SD card real time data logger
TDS (Total dissolved solids), Salt

CONDUCTIVITY METER

Model : CD-4317SD

Your purchase of this CONDUCTIVITY METER with SD CARD DATA LOGGER marks a step forward for you into the field of precision measurement. Although this meter a complex and delicate instrument, its durable structure will allow many years of use if proper operating techniques are developed. Please read the following instructions carefully and always keep this manual within easy reach.

OPERATION MANUAL

TABLE OF CONTENTS

1. FEATURES

* One meter for multi purpose operation :
  Conductivity, TDS (Total dissolved solids),
  Salt measurement.
* Pt glass electrode, high performance for the low
  conductivity (pure water) measurement.
* Conductivity : 200 uS/2 mS/20 mS/200 mS.
* Salt : 0 to 12 % salt (% weight).
* Conductivity measurement can select Temp. Coefficient
  of measurement solution.
* ATC for the conductivity measurement.
* Separate probe, easy for operation of different
  measurement environment.
* Real time SD memory card Datalogger, built-in Clock
  and Calendar, sampling time can set from 1 sec to 8
  hour 59 min. 59 sec.
* Manual datalogger is available, during execute the
  manual datalogger function, it can set the different
  location no. (position 1 to position 99).
* Innovation and easy operation, computer is not need to
  setup extra software, after execute datalogger, just take
  away the SD card from the meter and plug in the SD card
  into the computer, it can down load the all the measured
  value with the time information (year/month/date/
  hour/minute/second) to the Excel directly, thenuser can
  make the further data or graphic analysis by themselves.
* SD card capacity : 1 GB to 16 GB.
* LCD with green light backlight, easy reading.
* Data hold, record max. and min. reading.
* Power by UM3/AA (1.5 V) x 6 batteries or DC 9V adapter.
* RS232/USB PC COMPUTER interface.
* Wide applications: water conditioning, aquariums,
  beverage, fish hatcheries, food processing, photography,
  laboratory, paper industry, plating industry, quality
  control, school & college, water conditioning.

2. SPECIFICATIONS

2-1 General Specifications

Circuit	Custom one-chip of microprocessor LSI circuit.
Display	LCD size : 52 mm x 38 mm LCD with green backlight (ON/OFF).
Measurement Function	* Conductivity (uS, mS) * TDS (Total Dissolved Solids, PPM) * Salt (% Weight) * Temperature (℃,℉)
Temperature Compensation	Automatic from 0 to 60 ℃ (32 - 140 ℉), with temperature compensation factor variable between 0 to 5.0% per C.
Conductivity Probe	Pt glass electrode, high performance for the low conductivity (pure water) measurement.
Datalogger Sampling Time Setting range	Auto	1 sec to 8 hour 59 min. 59 sec. @ Sampling time can set to 1 second, but memory data may loss.
	Manual	Push the data logger button once will save data one time. @ Set the sampling time to 0 second. @ Manual mode, can also select the 1 to 99 position (Location) no.
Memory Card	SD memory card. 1 GB to 16 GB.
Advanced setting	* SD memory card Format * Set clock time (Year/Month/Date, Hour/Minute/ Second) * Set sampling time * Auto power OFF management * Set beep Sound ON/OFF * Decimal point of SD card setting * Set temperature unit to ℃ or ℉ * Set CD temperature compensation factor

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Data Hold	Freeze the display reading.	
Memory Recall	Maximum & Minimum value.	
Sampling Time of Display	Approx. 1 second.	

Data Output	RS 232/USB PC computer interface.
	* Connect the optional RS232 cable
	  UPCB-02 will get the RS232 plug.
	* Connect the optional USB cable
	  USB-01 will get the USB plug.	

Operating Temperature	Meter	0 to 50 ℃.
	Probe	0 to 60 ℃.
Operating Humidity	Less than 85% R.H.	
Power Supply	* Alkaline or heavy duty DC 1.5 V battery (UM3, AA) x 6 PCs, or equivalent.	
	* DC 9V adapter input. (AC/DC power adapter is optional).	
Power Current	Normal operation (w/o SD card save data and LCD Backlight is OFF) : Approx. DC 14 mA.	
	When SD card save the data and LCD Backlight is OFF) : Approx. DC 37 mA.	

	* If LCD backlight on, the power
	  consumption will increase approx.
	  12 mA.	

