ Built-in different temperature compensation selectable: Thermistor 30K, 10K ohm and not 25.0 (manual compensation).

✓ RFS (Recover to Factory Setting) function is included.

✓ 3 points pH calibration: 4.01, 7, 10.01 (Adjustable). Calibration buffer solution is included with soaking solution.

✓ SD card capacity: 8GB (PHH444-DL).

✓ Tripod receptacle mountable design for long time monitoring purposes.

✓ All electrodes are well calibrated before shipment.

✓ Warranty period of meter is two years. Electrode is one year.

SUPPLIED

● Meter

● Electrode x 1 pc (pH)

● Battery-AAA x 3 pcs or 9V AC/DC adaptor (optional)

● pH buffer solution x 3 pcs (pH 4, pH7, pH10)

● Soaking Solution x 1 pc

● Black carrying case

● Calibration certificate

● 8G SD card (PHH444-DL only)

SPECIFICATION

Model		PHH444	PHH444-DL
Parameter		pH	
Datalogger sampling time setting range		N/A	**Auto:** 0, 2 secs, 5 secs, 10 secs, 15 secs, 30 secs, 60 secs, 120 secs, 300secs, 600 secs, 900 secs, 1800secs, 1Hr **Manual**: Press the **ADJ** button once will save data one time. Set the sampling time to 0 second.
Memory Card		N/A	SD memory card 8G
Data Hold		Freeze the display reading.	
Meter dimension		175mm x 58mm x 32mm (With BNC connector)	
Power supply		AAA batteries x 3 pcs or 9V AC/DC adaptor (optional)	
Temperature		0~90 ℃	
Temp. accuracy		±0.5 ℃	
pH			
Measurement range	pH	0 to 14 pH	
	mV	414.12 mV to -414.12 mV	
Accuracy		±0.02 pH + 2 digit	
pH Calibration		pH 4, pH 7, pH 10, 3 points calibration Ensure the best linearity and accuracy.	
Resolution		0.01(pH)	
Automatic temperature		YES	

Compensation (ATC)	
Dimension	12x120mm
Electrode body	PC
Sensor type	Glass bulb
ATC Temperature sensor electrode port (pH)	3.5 mm diameter phone jack
Cable length	1 M

KEY PAD (CONTROLS)

PWR: Power on (Press in one second) or power off (Press more than 2 seconds when operation).
SET: Move to left digit. (Under setting mode). Long pressing to save setting or calibrate the reading.
CAL: Move to right digit. (Under setting mode). To clear SD manual record data. (PHH444-DL only)
MODE: Check pH in mV measurement. Select pH4, pH7, pH10 calibration mode. Select sample rate of SD card. (PHH444-DL only).
UNIT: Short pressing to change temperature unit ℃/℉. Long pressing to select temperature electrode type. Short pressing to select NTC: Negative Temperature Coefficient)/ NOT: no remote temperature probe. Long pressing again to save electrode type.
HOLD: Freeze current readings (**Hold** shows at top of LCD). Increase value. (Under setting mode).
ADJ: Decrease value. (Under setting mode). Long press to start SD recording (SD card is inserted to the meter). (PHH444-DL only).
SET+UNIT: Recover to factory setting. (Under pH calibration mode)
MODE+CAL: pH Calibration.
HOLD+PWR: Disable Auto Power Off.

OPERATION

pH INSTALLATION (BNC connector):

a) Insert the pH electrode into the top of right hole. And insert the 3.5mm Ø diameter phone jack ATC sensor parts into the middle of hole.
b) Hold the BNC connector in one hand; with the other, insert the braid into the center of the connector. Continuing pushing the braid into the connector until it will not go in any farther. Do this gently and slowly; do not bend the braid.
c) Turn the BNC connector in a clockwise direction, until you cannot turn it any more.

NOTE: Remove batteries when not use!

Power-off switch: When the meter is turned off, the internal CPU does not shut down completely, it will keep detecting the buttons per milliseconds, letting meter know if the user wants to activate the meter or not. It will consume the power by each detecting, in order to save the power, you may pull down the switch.

Pull down the switch

NOTE:
For each operation, make sure you are using fresh batteries, same brand, same power of batteries is required, and otherwise meter shows erratic readings or leakage. Warranty is void if not follow the

notices. (Note：remove batteries when not use！)

1. Power supply:

(a) AAA batteries x 3pcs, or (b) AC/DC adaptor 9V (optional).

