CE

**ΩΞ OMEGA®**
# User's Guide

# CDH-SD1
## Conductivity Meter
## With Data Logging SD Card

# ΩΕ OMEGA®

| OMEGAnet® Online Service<br>omega.com | Internet e-mail<br>info@omega.com |
|---|---|

## Servicing North America:

**U.S.A.:**
ISO 9001 Certified

Omega Engineering, Inc., One Omega Drive, P.O. Box 4047
Stamford, CT 06907-0047
Toll-Free: 1-800-826-6342          Tel: (203) 359-1660
FAX: (203) 359-7700          e-mail: info@omega.com

**Canada:**

976 Bergar
Laval (Quebec), H7L 5A1 Canada
Toll-Free: 1-800-826-6342          TEL: (514) 856-6928
FAX: (514) 856-6886          e-mail: info@omega.ca

## For immediate technical or application assistance:

**U.S.A. and Canada:** Sales Service: 1-800-826-6342/1-800-TC-OMEGA®
Customer Service: 1-800-622-2378/1-800-622-BEST®
Engineering Service: 1-800-872-9436/1-800-USA-WHEN®

**Mexico**
**Latin America**

En Español: 001 (203) 359-7803          FAX: 001 (203) 359-7807
info@omega.com.mx          e-mail: espanol@omega.com

## Servicing Europe:

**Benelux:**

Managed by the United Kingdom Office
Toll-Free: 0800 099 3344          TEL: +31 20 347 21 21
FAX: +31 20 643 46 43          e-mail: sales@omegaeng.nl

**Czech Republic:**

Frystatska 184
733 01 Karviná, Czech Republic
Toll-Free: 0800-1-66342          TEL: +420-59-6311899
FAX: +420-59-6311114          e-mail: info@omegashop.cz

**France:**

Managed by the United Kingdom Office
Toll-Free: 0800 466 342          TEL: +33 (0) 161 37 29 00
FAX: +33 (0) 130 57 54 27          e-mail: sales@omega.fr

**Germany/Austria:**

Daimlerstrasse 26
D-75392 Deckenpfronn, Germany
Toll-Free: 0800 6397678          TEL: +49 (0) 7056 9398-0
FAX: +49 (0) 7056 9398-29          e-mail: info@omega.de

**United Kingdom:**
ISO 9001 Certified

OMEGA Engineering Ltd.
One Omega Drive, River Bend Technology Centre, Northbank
Irlam, Manchester M44 5BD United Kingdom
Toll-Free: 0800-488-488          TEL: +44 (0) 161 777-6611
FAX: +44 (0) 161 777-6622          e-mail: sales@omega.co.uk

---

# TABLE OF CONTENTS

# INTRODUCTION

Thank you for purchasing the CDH-SD1 Conductivity Meter with Datalogging SD Card. Please read this user's manual carefully and thoroughly before using the instrument.

The CDH-SD1 is a general-purpose handheld instrument suitable for measuring the conductivity of a solution or its total dissolved solids (TDS) or salt content. The meter also measures the solution's temperature.

The meter has four automatically switched full-scale ranges of conductivity measurement: 200 uS (microSiemens), 2 mS (milliSiemens), 20 mS and 200 mS. It also has four automatically switched ranges of TDS measurement: 200 ppm, 2,000 ppm, 20,000 ppm and 100,000 ppm. Salt content of up to 12% by weight also can be measured.

Among the applications suitable for the CDH-SD1 are water conditioning, wastewater monitoring, beverage production, aquaculture (fish farming), aquariums, pulp and paper processing, electroplating, and photography.

The CDH-SD1 has the performance and features needed to satisfy the most demanding aspects of the above applications. A front-panel pushbutton enables rapid switching among the three measurement modes. Measurement accuracies are ± 2% of full-scale reading + 1 digit for conductivity and TDS; ± 0.8ºC/± 1.5ºF for temperature, and ±0.5% of the value for salt. The supplied carbon rod electrode conductivity/TDS/salt probe can be calibrated using standard solutions for any of three full-scale measurement ranges. Many standard solutions are available from Omega as optional accessories.