Weight	489 g/1.08 LB.	
Dimension	Meter	177 x 68 x 45 mm (7.0 x 2.7x 1.9 inch)
	Probe	Round, 12 mm Dia. x 157 mm length.
Accessories Included	* Instruction manual......................1 PC * Conductivity/TDS/Salt probe, CDPB-04................................... 1 PC * Hard carrying case (CA-06)........1 PC	

Optional Accessories	* 1.413 mS Conductivity Standard Solution..............................CD-14
	SD memory card (1 GB)
	SD memory card (2 GB)
	AC to DC 9V adapter.
	USB cable, USB-01.
	RS232 cable, UPCB-02.
	Data Acquisition software,SW-U801-WIN.

2-2 Electrical Specifications (23± 5 ℃)

Conductivity (uS, mS)

Range	Measurement	Resolution	Accuracy
200 uS	0 to 200.0 uS	0.1 uS	
2 mS	0.2 to 2.000 mS	0.001 mS	± (2% F.S.+1d)
20 mS	2 to 20.00 mS	0.01 mS	* F.S. -
200 mS	20 to 200.0 mS	0.1 mS	full scale

 * *Temperature Compensation :*
   Automatic from 0 to 60 ℃ (32 - 140 ℉), with temperature
   compensation factor variable between 0 to 5.0% per C.
* *The accuracy is specified under measurement value ≦ 100 mS.*
* *mS - milli Simens   * @ 23± 5℃*

TDS (Total Dissolved Solids)

Range	Measurement	Resolution	Accuracy
200 PPM	0 to 132 PPM	0.1 PPM	
2,000 PPM	132 to 1,320 PPM	1 PPM	± (2% F.S.+1d)
20,000 PPM	1,320 to 13,200 PPM	10 PPM	* F.S. -
200,000 PPM	13,200 to 132,000 PPM	100 PPM	full scale

* *Temperature Compensation :*
   Automatic from 0 to 60 ℃ (32 - 140 ℉), with temperature
   compensation factor variable between 0 to 5.0% per ℃.
* *The accuracy is specified under measurement value ≦ 66,000 PPM.*
* *PPM - parts per million   * @ 23± 5℃*

Temperature

Function	Measuring Range	Resolution	Accuracy
℃	0 ℃ to 60 ℃	0.1 ℃	± 0.8 ℃
℉	32 ℉ to 140 ℉	0.1 ℉	± 1.5 ℉
@ 23± 5℃			

Salt

Measurement Range	0 to 12 % salt (% weight).
Resolution	0.01 % salt.
Accuracy	± 0.5 % salt value

3. FRONT PANEL DESCRIPTION
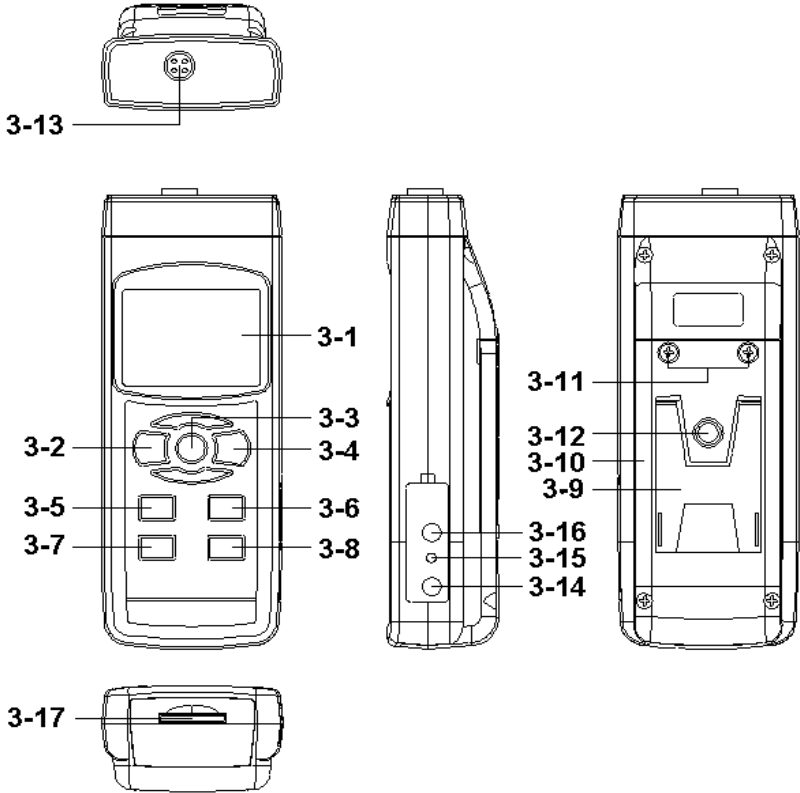
3-1 Display

3-2 Power Button (Backlight Button)