(b) Battery icon ▭ indicates when power is weak, replace with new batteries immediately as the readings now on

   LCD are incorrect due to weak power.

   ▲Battery life: Approx. 50 hours for continuous used. Approx. 11.5 hours for activating SD function (w/ sample rate: 2 seconds). Approx. 13 hours for activating SD function (w/ sample rate: 1 hrs). For short time measurement, you may power on by batteries. For long time use, it suggests to connect with an 9V AC/DC adaptor.

2. Make sure sensor electrode and meter are well connected. Don't attempt to detach sensor probe from meter while in operation.

3. When Meter shows erratic readings, it must be sensor failed or power is weak.

4. Only select one of the two electrodes while measuring the same water zone, otherwise meter appears erratic readings. Read two parameters at the same time are only available for measuring two different water sources.

(1) POWER
NOTE: Make sure you have connected the electrode to the meter before power on.
Momentarily press **PWR** button to turn on the meter, press and hold **PWR** button to turn off meter.

(2) Check PH mV value
Short press **MODE** to check pH in mV unit.

(3) CHANGE THE TEMP. UNIT TO ℃/℉
Short press **UNIT** button to toggle ℃ or ℉.

(4) HOLD
Freeze the current readings of pH, then icon "**Hold**" will appear on the top left of screen.

(5) AUTO POWER OFF
Meter will turn off automatically in 15 minutes when no use, to disable auto power off function by pressing **HOLD** and **PWR** button, "n" momentarily shows on screen, now meter is at non-sleep mode, then turns to normal measurement, Meter default auto power off.

(6) FACTORY RESET
a) pH electrode
Whenever replacing a new pH electrode. Long pressing **MODE+CAL** to enter pH calibration mode then strongly recommend doing factory reset by pressing **SET+UNIT** under pH4/7/10 calibration mode, screen will show "**rFS**" momentarily.

(7) TEMPERATURE PROBE TYPE SELECTION
NOTE: If using NTC 10K probe but select 30K type. The temperature value will not be accurate.

Default setting is NTC 10K. User can change it depends on the electrode type to get the correct value.

NTC 10K:	Negative Temperature Coefficient 25℃ = 10 K
NTC 30K:	Negative Temperature Coefficient 25℃ = 30 K
NOT:	External temperature probe is excluded, user can enter the temperature degree by their own temperature instrument, default: 25℃ Adjustable range: 0.0℃~90.0℃

Step 1: Must select correct probe type before measurement, otherwise the value would be incorrect.

Step 2: Long pressing **UNIT** button, the meter default is "**ntc 10k**", short pressing **UNIT** button to toggle ntc 30k → not.

Step 3: Long pressing **UNIT** button again to save the setting, meter shows **"SA"** at the bottom of LCD and then

return to normal measurement mode.
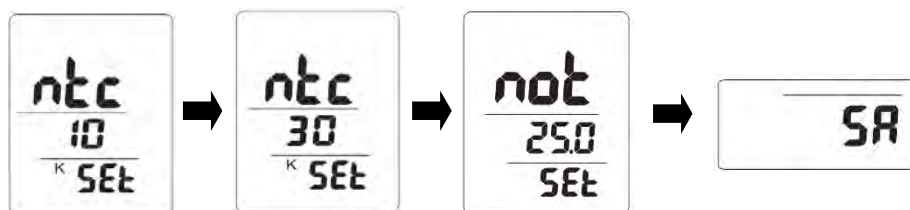
"ATC" ICON INDICATION

Probe type	ntc 10K (Default)	ntc 30K	not
Plug in	Temp. XX.X	Temp. XX.X	Manual
Un-plugged	"— — —"	"— — —"	temp.
ATC icon	O	O	X

pH/mV CALIBRATION PROCEDURE and MEASURING

NOTE: When not use the electrode, it should immerse the "Electrode sensing head" into the "Protection bottle."

NOTE: Calibration is necessary before operation, the calibration procedures refer to as below "a) to b)":

a) Required Equipment for calibration:

1) pH electrode.

2) pH buffer solution.

   NOTE: Make sure to use fresh solution each time due to the contaminants in the solution will affect the calibration and the accuracy.

b) Calibration Procedure:

1) Prepare the pH electrode, install the "probe plug" into the <u>right</u> "BNC port" of the meter.

2) Power on the meter by pressing **PWR** button.

3) Long pressing **MODE + CAL** buttons to enter pH calibration mode. Immerse the pH probe to pH buffer solution. Meter will automatically recognize pH buffer values.