Because it is microprocessor-based, the CDH-SD1 can make full use of the portability, reliability and large storage capacities that SD memory cards offer. Measurements can be made automatically at any sampling rate between one second and nine hours. After time-stamping and storing the measurements on an SD card plugged into the instrument (a process called datalogging), the user can remove the card and plug it into to a laptop or desktop computer either directly or

via a USB card reader The data logs are stored on the card as files with the .xls extension, which can be opened by Microsoft's Excel application.

The CDH-SD1 has a backlit 2-1/2 inch diagonal display and is powered by six AA Alkaline batteries or an optional 9-VDC AC adapter.

# KEY FEATURES

- Sensors calibrated by single push of a button
- Ten different pressure units selectable via front panel
- Displays maximum and minimum readings
- Performs real-time automatic datalogging at sampling time settable from 1 second to 9 hours
- Also supports manual logging and changing of card storage location
- Outputs Excel-compatible data logs
- Accepts SD memory cards of up to 16 GB capacity
- Big (2.5-inch diagonal) front-panel green backlit LCD is easy to read
- Auto power off function
- Powered by six AA batteries or optional 9V AC/DC adapter

# OPERATING INSTRUCTIONS

**What's in the case**
The CDH-SD1 comes fully assembled in a hard carrying case along with a conductivity/TDS/salt probe, a 2 GB SD memory card and this user's manual.

Accessories for the meter available from Omega are standard conductivity solutions (1.413 mS, 12.88 mS, 80 uS) needed to calibrate the probe and a 9VDC adapter for a 110V power supply. See the Optional Accessories section of this manual for more details.

Figure 1 shows all of the controls and indicators on the front, back, top, bottom and right side of the CDH-SD1. Familiarize yourself with the positions and functions of these controls, indicators and connectors before moving on to the setup procedure.
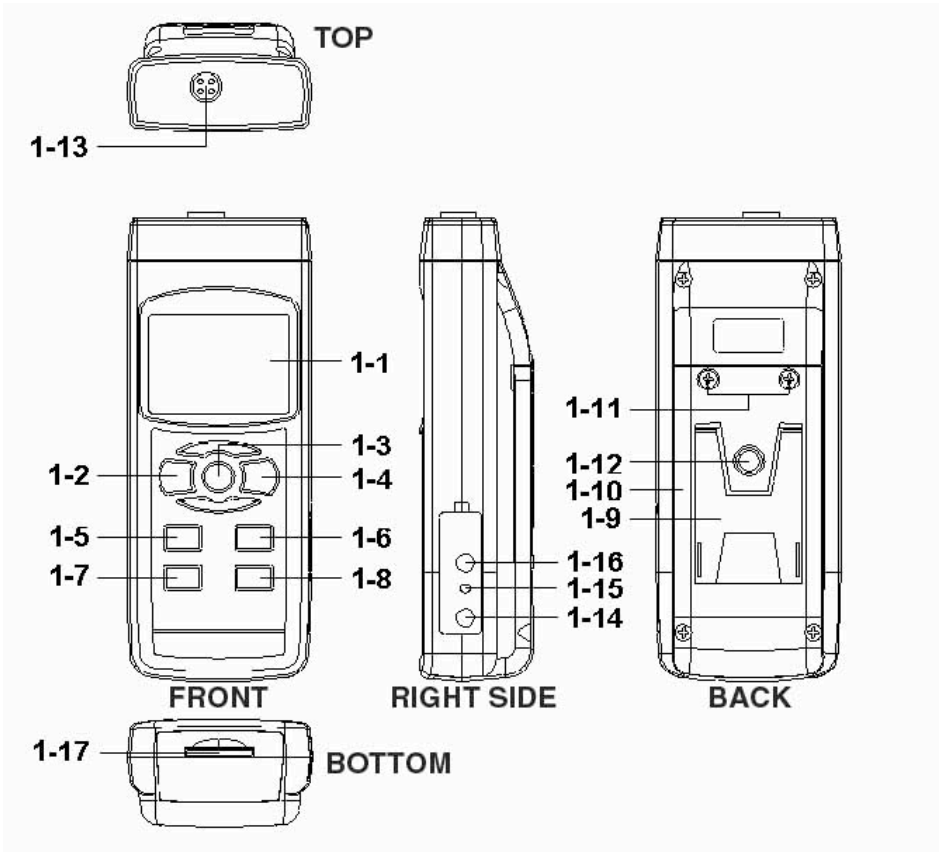