3-3 Hold Button (ESC Button)

3-4 REC Button (Enter Button)

3-5 Mode Button (▲ Button)

3-6 Range Button (▼ Button)

3-7 Time Button

3-8 Logger Button (SET Button, Sampling check)

3-9 Stand

3-10 Battery Compartment/Cover

3-11 Battery Cover Screw

3-12 Tripod Fix Nut

3-13 Probe Socket

3-14 DC 9V Power Adapter Input Socket

3-15 Reset Button

3-16 RS-232 Output Terminal

3-17 SD card socket

4. MODE SELECTION

1) Turn on the meter by pressing the " Power Button " (3-2, Fig. 1) momentarily.

   * *Pressing the " Power Button " (3-2, Fig. 1) continuously and > 2 seconds again will turn off the meter.*

2) The meter can select 3 kind Mode as :

   a. Conductivity, TDS measurement
   b. TDS measurement
   c. Salt measurement

   Pressing the " Mode Button " (3-5, Fig. 1) once, the Display will show the following text in sequence :

Cd	**Conductivity measurement**
tdS	**'TDS measurement**
SALt	**Salt measurement**

   Until the Display show the desired mode the meter will execute this Mode with default.

5. CONDUCTIVITY/TDS MEASURING and CALIBRATION PROCEDURE

The meter default function are following :
* The display unit is set to conductivity (uS, mS).
* The temperature unit is set to ℃.
* Temp. compensation factor is set to 2.0% per C.
* Auto range.
* Auto power off.
* The sampling time of data logger function is 2 seconds.

CDPB-04
probe
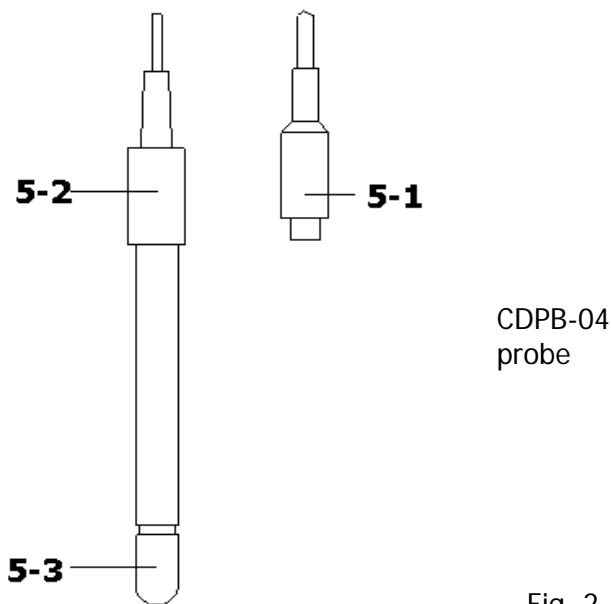
Fig. 2

5-1 Conductivity measurement

1) Prepare the Conductivity Probe (CDPB-04, standard
   accessory, included), install the " Probe Plug " (5-1,
   Fig. 2) into the " Probe Socket " (3-13, Fig. 1).
2) Power on the meter by pressing " Power Button "
   (3-2, Fig. 1) once.
   Select the Meter's measurement Mode to " Cd "
   (Conductivity measurement), refer to chapter 4, page 8.
3) Hold the " Probe Handle " (5-2, Fig. 2) by hand
   and let the " Sensing head " (5-3, Fig. 2)
   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.
   at the same time the left bottom display will show the
   Temp. value of the measured solution.

Manual range operation

The meter is default to be used for the auto range mode. Push the " Range Button " (3-6, Fig. 1) once in sequence will change the range from 200 uS, 2 mS, 20 mS, 200 mS and auto range.

Change the Temp. unit to ℉

If intend to change the Temp. unit from ℃ to ℉, please refer to chapter 10-7 page 26.

Change the Temp. Coefficient Factor

The default Temp. compensation factor value of the measurement solution is to 2.0% per ℃. If intend to change it, please refer to chapter 10-8, page 27.

