ΩΞ OMEGA™

User's Guide

CDH-SD11

Conductivity, TDS, and Salinity Meter with Real Time SD Card Data Logger

ΩE OMEGA™

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FEATURES

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

2) All electrodes with BNC connector compatible to any other electrodes.

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

4) Built-in different temperature compensation selectable: Thermistor 30K, 10K ohm.

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

6) Conductivity calibration points: 1413uS. Calibration solution is included.

7) Conductivity electrode may convert to EC, TDS and Salinity concentration, Adjustable conductivity to TDS conversion factor from 0.4 to 1.0. Three in one conductivity electrode (Cond/EC. TDS. Salinity) measurement.

8) Conductivity cell constant (K) selectable: 1.0, (Standard) 10 (Optional) (Selectable and adjustable).

9) SD card capacity: 1GB to 8GB.

10) Tripod receptacle mountable design for long time monitoring purposes.

11) All sensors are well calibrated before shipment.

12) Warranty period of meter is two years. Electrode is one year.

SUPPLIED

- Meter
- Electrode x 1pc (Cond./EC/TDS/Salt)
- Battery-AAA x 3 pcs
- 1413uS buffer solution (Cond. K=1) x1 or 12.88mS buffer solution (Cond. K=10)
- 9V adaptor (optional)
- Black carrying case
- Operation manual
- 8G SD card

ADDITIONAL PURCHSE

- CDE-11G K=1 electrode replacement (Graphite type)
- CDE-11P K=10 option (Platinum type)

SPECIFICATION

Model	CDH-SD11	
Parameter	Cond./EC/TDS /Salt	
Data logger sampling time Setting range	Auto	0, 2 secs, 5 secs, 10 secs, 15 secs, 30 secs, 60 secs, 120 secs, 300secs, 600 secs, 900 secs, 1800 secs, 1Hr
	Manual	Press the ADJ button once will save data one time. Set the sampling time to 0 second.
Memory Card	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 / 9V AC/DC adaptor (optional)	
Temperature	0~90℃	
Temp. accuracy	±0.5 ℃	
Conductivity		
Measurement range	30 uS/cm~20 ms/cm (K=1) Supplied	
	500 uS/cm ~199 mS/cm (K=10) Option	
Accuracy		

(±1% of full scale + 1 digit)	±199.71 (K=1)		
	±1985.01 (K=10)		
Cond Calibration	1 point 1413 uS calibration (K=1)		
	1 point 12.8 mS calibration (K=10)		
Resolution	0~1999 uS/cm (1)		
Dimension	12x120mm		
Electrode body	ABS		
Sensor type	Graphite plate		
TDS (Total Dissolved Solids)			
Measurement range	0 to 19.99 ppm	0 to 199.9 ppm	0 to 1999 ppm
	0 to 19.99 ppt		0 to 199.9 ppt
Accuracy	±1% of full scale + 1 digit		
Resolution	0.01 ppm, 0.1 ppm, 1 ppm ; 0.01 ppt, 0.1 ppt		
SALT			
Measurement range	0~42.0 ppt (Sea water)		
Accuracy	±1% of full scale + 1 digit		
Resolution	0.1 ppt		
ATC Temperature sensor Probe port	3.5 mm diameter phone jack		
Cable length	1 M		

KEYPAD (CONTROLS)

PWR: Power on (Press in one second) or power off (Press more than 2 seconds when operation).
SET: Move to left digit. Short press to toggle COND → EC → TDS → Salt. Long pressing to save setting.
CAL: Move to right digit. To clear SD manual record data.
MODE: Select sample rate of SD card. Toggle Cond→t1F→tds (under K value adjustment mode).
Toggle 1413 uS calibration mode to 12.8 mS calibration mode (under Conductivity calibration mode).
UNIT: Short pressing to change temperature unit ℃/℉. Long pressing to select temperature probe type.
Short pressing to select NTC: Negative Temperature Coefficient)/ NOT: no remote temperature probe.
HOLD: Freeze current readings (Hold shows at top of LCD). Increase value.
ADJ: Long press to start SD recording (SD card is inserted to the meter). Decrease value.
SET+UNIT: Enter cond. cell constant K value / Temp. coefficient compensation/tds K factor value mode.
Long press again to escape the K value setting. Recovery to factory setting (under calibration mode).
SET+CAL: Conductivity Calibration.
HOLD+PWR: Disable Auto Power Off.