   NOTE: Calibrating the pH in the incorrect buffer solution, "Er 3" will appear on the bottom of screen.

4) User can do 1, 2 or 3 points calibration.

   Rinse the probe with de-ionized water before doing each pH buffer calibration.

   If you are doing multipoint calibration, short pressing **MODE** button to select pH 4 or pH7 or pH 10 calibration mode.

   **HOLD:** ↑to increase ADJ**:** ↓to decrease SET**:** ← to left digit CAL**:** → to right digit

   Referring to the Adjust range as below:

Calibration Points	Adjustable/Calibration range
pH4	3.75 to 4.25
pH7	6.75 to 7.25
pH10	9.75 to 10.25

NOTE: Before doing pH 4, 7, 10 calibrations, if the value is out of above adjustable range, the meter displays "CAL Err". Please immerse the electrodes to distilled water or tap water to see if the value

5) Long pressing **SET** button to save and complete calibration, then screen shows "**SA**".

To escape calibration mode, long pressing **MODE+CAL** button, the bottom of screen will show "ESC" in few seconds and return to normal measurement mode.
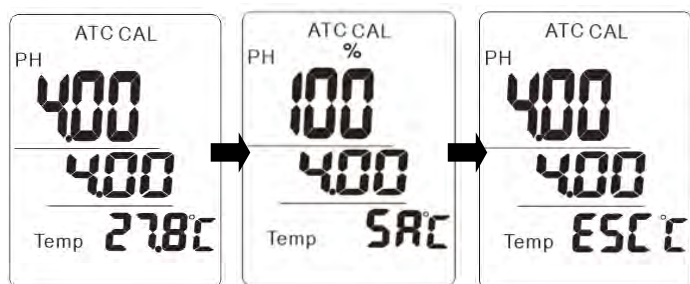
NOTE: After calibrating pH4 or pH10 by long pressing **SET** button, there is a slope value show in pH block in few seconds which stands for the electrodes conditions.

If the slope value is:

Slope Range	Description
Between 70%~130%	First clean the electrode and then calibrate.
<70% or >130%	You need to change the electrode, it is no longer usable.
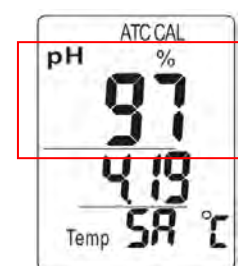
c) pH measurement (ATC, automatic Temperature):

NOTE: Without connecting ATC probe, the temperature value will display dashes"─ ─ ─".

1) The pH electrode should be with ATC feature, and then immerse the sensing probe into the measurement solution until the value is stable.

2) The main display will show the pH value, the bottom display will show the sensing Temp. value of the measured solution (measured from ATC probe).

d) pH measurement (Manual Temp. compensation):

NOTE: This function is used for your pH electrode without connecting the ATC probe.

1) Power on the meter by short pressing **PWR** button.

2) Prepare the pH electrode, installing the "probe plug" into the right "BNC port" of the meter.

3) Adjust the manual Temp. value by following steps:

Long pressing **UNIT** button, the meter default is "**ntc 10k**", short pressing **UNIT** button to select "**not**" type.

HOLD: ↑to increase **ADJ:** ↓to decrease **SET:** ← to left digit **CAL:** → to right digit

Long pressing **UNIT** again to save setting until screen shows "**SA**" and back to normal measurement mode.

4) Hold the Electrode Handle by hand and let the Sensing Head immersed wholly into the measured solution. Stir gently and wait until the display be stabilized.

5) The main display will show the pH value, the bottom display will show the setting manual temperature.

e) pH convert to mV:

1) Under normal measurement mode, short pressing **MODE** button to toggle Cond. to mV measurement.

2) The display will show the mV value.

3) Short pressing **MODE** button again to return Cond. measurement.

ELECTRODE MAINTENANCE
Proper maintenance will ensure faster measurements, improve accuracy and extend the lifetime of the electrode.

pH probe
- **When not in use**

  pH electrodes should be stored in pH electrode storage solution.

  This insures that the electrode glass remains hydrated, ready to measure accurately and quickly. The storage solution also helps keep the reference junction fully charged with KCl (Soaking solution).

  NOTE: Storing pH electrodes in distilled or deionized water is not recommended.

- **User already use the electrode for a certain period**

  Whenever user cannot calibrate the meter properly or the meter's reading value is not stable, please check the electrode to see if the electrolyte in the electrode is run out. If yes, please fill the electrolyte and make the new calibration.