Zero adjustment

If the probe not immerse the measurement solution and display not show zero value, pressing the " ▲ Button " (3-5, Fig. 1) continuously at least 10 seconds will let display show zero. The zero function only valid for the 200 uS range and the not zero value is < 2.0 uS.

5-2 TDS (PPM) measurement
The measuring procedures are same as above
5-1 Conductivity (uS, mS) measurement,
except to change the display unit from uS, mS to PPM.
The detail procedures please refer chapter 4, page 8.

5-3 Calibration

1) Prepare the standard conductivity solution (optional)
   For example :
   2 mS range calibration solution :
   1.413 mS Conductivity Standard Solution, CD-14
   200 uS range calibration solution :
   80 uS Conductivity Standard Solution
   20 mS range calibration solution :
   12.88 mS Conductivity Standard Solution
   or other Conductivity Standard Solution

2) Install the " Probe Plug " (5-1, Fig. 2) into the
   " CD Socket " (3-13, Fig. 1).
3) Power on the meter by pressing " Power Button "
   (3-2, Fig. 1) once.
4) Hold the " Probe Handle " (5-2, Fig. 2) by hand
   and let the " Sensing head " (5-2, Fig. 2)
   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.
5) Use the two fingers to press the " REC Button " (3-4,
   Fig 1) and " HOLD Button " (3-3, Fig. 1) at the same
   time. the display will show the following screen as
   example, release the both fingers.

```
        Cd
   CAL
```

6) Press the " Enter Button " (3-4, Fig. 1), the measuring value will present on both upper and lower Display. Use "▲ Button " (3-5, Fig. 1), " ▼ Button " (3-6, Fig. 1) to adjust the up display value exact same as the standard conductivity value. Press the " Enter Button " (3-4. Fig. 1) will save the calibration data and finish the calibration procedures.

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

  *If only intend to make the one point calibration,
   just execute the 2 mS range (1.413 mS Cal.)
    is enough.
  *Multi-points calibration procedures should
   execute the 2 mS range (1.413 mS Cal.)
   calibration at first, then make other ranges
   (20 uS range, 20 mS range or 200 mS range)
   calibration procedures following if necessary.

6. SALT MEASURING and CALIBRATION

6-1 Salt measurement

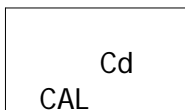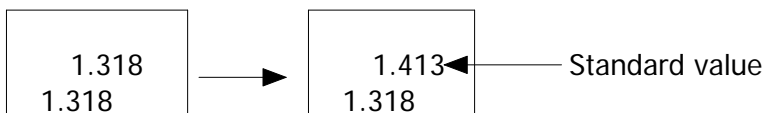1) Prepare the Probe (CDPB-04, same probe as the conductivity measurement, refere to Fig. 2, page 9), install the " Probe Plug " (5-1, Fig. 2) into the " Probe Socket " (3-13, Fig. 1).

2) Power on the meter by pressing " Power Button " (3-2, Fig. 1) once.
Select the Meter's measurement Mode to " SALt ", refer to Chapter 4, page 8.

3) Hold the " Probe Handle " (5-2, Fig. 2) by hand and let the " Sensing head " (5-3, Fig. 2) 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 Salt values (% weight).

6-2 Calibration

If the conductivity range already make the calibration completely then the Salt measurement is not necessary to make the calibration again.

7. OTHER FUNCTION

7-1 Data Hold
During the measurement, press the " Hold Button " (3-3, Fig. 1) once will hold the measured value & the LCD will display a " HOLD " symbol.
Press the " Hold Button " once again will release the data hold function.

7-2 Data Record (Max., Min. reading)
1) The data record function records the maximum and minimum readings. Press the " REC Button " (3-4, Fig. 1) once to start the Data Record function and there will be a " REC. " symbol on the display.
2) With the " REC. " symbol on the display :
   a) Press the " REC Button " (3-4, Fig. 1) once, the " REC. MAX. " symbol along with the maximum value will appear on the display.
   If intend to delete the maximum value, just press the " Hold Button " (3-3, Fig. 1) once, then the display will show the " REC. " symbol only & execute the memory function continuously.
   b) Press the " REC Button " (3-4, Fig. 1) again, the " REC. MIN. " symbol along with the minimum value will appear on the display.
   If intend to delete the minimum value, just press the " Hold Button " (3-3, Fig. 1) once, then the display will show the " REC. " symbol only & execute the memory function continuously.
   c) To exit the memory record function, just press the " REC " button for 2 seconds at least. The display will revert to the current reading.