**1. The CDH-SD1's controls and indicators** and other physical features

[CALLOUTS FOR FIGURE 1]
1-1 Liquid-crystal display
1-2 POWER button
1-3 HOLD/ESC button

1-4 REC/ENTER button
1-5 ▲ button
1-6 ▼button
1-7 TIME button
1-8 LOGGER SET button
1-9 Kickstand
1-10 Battery compartment cover
1-11 Battery compartment cover screws
1-12 Tripod attachment nut
1-13 Conductivity/TDS/salt probe socket
1-14 Socket for 9VDC AC adapter
1-15 Reset button
1-16 RS232 output jack
1-17 SD card socket

**Setup**
1. **Choose the power source.** Before using the CDH-SD1, be sure it is powered by fresh batteries or an optional 9VDC AC adapter plugged into the bottom jack on its right side (callout 1-14).

   To remove the battery compartment cover, remove the two screws holding it in place (callout 1-11). Then install six AA batteries in the correct orientation, using the polarity marks on the inside of the compartment as a guide. Replace the cover by replacing the two screws.

2. **Install an SD card.** To prepare for setup, also install the supplied 2 GB SD memory card or another card with a capacity from 1 GB to 16 GB capacity in the socket on the bottom of the CDH-SD1 (callout 1-17). When installing the card, make sure its gold contacts are facing front and push the card into the socket until you hear a click. To remove the card, push it in until you hear a click and the card pops out.

Now power on the instrument by pressing the POWER button (callout 1-2) to generate a short beep. (To power off the CDH-SD1, press the POWER button and hold it until the instrument responds with a long beep.)

When the meter powers on, a series of transient startup screens will briefly appear. Once the display has stabilized, perform the following eight setup steps in the order presented.

3.  **Format the SD card.** The first step in the setup procedure determines whether or not to format the SD memory card plugged into the instrument. Press the LOGGER SET button (callout 1-8) and hold it for at least five seconds, until "Sd-F" appears in the lower half of the display. Quickly (within three seconds) press the REC/ENTER button.

(If you press buttons too slowly in setup mode, the screen will revert to the normal display. To return to the setup sequence, press and hold the LOGGER SET button again. To move ahead to the next field in the sequence or to the next parameter, press the HOLD/ESC button.)

Pressing the REC/ENTER button causes the word "no" or "yES" to appear over the term "Sd-F". Press the ▼ button to make a selection. Choose "yES" whenever a new SD card is being used, or when a used card is being repurposed (from use with another SD card instrument or a camera, for example) and all data on it is to be erased. Choose "no" to preserve any data on a card previously used with this instrument.

If you choose "yES", after you press the REC/ENTER button the instrument will prompt you to confirm that decision by displaying the term "Ent" below "yES" and sounding three beeps. To confirm that you want to begin the erasure/formatting procedure, press the REC/ENTER. "Ent" will then flash several times and the instrument will sound another three beeps to confirm that the SD card has been erased and formatted.

4.  **Set the date and time.** Once the SD card has been formatted (or not), the meter will automatically move to the next step in the startup sequence: setting the current date and time.

When the word "dAtE" appears in the center of the display, along with the flashing value "00.00.00" at the lower left, above "yy.mm.dd", set the current year by pressing the ▼ or ▲ button

repeatedly until the correct value appears above "yy". Press the REC/ENTER button to store the setting. The next screen that appears will have the value above "mm" flashing. Use the ▼ or ▲ button to navigate to the current month and press the REC/ENTER button to store the setting. When the next screen flashes the value above "dd", again use the ▼ or ▲ button to navigate to the current day and press the REC/ENTER button to store the setting.

Once you have set the date, the display will prompt you to set the hour, minute and second of the current time. Again use the ▼ or ▲ buttons to navigate to the correct values, and the REC/ENTER button to store the settings.

5. **Set the datalogging sampling time.** Once the date and time have been set and stored, the display will show a value below the letters "SP-t". Press the ▼ or ▲ button to decrease or increase the flashing hour value until the desired number appears below "SP-t". Press the REC/ENTER button to store that setting. The minutes value will then flash. Press the ▼ or ▲ button to decrease or increase the value and then press the REC/ENTER button to store that setting. Finally, press the ▼ or ▲ button to decrease or increase the flashing seconds value and then press the REC/ENTER button to store that setting. This completes the setting of the pressure meter's datalogging sampling time.