- **Electrode Cleaning Techniques**

  When your pH or ORP electrode gets slow, fouled and coated with contaminants, there are several things that you can do to restore performance. The reason for this is that the sensing glass membrane becomes coated. These coatings range from organics such as oil, grease, proteins to metal ions or other contaminants. Removing them usually requires soaking or washing in a solution which will remove the coating; similar to cleaning your eyeglasses.

a) Cleaning metal ions, some proteins and organics

  Soaking the electrode in 0.01N. HCl for 10-20 minutes. Follow this by soaking in pH electrode storage solution

  for 1-2 hours. Rinse the electrode in deionized water, as usual, and recalibrate.

b) Cleaning grease and oils

  Washing with acetone or methanol and then warm tap water and dishwashing liquid. Use care if cleaning mechanically as the pH or ORP glass is fragile. Electrodes washed in this manner also need to be conditioned by storing in pH/ORP electrode storage solution and recalibrated.

c) Salt Build-Up

  Salt crystals can accumulate when water in a salt solution evaporates during contact with air. These salt crystals can be removed by rinsing the area with warm water.

SD CARD DATALOGGING (PHH444-DL only)
- **SD Card Information**
- **a)** Insert an SD card (8G supplied) into the SD card slot at the left side of the meter. The card must be inserted with the front of the card (label side) facing toward front of the meter.

  After inserting the SD card, icon "**Logging**" will appear on the right of screen.
- **b)** If the SD card is being used for the first time it is recommended that the card be formatted.
- **SD Card Formatting**

NOTE: Always confirm that the device is compatible with the SD, SDHC or SDXC memory card before formatting.

WARNING: Backup all your data before formatting. Formatting will erase all data on the memory device.

a) Open the Computer window.

Click the Start or Windows menu and select Computer (Windows Vista/7) or My Computer (Windows XP). For Windows 8 users, type "computer" and click the Computer icon in the Apps search results. For Windows 10, open the File Explorer. Then find "This PC".

b) Find your SD card.

The removable drive that appears last in the "**Devices with Removable Storage**" list should be the SD card that you just connected to your computer. Right-click on your SD card to bring up the right-click menu options. Select **Format**. This will take you to the Format window. Keep "Capacity" and "Allocation unit size" set to default.
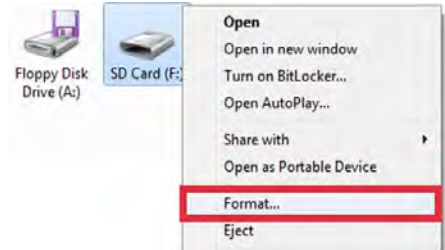
c) Select the file system.

This is the way files are stored on the card. Different systems use different file structures. In order for the SD card to be read by any device, select **FAT32** as the file system. This will enable it to be read by cameras, phones, printers, Windows, Mac, and Linux computers, and more.

1. Select Quick Format.
2. Click "Start".
3. Once the formatting is complete, you can close the window.
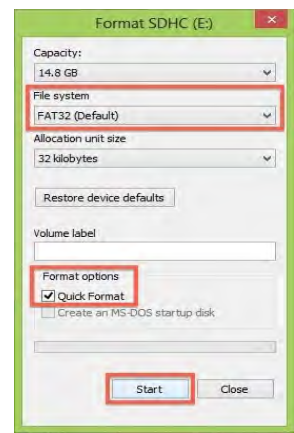
● **Automatic Datalogging**

The meter stores a reading at a user-selected sampling rate onto an SD memory card. The meter defaults to a sampling rate of 2 seconds.

**NOTE:** The sampling rate cannot be "0" for automatic datalogging.

NOTE: It is recommended that plug in the adaptor for long time using in order to avoid data lost. (Adaptor is optional.)

a) Setting the datalogger clock time

NOTE: Make sure the clock of the meter is set up correctly in order to get accurate date/time during Datalogging sessions.

1. Power **OFF** the meter, press **MODE+POWER** button to enter setting. YEAR digit "17" will flash.
2. Short press **CAL** go to Month→Day→ Hour→ Minute setting.
3. Press and hold **SET** button to save setting and screen will show "**SA**" then "**End**".
4. Re-power **ON** the meter to back to normal measurement mode.