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7-3 LCD Backlight ON/OFF

After power ON, the " LCD Backlight " will light automatically. During the measurement, press the " Backlight Button " (3-2, Fig. 1) once will turn OFF the " LCD Backlight ".
Press the " Backlight Button " once again will turn ON the " LCD Backlight " again.

8. DATALOGGER

8-1 Preparation before execute datalogger function

a. Insert the SD card
Prepare a " SD memory card " (1 GB to 16 GB, optional), insert the SD card into the " SD card socket " (3-12, Fig. 1). The front panel of the SD card should face against the down case.

b. SD card Format
If SD card just the first time use into the meter, it recommend to make the " SD card Format " at first. , please refer chapter 10-1, page 23.

c. Time setting
If the meter is used at first time, it should to adjust the clock time exactly, please refer chapter 10-2, page 23.

d. Decimal format setting

⚠️ The numerical data structure of SD card is default used the " . " as the decimal, for example "20.6" "1000.53" . But in certain countries   (Europe ...) is used the " , " as the decimal point, for example " 20, 6 " "1000,53". Under such situation, it should change the Decimal character at first, details of setting the Decimal point, refer to Chapter 10-6, page 26.

8-2 Auto Datalogger (Set sampling time ≧ 1 second)

a. Start the datalogger

Press the " REC Button (3-4, Fig. 1) once , the LCD will
show the text " REC ", then press the " Logger Button "
(3-8, Fig. 1), the bottom text " DATALOGGER " will
flashing, at the same time the measuring data along the
time information will be saved into the memory circuit.

Remark :
 *∗How to set the sampling time, refer to Chapter 10-3
   page 24.*
 *∗How to set the beeper sound is enable, refer to
   Chapter 10-5, page 25.*

b. Pause the datalogger

During execute the Datalogger function , if press the
" Logger Button " (3-8, Fig. 1) once will pause the
Datalogger function (stop to save the measuring data
into the memory circuit temporally). In the same time
the the text of " DATALOGGER " will be no flashing.

Remark :
*If press the " Logger Button " (3-8, Fig. 1) once again
will execute the Datalogger again, the bottom text of "
DATALOOGER " will flashing .*

c. Finish the Datalogger

During pause the Datalogger, press the " REC Button "
(3-4, Fig. 1) continuously at least two seconds, the " REC "
indication will be disappeared and finish the Datalogger.

8-3 Manual Datalogger (Set sampling time = 0 second)

a. Set sampling time is to 0 second

Press the " REC Button (3-4, Fig. 1) once , the LCD will show the text " REC ", then press the " Logger Button " (3-8, Fig. 1) once, the bottom text " DATALOGGER " will flashing once and Beeper will sound once, at the same time the measuring data along the time information will be saved into the memory circuit. The lower Display will show the Position (Location) no. and saved into the SD card too.

Remark :
During execute the Manual Datalogger, press the " ▲ Button " (3-5, Fig, 1) the lower no. (position no.) will flashing. It can use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button " (3-6, Fig. 1) to set the measuring Location no. (1 to 99, for example room 1 to room 99) to identify the measurement location , the lower Display will show P x (x = 1 to 99).

b. Finish the Datalogger

Press the " REC Button " (3-4, Fig. 1) continuously at least two seconds, the " REC " indication will be disappeared and finish the Datalogger.

8-4 To check the time information
During the normal measurement screen (not execute the Datalogger),
1) If press " Time Button " (3-7, Fig. 1) once , the lower LCD display will present the time information of Hour/Minute/Second (h.m.s) in the lower Display.

2) If press " Time Button " (3-7, Fig. 1) once again , the lower LCD display will present the time information of Year/Month/Date (yy.mm.dd) in the lower Display.
3) If press " Time Button " (3-7, Fig. 1) once again , the LCD will return to normal screen.

8-5 Check sampling time information

During the normal measurement screen (not execute the Datalogger), If press " Sampling Button " (3-8, Fig. 1) once , the lower LCD display will present the Sampling time information in second unit.

8-6 SD Card Data structure

1) When the first time, the SD card is used into the meter, the SD card will generate a route :

CDA01

2) If the first time to execute the Datalogger,
under the route CDA01\, will generate a new
file name CDA01001.XLS.
After exist the Datalogger, then execute again,
the data will save to the CDA01001.XLS until
Data column reach to 30,000 columns, then
will generate a new file, for example CDA01002.XLS
3) Under the folder CDA01\, if the total files more
than 99 files, will generate anew route, such as
CDA02\ ....