OPERATION

COND/EC/TDS/SALT PROBE INSTALLATION (BNC connector):

a)   Insert the COND electrode into the top of left hole. And insert the 3.5mm Ø diameter phone jack ATC sensoring 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: <u>Remove batteries when not use！</u>

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:

<u>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！)</u>

1. There are two ways to provide power:
(a) AAA batteries x 3pcs
(b) 9V AC/DC adaptor (optional).
    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, you have to connect with an AC/DC adaptor.
2. Make sure sensor probe 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
<u>NOTE: Make sure you have connected the electrode to the meter before power on.</u>
Momentarily pressing **PWR** button to turn on the meter, press and hold **PWR** buttons to turn off meter.

(2) COND/EC/TDS/Salt MODE
Short pressing **SET** button to toggle COND → EC→ TDS → Salt

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

(4) HOLD
Freeze the current readings of Cond./EC/TDS/Salt, 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** buttons, "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)   Cond. electrode

Whenever replacing a new cond. electrode. Long pressing **SET+CAL** buttons to enter Cond. calibration mode then strongly recommend doing factory reset by pressing **SET+UNIT** under 1413 uS 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.
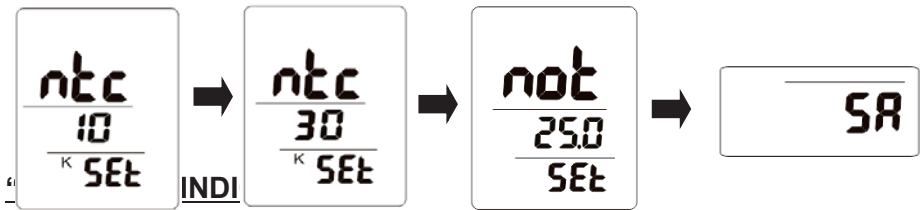
Probe type	ntc 10K (Default)	ntc 30K	not
Plug in	Temp. XX.X	Temp. XX.X	Manual
Un-plugged	"— — —"	"— — —"	temp.
ATC icon	O	O	X

CONDUCTIVITY/EC/TDS/SALT CALIBRATION PROCEDURE and MEASURING

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

2-1 Conductivity

a) Required Equipment for calibration:

1) Cond./EC/TDS/SALT ELECTRODE

2) Prepare the standard 1413 uS conductivity solution.

Toggle 1413 uS calibration mode to 12.8 mS calibration mode (under Conductivity calibration mode).

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 Conductivity electrode, install the "electrode plug" into the left "BNC port" of the meter.

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

3) First, to enter the cell constant (K) value of the Cond. electrode is required (e.g. Refer to the label on the top handle of the probe.)

Long pressing **SET+UNIT** buttons to enter the cell constant value. Units digit will flash.

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

And long pressing **SET** to save setting, screen will show "SA".

To escape calibration mode without saving setting, long pressing **SET+UNIT** buttons, the bottom of screen will show "ESC" few seconds and return to normal measurement mode.

4) **Conductivity electrode (K = 1):**

Long pressing **SET + CAL** buttons to enter Cond. calibration mode. Immerse the cond. probe to standard 1413 uS buffer solution. Display will show the standard conductivity 1413 uS values. Long pressing **SET** button to finish calibration, screen will show "SA". To escape calibration mode without saving setting, long pressing **SET+CAL** buttons, the bottom of screen will show "ESC" few seconds and return to normal measurement mode.
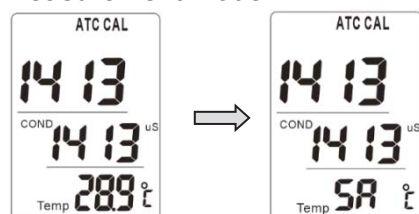
Conductivity electrode (K=10):

Long pressing **SET + CAL** buttons to enter Cond. calibration mode. Short pressing **MODE** button to enter 12.8 mS calibration mode. Immerse the cond. probe (K=10) to standard 12880 us/cm buffer solution. Display will show the standard conductivity 12.8 mS value in the first layer. Long pressing **SET** button to finish calibration, screen will show "SA".