NOTE: To escape setting by turning **OFF** the meter without any change.
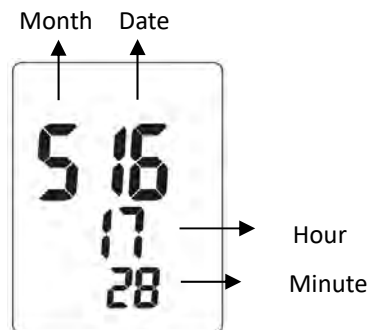
b) Setting the datalogger sampling rate

1. While meter is power **ON**, press and hold **MODE** to enter setting.
2. Press **HOLD** to increase the value; press **ADJ** to decrease the value.
3. Long press **MODE** to save setting.
4. The available settings are: 0, 2 sec, 5 sec, 10 sec, 15 sec, 30 sec, 60 sec, 120 sec, 300 sec, 600 sec, 900 sec, 1800 sec, and 1hr.

c) **Start datalogging**

Warning: SD recording the selected temperature unit (℃or℉). If changing the temperature unit during the datalogging sessions, the recorded data will be switched into the selected temperature unit.

1. After inserting the SD card, display will show icon "**SD**" on the bottom of the screen.
2. Long press **ADJ** to starts recording until icon "**SD**" flashing on the bottom of screen.
3. When "**-Sd-**" disappear, SD stop to record data or SD card is not being inserted.
4. When an SD card is used for the first time a folder is created on the card and named **the model number**. Under the MODEL number folder, the MODEL number and **AUTO+YEAR** folder will be automatically created. **e.g.: /PHH444DL/AUTO2021/…..**
5. When datalogging begins, a new folder named **M(month)/D(date)/H(hour)/M(minute)** is created on the SD card in the **AUTO+YEAR** folder. At the same time, a new spreadsheet document (CSV.) named M/D/H/M is also created under its folder.
   e.g.: / PHH444DL /AUTO2021/04051858/04051858.csv

6. Each CSV. file can be stored up to 30,000 points.
   After reaching 30,000 points, a new file name will be auto created as **M/D/H/M** right after the last recording time. Unless you interrupt the recording, this process continues in the initial created M/D/H/M folder.
   e.g.: / PHH444DL /AUTO2021/12261858/12262005.csv

   NOTE: Datalogging stopped when replacing the probe or removing the SD card or resetting the sampling rate.
   NOTE: When the recording is been stopped, a new folder will be created as M/D/H/M from the next datalogging.
   NOTE: When the recording year and model number is changed, the new folder will be also created accordingly.

● **Manual datalogging (MAX 199 points)**
1. Set the sampling rate to "0" seconds (Refer to "**Setting the datalogger sampling rate**").
2. In the manual mode, data is logged when press and hold **ADJ** button and screen shows recorded points "00X" in the temp. block with icon "**MEM**" flash in few seconds.
   e.g. Recorded 1 points, then bottom screen shows "001".

3. Long press **CAL** button to clear data (removed MANUAL.csv), screen shows "**CLr**".
   NOTE: While screen shows "**Err**" by long press **CAL**, it stands for no data can be cleared or SD card isn't being inserted.
   NOTE: Once clear the data by long press **CAL**, there is no way to recover the data. If you want to keep the previous data, rename the file "**MANUAL.csv**" in **/PHH444DL/ MANUAL.csv** is required.

4. Data directory in SD card: **/PHH444DL/ MANUAL.csv**
   Note: When manual data records full (199 points), logging will continue, but with new data overwriting old. If you want to keep the previous data, rename the file "**MANUAL.csv**" in **/PHH444DL/ MANUAL.csv** is required.

● **SD Data Transfer to PC**

a) Remove the SD card from the meter.

b) Insert SD card directly into a PC SD card slot or use a SD card reader.

c) Open the saved documents (CSV.) in the folder from the PC to get the data.

d) File name /Product number/ Sample rate/ Recording point/ Start recording time/ End recording time/ Recording date/time /Recording parameters will be shown in the CSV. file.

e) Data show "-49" stands for no measured value during recording period.