4) The file's route structure :
   CDA01\
      CDA01001.XLS
      CDA01002.XLS
      …………………
      CDA01099.XLS
   CDA02\
      CDA02001.XLS
      CDA02002.XLS
      …………………
      CDA02099.XLS
   CDAXX\
      …………………
      …………………

   Remark :
   XX : Max. value is 10.

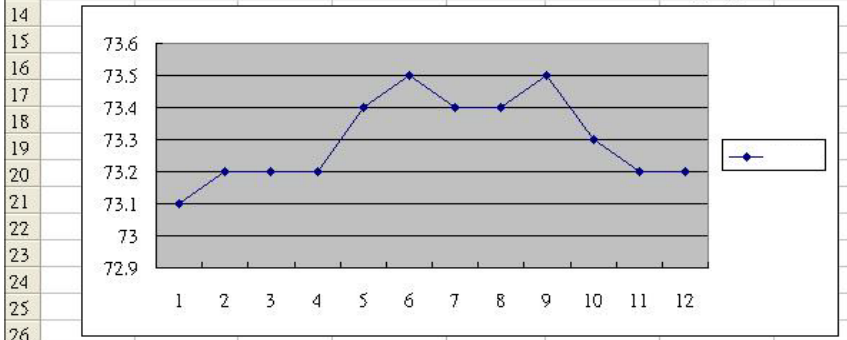# 9. Saving data from the SD card to the computer (EXCEL software)

1) After execute the Data Logger function, take away the SD card out from the " SD card socket " (3-17, Fig. 1).
2) Plug in the SD card into the Computer's SD card slot (if your computer build in this installation) or insert the SD card into the " SD card adapter ". then connect the " SD card adapter " into the computer.
3) Power ON the computer and run the " EXCEL software ". Down load the saving data file (for example the file name : CDA01001.XLS, CDA01002.XLS) from the SD card to the computer. The saving data will present into the EXCEL software screen (for example as following EXCEL data screens) , then user can use those EXCEL data to make the further Data or Graphic analysis usefully.

EXCEL data screen (for example)

	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

EXCEL data screen/graphic screen (for example)

	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								

EXCEL graphic screen (for example, graphic)
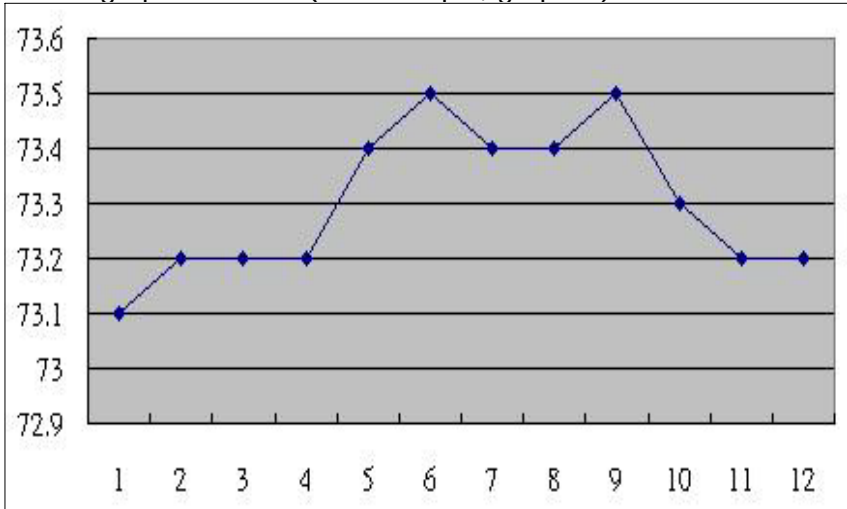
10. ADVANCED SETTING

Under do not execute the Datalogger function,
press the " SET Button " (3-8, Fig. 1) continuously at
least two seconds will enter the " Advanced Setting " mode.
then press the " SET Button " (3-8, Fig. 1) once a while
in sequence to select the eight main function, the
display will show :

Sd F..... SD memory card Format
dAtE...... Set clock time (Year/Month/Date, Hour/Minute/
　　　　　Second)
SP-t...... Set sampling time (Hour/Minute/Second)
PoFF..... Auto power OFF management
bEEP..... Set beeper sound ON/OFF
dEC....... Set SD card Decimal character
t-CF...... Select the Temp. unit to ℃ or ℉
PEr C.... Set CD temperature compensation factor
ESC...... Escape from the advanced setting

Remark :
During execute the " Advanced Setting " function,
if press " ESC Button " (3-3, Fig. 1) will exit the
" Advanced Setting " function, the LCD will return
to normal screen.