To escape calibration mode without saving setting, long pressing **SET+CAL** buttons, the bottom of screen will show "ESC" few seconds and return to normal measurement mode.
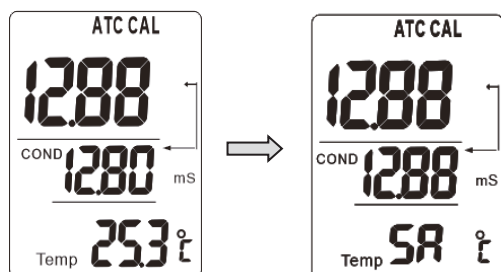
NOTE: The display shows 12.88 means 12.88 mS (12880 uS/cm).

5) Change the temp. coefficient is necessary. Default setting is 2.01% per ℃.

Using a suitable temp. coefficient of the solution will provide good results.

The temp. coefficients of the following electrolytes generally fall into the ranges shown below:

To enter the temperature coefficients by long pressing **SET+UNIT** buttons, then short pressing **MODE** to toggle Con→t I F→tdS. And go to select "t I F" and set the value.

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

Long pressing **SET** button to finish calibration, screen will show "SA" .The adjustable range is 1% to 7.4%.

Or to escape setting by long pressing **SET+UNIT** buttons, the bottom of screen will show "ESC" in few seconds and return to normal measurement mode.

Solution	Temp. Coefficients
Acids	1.0 - 1.6% / ℃
Bases	1.8 - 2.2% / ℃
Salts	2.2 - 3.0% / ℃
Drinking water	2.0% / ℃
Ultrapure water	5.2% / ℃

c) Conductivity measurement:

NOTE: For measuring high conductivity reading such as seawater, ensure to purchase cond. electrode (K=10).

1) Prepare the Conductivity electrode, install the "electrode plug" into the left "BNC port" of the meter.

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

3) Hold the electrode handle by hand and let the sensing head immersed wholly into the measured solution.
   Shake the probe to let the probe's internal air bubble drift out from the sensing head.
   Display will show the conductivity mS (uS) values.

2-2 TDS

a) Calibration by using Conversion Factors

TDS values are related to conductivity. To calibrate the meter by using conductivity standards as described in 2-1-b (Page 6) and select the correct TDS conversion factor. You can refer to below table or calculate the TDS conversion factor for other solutions by using the formula. Meter default is 0.66.

Factor= Actual TDS ÷ Actual Conductivity @ 25 ℃

Solution	Factor
Water	0.55~0.8
Drinking water	0.64
Absolute pure water	0.055
Distilled water	0.5 ~ 1.0

To enter the factor by long pressing **SET+UNIT** buttons, then short pressing **MODE** to toggle Con→t I F→tdS. And go to select "tdS"and set the value.

HOLD: ↑ to increase **ADJ:** ↓ to decrease **SET:** ← to left digit **CAL:** → to right digit
Long pressing **SET** button to finish calibration, screen will show "SA". The adjustable range is 0.05 to 1.00.
Or to escape setting by long pressing **SET+UNIT** buttons, the bottom of screen will show "ESC" few seconds and return to normal measurement mode.

b) TDS measurement:

1) Under normal measurement mode, short pressing **SET** button to toggle Cond. measurement to TDS measurement.

2) The measuring procedures are same as above 2-1-c (page 7) conductivity measurement, except to change the display unit from uS, mS to PPM, PPT.
   Display will show TDS values at the same time the left bottom display will show the temp. value of the measured solution.
   NOTE: If the TDS value is ppm, the conductivity value must be in uS ; if the TDS value is in ppt, the conductivity value must be in mS.