6. **Enable or disable auto power off**. Once the sampling time has been set and stored, the display will show the word "yES' over the term "PoFF". Press the ▼ button until the desired automatic power off management scheme ("yES" for enable; "no" for disable) is displayed. Press the REC/ENTER button to store the selection. If enabled, the power off function shuts off the CDH-SD1 after a period of inactivity of ten minutes.

7. **Enable or disable the beeper**. Once the auto power off function has been enabled or disabled, the display will show the word "yES" over the word "bEEP". Press the ▼ button until the desired setting ("yES" or "no") is displayed, and then press the REC/ENTER button to store the selection.

8. **Choose a decimal point or comma** to represent the decimal division between integers and fractions (for example, American-style 20.88 vs. European-style 20,88). Once the beper has been enabled or disabled, the display will show the word "bASIC" above the phrase "dEC". Press the ▼ button to make "bASIC" (American style) or "Euro" appear in the upper display, as desired. Press the REC/ENTER button to store the selection.

9. **Select the temperature unit.** Once the format of decimal point divisions has been set and stored, the lower portion of the display will show the term "t-CF". Press either the ▼ or ▲ button to change the letter displayed at the right of the display to "C" (for Celsius units) or "F" (for Fahrenheit units), as desired. Then press the REC/ENTER button to store the selection.

10. **Compensate the conductivity/TDS/salt probe for temperature.** The default value is 2% per degree C. The value is adjustable from 0 to 5% per degree C. Once the default temperature unit has been selected and stored, the lower portion of the display will show the term "PEr C". Press the ▼ or ▲ button repeatedly until the value above "PEr C" matches the desired temperature compensation level. Press the REC/ENTER button to store the setting.

The display will then either return to the first of the eight steps in the setup sequence—choosing whether or not to format the SD memory card—or show the term "ESC". If "ESC" appears, press either the HOLD/ESC button or the LOGGER SET button to exit the setup procedure and enter normal operating mode.
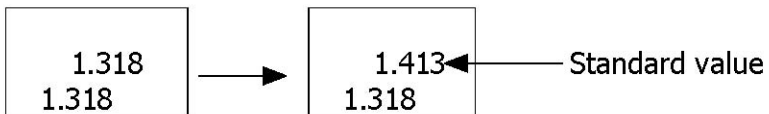
**Calibrating the conductivity/TDS/salt probe**
The following procedure is sufficient to calibrate the supplied conductivity/TDS/salt probe so it accurately measures all three parameters.

1.  **Obtain the correct standard conductivity solution(s)** for the full-scale range(s) you expect to use. For example, if you expect to measure conductivity values using a full-scale range of 2 mS, use a 1.413 mS standard conductivity solution. For measurements within the 200 uS full-scale range, obtain and use an 80 uS standard solution.

2.  **Plug the probe into its dedicated socket** on the top of the meter (callout 1-15 of Fig. 1). Then power on the meter and push the ▲ button (which has the word "MODE" stenciled above it) until the display shows the term "Cd".

3.  **To perform the calibration, immerse and shake the head of the probe** in the standard solution. The display will show its conductivity in units of uS or mS.

4.  **Once a value is displayed, use two fingers** to press the REC/ENTER and HOLD/ESC buttons simultaneously.

```
┌──────────────┐
│      Cd      │
│  CAL         │
└──────────────┘
```
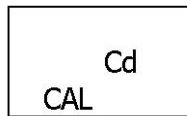
5.  **When this screen  appears, release both fingers**.

6.  **Immediately press the REC/ENTER button.** The display will then switch into a two-level (upper and lower) mode that looks like this:

```
┌──────────────┐          ┌──────────────┐
│    1.318     │ ───────▶ │    1.413◀─────┼──── Standard value
│  1.318       │          │  1.318       │
└──────────────┘          └──────────────┘
```

7.  **Immediately press the ▼ or ▲ button** to raise or lower the measured value until it matches the standard conductivity value.

8.  **Complete the calibration procedure** by pressing the REC/ENTER button.

If you expect to make conductivity readings using other full-scale ranges, you should repeat this calibration procedure using other standard conductivity solutions of appropriate strength. If you do,

General advises performing the above procedure (for a 2-ms full-scale range) first.

**Normal operation**

1. **To prepare to make measurements**, plug the connector at one end of the supplied conductivity probe into the socket on the top of the meter. Then power on the meter on by pressing the POWER button.