10-1 SD memory card Format

When the lower display show " Sd F "

1) Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button " (3-6, Fig. 1) to select the upper value to " yES " or " no ".

   yES - Intend to format the SD memory card
   no - Not execute the SD memory card format

2) If select the upper to " yES ", press the " Enter Button " (3-4, Fig. 1) once again, the Display will show text " yES Enter " to confirm again, if make sure to do the SD memory card format, then press " Enter Button " once will format the SD memory clear all the existing data that already saving into the SD card.

10-2 Set clock time (Year/Month/Date, Hour/Minute/ Second)

When the upper display show " dAtE "

1) Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button " (3-6, Fig. 1) to adjust the value (Setting start from Year value). After the desired value is set, press the " Enter Button " (3-4, Fig. 1) once will going to next value adjustment (for example, first setting value is Year then next to adjust Month, Date, Hour, Minute, Second value).

   Remark :
   The adjusted value will be flashed.

2) After set all the time value (Year, Month, Date, Hour, Minute, Second), press the " SET Button " (3-8, Fig. 1) once will save the time value, then the screen will jump to Sampling time " setting screen (Chapter 10-3).

Remark :
After the time value is setting, the internal clock will run precisely even Power off if the battery is under normal condition (No low battery power).

10-3 Set sampling time (Hour/Minute/Second)

When the upper display show " SP-t "

1) Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button " (3-6, Fig. 1) to adjust the value (Setting start from Hour value). After the desired value is set, press the " Enter Button " (3-4, Fig. 1) once will going to next value adjustment (for example, first setting value is Hour then next to adjust Minute, Second value).

Remark :
The adjusted value will be flashed.

2) After set all the sampling time value (Hour, Minute, Second), press the " SET Button " (3-8, Fig. 1) once will save the sampling value with default then the screen will jump to " Auto power OFF " setting screen (Chapter 10-4).

10-4 Auto power OFF management

When the lower display show " PoFF "

1) Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button "
   (3-6, Fig. 1) to select the upper value to " yES " or
   " no ".

   yES - Auto Power Off management will enable.
   no - Auto Power Off management will disable.

2) After select the upper text to " yES " or " no ", press the
   " Enter Button " (3-4, Fig. 1) will save the setting
   function with default.

10-5 Set beeper sound ON/OFF

When the lower display show " bEEP "

1) Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button "
   (3-6, Fig. 1) to select the upper value to " yES " or
   " no ".

   yES - Meter's beep sound will be ON with default.
   no - Meter's beep sound will be OFF with default.
   **   is power ON.**

2) After select the upper text to " yES " or " no ", press the
   " Enter Button " (3-4, Fig. 1) will save the setting
   function with default.

10-6 Decimal point of SD card setting

The numerical data structure of SD card is default used the " . " as the decimal, for example "20.6" "1000.53" . But in certain countries   (Europe ...) is used the " , " as the decimal point, for example " 20,6 " "1000,53". Under such situation, it should change the Decimal character at first.

| When the lower display show " dEC " |

1) Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button " (3-6, Fig. 1) to select the upper text to " bASIC " or " Euro ".

   bASIC - Use " . " as the Decimal point with default.
   Euro - Use " , " as the Decimal point with default.

2) After select the upper text to " bASIC " or " Euro ", press the " Enter Button " (3-4, Fig. 1) will save the setting function with default.

10-7 Select the Temp. unit to ℃ or ℉

| When the lower display show " t-CF " |

1) Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button " (3-6, Fig. 1) to select the upper Display text to " C " or " F ".

   C - Temperature unit is ℃
   F - Temperature unit is ℉

2) After Display unit is selected to " C " or " F ", press the
" Enter Button " (3-4, Fig. 1) will save the setting
function with default.

10-8 Set CD temperature compensation factor

When the lower display show " PEr C "

1) This function only for the Conductivity (TDS) mode of
adjusting the probe's Temp.compensation value in
 %/per ℃ unit. The default value is 2 %/ per ℃.
2) Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button "
(3-6, Fig. 1) to select the upper value to the desired
Temp. compensation value (%/per ℃), then press the
" Enter Button " (3-4, Fig. 1) will save the setting
value temporally.