	A	B	C	D	E	F	G	H	I	J
1	#A	FileName:	05171721.CSV							
2	Prod.No:	98721SD								
3	Sample Rate(s):		10							
4	Point(s):		5700							
5	Start:	2017/5/17 17:21								
6	End:	2017/5/18 09:11								
7										
8	#Point(s)	DATE	TIME	Temp.	PH	mV	COND	TDS	salt	
9	Point(s)	(Y/M/D)	(H:M:S)	(C/F)	(PH)	(mV)	(uS/mS)	(ppm/ppt)	(ppt)	
10	1	2017/5/17	17:21:55	35	7.13	-7.7	2281	1518	0.87	
11	2	2017/5/17	17:22:05	35	7.13	-7.7	2281	1518	0.87	
12	3	2017/5/17	17:22:15	29.4	7.1	-6.2	2073.5	1379.9	0.94	
13	4	2017/5/17	17:22:25	29.3	7.07	-4.2	2073.7	1380.1	0.94	
14	5	2017/5/17	17:22:35	29.4	6.95	2.6	2081.2	1385	0.94	
15	6	2017/5/17	17:22:45	29.7	6.87	7.1	2095.7	1394.7	0.94	
16	7	2017/5/17	17:22:55	29.5	6.94	3.3	2087.3	1389.1	0.94	
17	8	2017/5/17	17:23:05	29.5	7.02	-1.2	2089.8	1390.7	0.94	
18	9	2017/5/17	17:23:15	29.4	7.03	-2.2	2084.1	1387	0.95	
19	10	2017/5/17	17:23:25	29.4	7.03	-2.2	2085.5	1387.9	0.94	
20	11	2017/5/17	17:23:35	29.5	7.05	-3.1	2090.8	1391.4	0.95	
21	12	2017/5/17	17:23:45	29.4	7.06	-3.9	2091.1	1391.6	0.95	

▲Automatic Datalogging▲

	A	B	C	D	E	F	G	H	I	I
1	#M#055#182	FileName:	MANUAL.CSV							
2	Prod.No:	98721SD								
3	Point(s):	55								
4										
5	#Point(s)	DATE	TIME	Temp.	PH	mV	COND	TDS	salt	
6	Point(s)	(Y/M/D)	(H:M:S)	(C/F)	(PH)	(mV)	(uS/mS)	(ppm/ppt)	(ppt)	
7	1	2017/5/17	15:15:23	29.6	7.16	-9.7	2090.3	1391.1	0.94	
8	2	2017/5/17	15:15:30	29.6	7.16	-9.7	2093.7	1393.3	0.94	
9	3	2017/5/17	15:15:35	29.7	7.16	-9.7	2096	1394.9	0.94	
10	4	2017/5/17	15:26:25	29.5	7.16	-9.7	2082.4	1385.9	0.94	
11	5	2017/5/17	15:26:40	29.7	7.16	-9.7	2084.6	1387.3	0.94	
12	6	2017/5/17	15:26:44	29.6	7.16	-9.7	2085.4	1387.8	0.94	
13	7	2017/5/17	15:26:50	29.6	7.16	-9.7	2084.2	1387	0.94	
14	8	2017/5/17	15:26:55	29.6	7.16	-9.7	2085	1387.6	0.94	
15	9	2017/5/17	15:26:59	29.7	7.16	-9.7	2087.8	1389.4	0.94	
16	10	2017/5/17	15:27:01	29.6	7.16	-9.7	2086.7	1388.7	0.94	
17	11	2017/5/17	15:27:06	29.7	7.16	-9.7	2083.8	1386.7	0.94	
18	12	2017/5/17	15:27:11	29.7	7.16	-9.7	2087.7	1389.3	0.94	

▲ Manual Datalogging▲

TROUBLE SHOOTING

Q1: pH displays erratic readings or calibration errors??

A1: ❶Air Bubble in Glass Bulb

During shipment, horizontal storage, and from general use, sometimes allowing air bubbles into the glass Bulb. Before each use, it is recommended to inspect that the glass bulb is no visible air bubbles. If there are, shake the electrode in a downward motion to force air bubbles out of the glass bulb.

❷Dirty Glass Bulb

Some contaminants remain on the glass surface. Refer to page 9 for specific guidelines for the most suitable cleaning solution for the specific contamination you have.

❸Un-plugged the electrode

The readings keep changing on the screen are not referable.

Q2: Wrong temperature??

A2: Refer to page 4 (**pH TEMPERATURE PROBE TYPE**), you must select the correct temperature sensor type or adjust temperature manually (Long press **UNIT** button then press **UNIT** to select "**not**").

Q3: Appear "Error codes"??

A3: Make sure if Hold is appeared on LCD.

<u>**ERROR CODES**</u>

Code	Description
- - -	The electrode was not in a solution. Dashes in the temp. mode indicates that probe without ATC or manual temp. setting. The electrode of cond. measured in pure water or ultra-pure water. Select the wrong temp. electrode type (refer to page 4).
OL2	Measurement is out of range of the display.

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **25 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal two **(2) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY / DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

OMEGA is a trademark of OMEGA ENGINEERING, INC.

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