The CDH-SD1 has three operating modes. It can measure three properties of a solution: its conductivity, its total dissolved solids (TDS) content, and its salt content (by weight).

2. **To select the parameter to be measured**, press the ▲ button until the desired mode appears (as the term Cd, tdS or SALt).

Following are the default states for the CDH-SD1:
- Conductivity measurement in units of microSiemens (uS) or milliSiemens (mS)
- Temperature measurement in ºC
- Temperature compensation of 2% per ºC
- Autoranging on and auto power off
- Sampling time of 2 seconds

3. **To measure the conductivity of a solution**, press the ▲ button until the term "Cd" appears. Hold the conductivity probe and immerse its head in the solution to be measured. Shake the probe to help any air bubbles inside it escape through the head.

The display will simultaneously show the solution's conductivity (in units of uS or mS) in the center and the solution's temperature (in ºC) at the lower left.

As mentioned earlier, in the CDH-SD1 autoranging is enabled by default.

4. **To manually choose a full-scale measurement range**, press the ▲ button until the desired value (200 uS, 2 mS, 20 mS or 200 mS). Note that pressing the ▲ button also can re-enable

autoranging. To change the default temperature unit or temperature compensation, perform Step 9 or 10 of the setup procedure.

If the display does not show a zero value before the probe head is immersed in the solution, you can quickly correct that error by doing the following. First, use the ▲ button to manually choose a full-scale measurement mode of 200 uS. Then press the ▲ button again, but hold it for at least ten seconds, until the display reads zero.

5. **To measure the TDS content of a solution**, press the ▲ button until the term "tdS" appears. Hold the conductivity probe and immerse its head in the solution to be measured. Shake the probe to help any air bubbles inside it escape through the head. The display will simultaneously show the solution's TDS content (in units of ppm) in the center and the solution's temperature (in ºC) at the lower left.

6. **To measure the salt content of a solution**, press the ▲ button until the term "SALt" is displayed. Hold the conductivity probe and immerse its head in the solution to be measured. Shake the probe to help any air bubbles inside it escape through the head. The display will simultaneously show the solution's salt content (by % weight) in the center and the solution's temperature (in ºC) at the lower left.

Whenever the CDH-SD1 is in measurement mode, you can turn off the backlight (which is on by default) by briefly pressing (but not holding) the POWER/ESC button. To reactivate the backlight, briefly press the button again.

Whenever the instrument is in measurement mode, you also can check the current date and time by briefly pressing the TIME button. Doing so causes both values to appear briefly at the lower left of the display.

**Holding and storing measurements**

7. **To hold a measured value** of pressure, press the HOLD/ESC button during the measurement. Doing so will cause the word "HOLD" to appear at the top of the display. Pressing the HOLD/ESC button again releases the hold.

8. **To record and recall readings**, press the REC/ENTER button while making measurements. This will make the term "REC" appear at the top of the display. Pressing the REC/ENTER button again, briefly, will make the term "MAX" appear to the right of "REC" and switch the display to the maximum value stored in memory during the last recording session. Pressing the REC/ENTER button again, briefly, will make the term "MIN" appear to the right of "REC" and switch the display to the minimum value stored during the last session.

9. **To exit recording mode,** press and hold the REC/ENTER button for at least three seconds, until the term "REC" disappears from the top line of the display. The display will then revert to showing the current reading.

**Automatic vs. manual datalogging**

The CDH-SD1 can automatically log data at a user-selected sampling period from 1 second to 9 hours. To view the sampling time for which the instrument was set up, press the LOGGER SET button (which has the words "Sampling check" stenciled below it) once. To change the sampling time, perform Step 5 of the setup procedure.

10. **To start automatic datalogging**, press the REC/ENTER button once. The top line of the display will then show the term "REC". Pressing the LOGGER SET button at this point will make REC flash and add the flashing term "LOGGER" at the top right of the display. This indicates that the instrument is currently storing measured values and their time stamps in memory.

11. **To pause automatic datalogging**, press the LOGGER SET button once; this action makes the flashing term LOGGER

disappear from the top right of the display and changes the term "REC" from flashing to constant. Pressing the LOGGER SET button again resumes automatic datalogging.

12. **To end automatic datalogging**, press the REC/ENTER button and hold it for at least two seconds. This action causes the "REC" message to disappear.