2-3 Salt

a) Calibration

If the conductivity range already makes the calibration completely (refer to 2-1-b at page 6) then the salt measurement is not necessary to make the calibration again.

b) Salt measurement

1) Under normal measurement mode, short pressing **SET** button to toggle Cond. measurement to "salt" measurement mode.

2) Hold the Cond. electrode handle by hand and let the sensing head Immersed wholly into the measured solution. Shake the probe to let the electrode's internal air bubble drift out from the sensing head. Display will show salt values (ppt) at the same time the left bottom display will show the temp. value of the measured solution.

CONDUCTIVITY STANDARD SOLUTION (K=1) (1413 µS/cm at 25°C)

※Conductivity reading will be affected by the temperature.

℃	℉	µS/cm	℃	℉	µS/cm	℃	℉	µS/cm
0	32	776	17	62.6	1198	34	93.2	1665
1	33.8	799	18	64.4	1224	35	95	1693
2	35.6	822	19	66.2	1251	36	96.8	1722
3	37.4	846	20	68	1277	37	98.6	1751
4	39.2	870	21	69.8	1304	38	100.4	1780
5	41	894	22	71.6	1331	39	102.2	1808
6	42.8	918	23	73.4	1358	40	104	1837
7	44.6	943	24	75.2	1386	41	105.8	1866
8	46.4	968	25	77	1413	42	107.6	1896
9	48.2	992	26	78.8	1441	43	109.4	1925
10	50	1017	27	80.6	1468	44	111.2	1954
11	51.8	1043	28	82.4	1496	45	113	1983
12	53.6	1068	29	84.2	1524	46	114.8	2013
13	55.4	1094	30	86	1552	47	116.6	2042
14	57.2	1119	31	87.8	1580	48	118.4	2071
15	59	1145	32	89.6	1608	49	120.2	2101
16	60.8	1171	33	91.4	1636	50	122	2103

CONDUCTIVITY STANDARD SOLUTION (K=10) (12880 μS/cm at 25°C)

※Conductivity reading will be affected by the temperature.

℃	℉	μS/cm	℃	℉	μS/cm
5	41	8,216	22	71.6	12,153
10	50	9,326	23	73.4	12,398
15	59	10,439	24	75.2	12,643
16	60.8	10,684	25	77	12,880
17	62.6	10,929	30	86	14,112
18	64.4	11,174	35	95	15,392
19	66.2	11,419	40	104	16,678
20	68	11,664	45	113	18,024
21	69.8	11,909	50	122	19,338

ELECTRODE MAINTENANCE

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

Cond./EC/ TDS /Salt electrode

Conductivity meters and cells should be calibrated to a standard conductivity solution. Selecting standards is very important, you should always choose one that has the approximate conductivity of the solution to be measured.

A polarized or fouled electrode must be cleaned to renew the active surface of the cell.

In most situations, hot water with a mild liquid detergent is an effective cleanser.

Acetone easily cleans most organic matter, and hypochlorous solutions will remove algae,bacteria, or molds.

To prevent cell damage, abrasives or sharp objects should not be used to clean an electrode.

A cotton swab also works well for cleaning.

SD CARD DATA LOGGING

※After inserting the SD card, the "SD" icon will appear on the bottom of display. When the meter supplied by batteries, once the icon becomes ▣▯ with SD icon disappeared, it indicates the power is not enough to activate SD function but other functions are still working, now we suggest the user to use adaptor to power the meter. Once the battery icon becomes ▪▭, it means the power is very weak, and should be replaced the new batteries for operating the meters.

●   SD Card Information

a)   Power the meter with AAA batteries or 9V AC/DC adaptor (optional).

b)   Insert an SD card (8G supplied) into the SD card slot at the right 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 "SD" will appear on the bottom of screen.

c)   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.
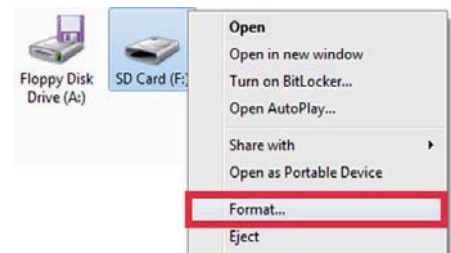
1. Select Quick Format.