13. **To log data manually**, set the sampling time to zero using Step 5 of the setup procedure. Then press the REC/ENTER button once. The display will show the term "REC" on the top line, a value in the middle, and below it the letter "P" on the left and a number from 1 to 99 on the same line to the right. The number indicates the position on the SD card that will be used to store manually logged data.

Now press the LOGGER SET button. This will cause the beeper to sound and the term "LOGGER" to briefly appear at the upper right of the display. As in automatic datalogging mode, in this mode the instrument is storing measurements and their time stamps on the SD card.

In manual datalogging mode, however, measurements are being stored continuously (with a sampling time of zero), and their locations on the card can be changed.

14. **To change the storage location of manually logged data**, press the ▼ button once; this causes the "P" to disappear from the left side of the display and the value on its line to begin flashing. Once the flashing begins, you can use the ▼ and ▲ buttons to change the flashing value to any number between 1 and 99. Once you have chosen the storage location, press the REC/ENTER button to save the setting. This causes the value to stop flashing and the "P" to return.

15. **To end manual datalogging**, press the REC/ENTER button and hold it for at least three seconds. This action causes the "REC" message to disappear from the top line of the display.

**Transferring data from the SD card to a computer**

After automatic or manual datalogging of measurements, remove the SD card from the meter and plug it into your computer either directly (if it has an SD card slot) or through an SD card reader.

Because the files containing time-stamped data logs have the file extension .xls, they open in Microsoft's Excel application. Figures 2, 3

and 4 show three kinds of Excel presentations: a data-only screen, a graphics-only screen, and a mixed data/graphics screen.
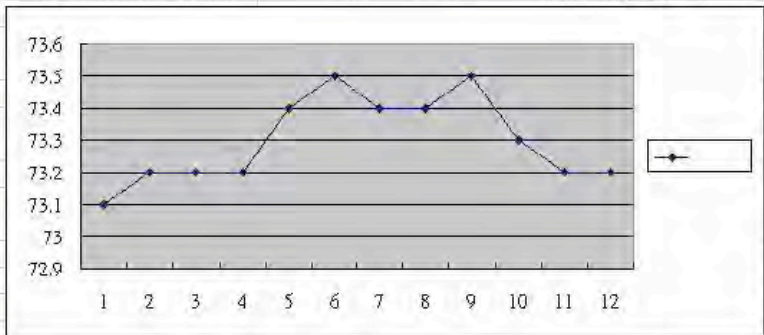
| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | Position | Date | Time | Ch1_Value | Ch1_Unit | Ch2_Value | Ch2_unit |
| 2 | | 1 | 2009/8/12 | 13:16:36 | 73.1 | uS | 24.7 | Degree_C |
| 3 | | 2 | 2009/8/12 | 13:16:38 | 73.2 | uS | 24.7 | Degree_C |
| 4 | | 3 | 2009/8/12 | 13:16:40 | 73.2 | uS | 24.7 | Degree_C |
| 5 | | 4 | 2009/8/12 | 13:16:42 | 73.2 | uS | 24.7 | Degree_C |
| 6 | | 5 | 2009/8/12 | 13:16:44 | 73.4 | uS | 24.7 | Degree_C |
| 7 | | 6 | 2009/8/12 | 13:16:46 | 73.5 | uS | 24.7 | Degree_C |
| 8 | | 7 | 2009/8/12 | 13:16:48 | 73.4 | uS | 24.7 | Degree_C |
| 9 | | 8 | 2009/8/12 | 13:16:50 | 73.4 | uS | 24.7 | Degree_C |
| 10 | | 9 | 2009/8/12 | 13:16:52 | 73.5 | uS | 24.7 | Degree_C |
| 11 | | 10 | 2009/8/12 | 13:16:54 | 73.3 | uS | 24.7 | Degree_C |
| 12 | | 11 | 2009/8/12 | 13:16:56 | 73.2 | uS | 24.7 | Degree_C |
| 13 | | 12 | 2009/8/12 | 13:16:58 | 73.2 | uS | 24.7 | Degree_C |

**2. Typical Excel data-only screen**
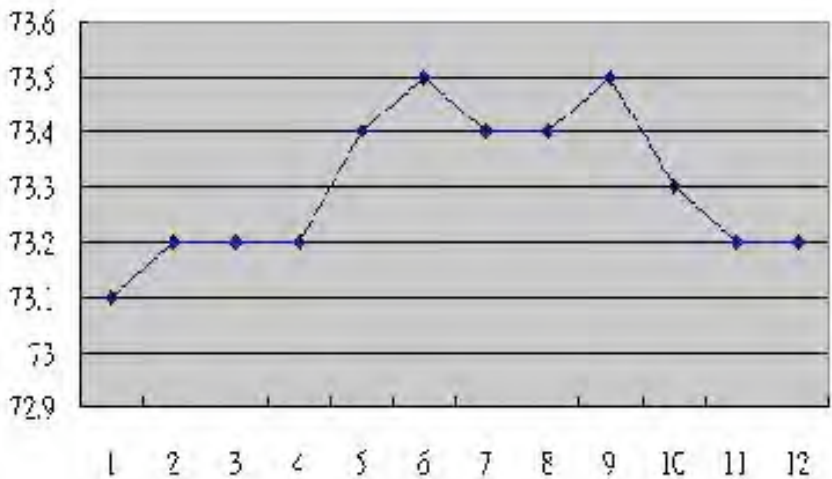
**3. Typical Excel graphics-only screen**



| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | Position | Date | Time | Ch1 Value | Ch1 Unit | Ch2 Value | Ch2 unit | |
| 2 | 1 | 2009/8/12 | 13:16:36 | 73.1 | uS | 24.7 | Degree_C | |
| 3 | 2 | 2009/8/12 | 13:16:38 | 73.2 | uS | 24.7 | Degree_C | |
| 4 | 3 | 2009/8/12 | 13:16:40 | 73.2 | uS | 24.7 | Degree_C | |
| 5 | 4 | 2009/8/12 | 13:16:42 | 73.2 | uS | 24.7 | Degree_C | |
| 6 | 5 | 2009/8/12 | 13:16:44 | 73.4 | uS | 24.7 | Degree_C | |
| 7 | 6 | 2009/8/12 | 13:16:46 | 73.5 | uS | 24.7 | Degree_C | |
| 8 | 7 | 2009/8/12 | 13:16:48 | 73.4 | uS | 24.7 | Degree_C | |
| 9 | 8 | 2009/8/12 | 13:16:50 | 73.4 | uS | 24.7 | Degree_C | |
| 10 | 9 | 2009/8/12 | 13:16:52 | 73.5 | uS | 24.7 | Degree_C | |
| 11 | 10 | 2009/8/12 | 13:16:54 | 73.3 | uS | 24.7 | Degree_C | |
| 12 | 11 | 2009/8/12 | 13:16:56 | 73.2 | uS | 24.7 | Degree_C | |
| 13 | 12 | 2009/8/12 | 13:16:58 | 73.2 | uS | 24.7 | Degree_C | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | | | | | | | | |

**4. Typical Excel mixed data/graphics screen**

# SPECIFICATIONS

| | |
|---|---|
| Embedded microcontroller | Custom one-chip LSI device |
| Display type | Liquid-crystal with green backlight |
| Display size | 2.05 x 1.5 inches (52 x 38 mm) |
| Probe type | Carbon rod electrode |
| Parameters (units) measured | Conductivity (uS, mS); total dissolved solids (ppm); salt content (% weight); temperature ($^{o}$F, $^{o}$C) |
| Measurement accuracy | ± 2% of full-scale reading + 1 digit for conductivity, TDS; ± 0.8$^{o}$C/± 1.5$^{o}$F for temperature; ±0.5% of value for salt |
| Measurement resolution | Conductivity: 0.1 uS @ 200 uS full-scale (f.s.), 0.001 mS @ 2 mS f.s., 0.01 mS @ 20 mS f.s., 0.1mS @ 200 mS f.s.; TDS: 0.1 ppm @200 ppm f.s., 1 ppm @ 2,000 ppm f.s., 10 ppm @ 20,000 ppm f.s., 100 ppm @ 100,000 ppm f.s.; Temperature: 0.1$^{o}$F/0.1$^{o}$C; Salt: 0.01% |
| Temperature compensation | Automatic from 32 to 140 $^{o}$F (0 to 60 $^{o}$C); temperature compensation factor is manually variable from 0 to 5% per degree Celsius |
| Stored readings | Maximum, minimum |
| Datalogging sampling time | Settable between 1 second and 8 hours, 59 minutes, 59 seconds (in automatic datalogging mode) |
| SD card capacity | 1 GB to 16 GB |
| Settable parameters | Date, time, auto power off, beep sound, sampling time, decimal point or comma decimal division, optional pressure sensor's full-scale range (2, 5, 10, 20, 50, 100, 200 or 400 bar) |
| Operating temperature | 32 to 122$^{o}$F (0 to 50$^{o}$C) for meter; 32 to 140 $^{o}$F (0 to 60 $^{o}$C) for probe |
| Operating relative humidity | 0 to 85% |
| Power supply | Six Alkaline AA batteries or optional 9-VDC AC adapter |