2. Click "Start".

3. Once the formatting is complete, you can close the window.

● Automatic Data logging

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 data logging.

NOTE: Plug in the adaptor for SD data logging.

Setting the data logger clock time

NOTE: Make sure the clock of the meter is set up correctly in order to get accurate date/time during data logging sessions.
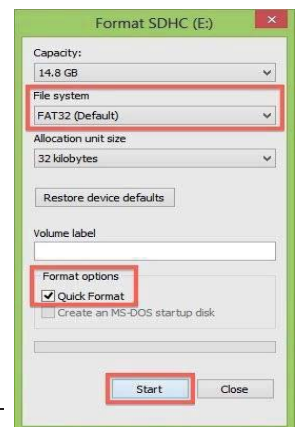
1. Power OFF the meter, pressing **MODE+POWER** buttons to enter setting. YEAR digit "18" will flash.
2. Short pressing CAL go to Month→Day→ Hour→ Minute setting.
3. Press and hold **SET** button to save setting and screen will show "SA" then "End".
4. Re-power ON the meter to back to normal measurement mode.

NOTE: To escape setting by turning OFF the meter without any change.

a) Setting the data logger sampling rate
   1. While meter is power ON, press and hold **MODE** button to enter setting.
   2. Pressing **HOLD** button to increase the value; pressing ADJ to decrease the value.
   3. Long pressing **MODE** button 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.
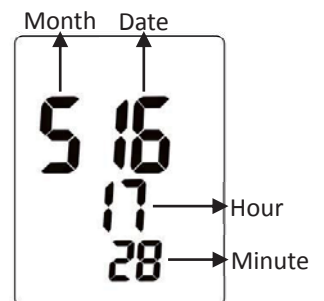
b) Start data logging

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

1. Power on the meter by AAA batteries or 9V AC/DC adaptor (optional).
2. After inserting the SD card, display will show icon "SD" on the bottom of the screen.
3. Long pressing **ADJ** button to starts recording until icon "SD" flashing on the bottom of screen.
4. When "SD" disappears, SD stop to record data or SD card is not being inserted.
5. 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.: /CDH-SD11/AUTO2017/…..
6. When data logging 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.: /CDH-SD11/AUTO2017/04051858/04051858.csv
7. 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.: /CDH-SD11/AUTO2017/12261858/12262005.csv

   NOTE1: Data logging stopped when replacing the probe, removing the SD card, removing batteries, adaptor or resetting the sampling rate.
   NOTE2: When the recording is been stopped, a new folder will be created as M/D/H/M from the next data logging.
   NOTE3: When the recording year and model number is changed, the new folder will be also created accordingly.
   NOTE4: When SD card records 1 points, "SD" icon will flash one time, once the "SD" icon flashes three times, it means the meter is under low battery, the recording will be failed if the battery is low.

● Manual data logging   (MAX 199 points)
1. Set the sampling rate to "0" seconds (Refer to "Setting the data logger 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 pressing **CAL** button to clear data (removed MANUAL.csv), screen shows "CLr".
   NOTE: While screen shows "Err" by long pressing 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 /CDH-SD11/ MANUAL.csv is required.
4. Data directory in SD card : /98717AT/ 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 /CDH-SD11/ 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 "0" stands for no measured value during recording period.

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

▲Automatic Data logging▲

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

▲ Manual Data logging▲

BURN OUT NOTIFICATION

If the sensor is not connected or over measurement range, the 「- - -」will be displayed on LCD and the data in the SD card is "0".

TROUBLE SHOOTING

Q1: Wrong temperature??

A1: Refer to page 4 (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").

Q2: Appear "Error codes"??

A2: Make sure if Hold appears on LCD.

ERROR CODES

Code	Description
- - -	The electrode were 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. probe 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.

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