| | |
|---|---|
| Power consumption | 14 mADC (normal operation, with backlight off and SD card not saving data); 37 mADC with backlight on and card saving data; 49 mADC with backlight on and card saving data |
| Dimensions of meter | 6.97 x 2.68 x 1.77 inches (177 x 68 x 45 mm) |
| Weight of meter | 1.08 lb (489 g) |
| Dimensions of probe | 0.86 in. (diameter) x 4.72 in. (L) (22 mm x 120 mm) |

# MAINTENANCE & TROUBLESHOOTING TIPS

Keep the conductivity/TDS/salt probe clean and in the carrying case when not in use.

When the icon [battery icon] appears in the left corner of the display, it's time to replace the six AA batteries that power the instrument (although measurements will remain valid for several hours after the low-battery indicator first appears). Replacing the batteries requires removing the two screws that hold the battery compartment cover in place, as explained earlier. After inserting fresh batteries in the correct orientation, tighten the screws to secure the cover.

If the meter "freezes" (like a computer) and buttons become unresponsive, try resetting the instrument by pushing the RESET button on its right side (callout 1-15 of Fig. 1) with the end of a paper clip.

Remove the batteries when storing the meter for an extended period of time.

Do not drop or disassemble the instrument.

# OPTIONAL ACCESSORIES

- Standard conductivity solutions (1.413 mS, 12.88 mS, 80 uS)
- 9-VDC adapter for a 110VAC power supply

**NOTES:**

**NOTES:**

## WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) 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 the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED 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 theproduct, 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 registered trademark of OMEGA ENGINEERING, INC.

# Where Do I Find Everything I Need for Process Measurement and Control? OMEGA...Of Course!

## *Shop online at omega.com*<sup>SM</sup>

### TEMPERATURE
- ☑ Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
- ☑ Wire: Thermocouple, RTD & Thermistor
- ☑ Calibrators & Ice Point References
- ☑ Recorders, Controllers & Process Monitors
- ☑ Infrared Pyrometers

### PRESSURE, STRAIN AND FORCE
- ☑ Transducers & Strain Gages
- ☑ Load Cells & Pressure Gages
- ☑ Displacement Transducers
- ☑ Instrumentation & Accessories

### FLOW/LEVEL
- ☑ Rotameters, Gas Mass Flowmeters & Flow Computers
- ☑ Air Velocity Indicators
- ☑ Turbine/Paddlewheel Systems
- ☑ Totalizers & Batch Controllers

### pH/CONDUCTIVITY
- ☑ pH Electrodes, Testers & Accessories
- ☑ Benchtop/Laboratory Meters
- ☑ Controllers, Calibrators, Simulators & Pumps
- ☑ Industrial pH & Conductivity Equipment

### DATA ACQUISITION
- ☑ Data Acquisition & Engineering Software
- ☑ Communications-Based Acquisition Systems
- ☑ Plug-in Cards for Apple, IBM & Compatibles
- ☑ Data Logging Systems
- ☑ Recorders, Printers & Plotters

### HEATERS
- ☑ Heating Cable
- ☑ Cartridge & Strip Heaters
- ☑ Immersion & Band Heaters
- ☑ Flexible Heaters
- ☑ Laboratory Heaters

### ENVIRONMENTAL MONITORING AND CONTROL
- ☑ Metering & Control Instrumentation
- ☑ Refractometers
- ☑ Pumps & Tubing
- ☑ Air, Soil & Water Monitors
- ☑ Industrial Water & Wastewater Treatment
- ☑ pH, Conductivity & Dissolved Oxygen Instruments

M4990/0712