10-9 ESC

When the display show " ESC "

When the Display show the text " ESC ", then press the
" Enter Button " (3-4, Fig. 1) will finish the Advanced
Setting procedures and return to the normal measuring
screen.

Remark :
   During execute the " Advanced Setting " function,
   if press " ESC Button " (3-3, Fig. 1) will exit the
   " Advanced Setting " function, the LCD will return
   to normal screen.

11. POWER SUPPLY from DC ADAPTER

The meter also can supply the power supply from the DC 9V Power Adapter (optional). Insert the plug of Power Adapter into " DC 9V Power Adapter Input Socket " (3-14, Fig. 1). The meter will permanent power ON when use the DC ADAPTER power supply (The power Button function is disable).

12. BATTERY REPLACEMENT

1) When the left corner of LCD display show " ⊏⊠⊐ ", it is necessary to replace the battery. However, in-spec. measurement may still be made for several hours after low battery indicator appears before the instrument become inaccurate.
2) Loose the screws of the " Battery Cover " (3-11, Fig. 1) and take away the " Battery Cover " from the instrument and remove the battery.
3) Replace with DC 1.5 V battery (UM3, AA, Alkaline/heavy duty) x 6 PCs, and reinstate the cover.
4) Make sure the battery cover is secured after changing batteries.

13. SYSTEM RESET

If the meter happen the troubles such as :

CPU system is hold (for example, the key button can not be operated...).

Then make the system RESET will fix the problem.
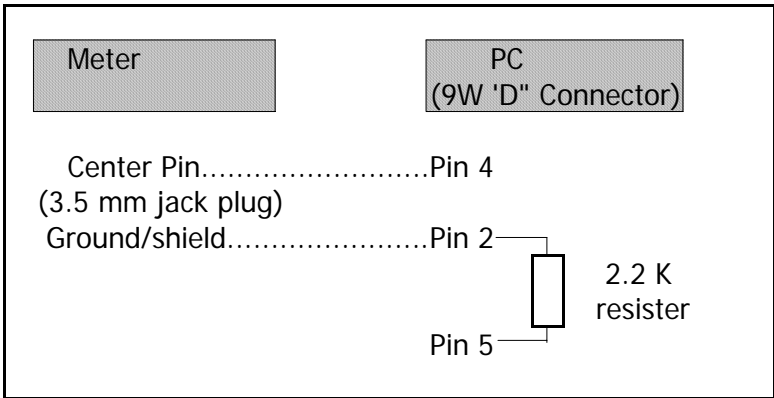The system RESET procedures will be either following method :

During the power on, use a pin to press the " Reset Button " (3-15, Fig. 1) once a while will reset the circuit system.

14. RS232 PC SERIAL INTERFACE

The instrument has RS232 PC serial interface via a 3.5 mm terminal (3-16, Fig. 1).

The data output is a 16 digit stream which can be utilized for user's specific application.

A RS232 lead with the following connection will be required to link the instrument with the PC serial port.

Meter	PC (9W 'D" Connector)

Center Pin.........................Pin 4
(3.5 mm jack plug)
Ground/shield......................Pin 2
Pin 5

2.2 K resister

The 16 digits data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

Each digit indicates the following status :

D15	Start Word		
D14	4		
D13	When send the upper display data = 1		
	When send the lower display data = 2		
D12, D11	Annunciator for Display		
	uS = 13	mS = 14	PPM = 19
	% = 03		
D10	Polarity		
	0 = Positive 1 = Negative		
D9	Decimal Point(DP), position from right to the left		
	0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP		
D8 to D1	Display reading, D1 = LSD, D8 = MSD		
	For example :		
	If the display reading is 1234, then D8 to D1 is : 00001234		
D0	End Word		

RS232 FORMAT : 9600, N, 8, 1

Baud rate	9600
Parity	No parity
Data bit no.	8 Data bits
Stop bit	1 Stop bit

15. OPTIONAL ACCESSORIES

Mmory card	SD memory card (1 GB) SD memory card (2 GB)

RS232 cable UPCB-02	* Computer interface cable. * Used to connect the meter to the computer (COM port).
USB cable USB-01	* Computer interface cable. * Used to connect the meter to the computer (USB port).

Data Acquisition software SW-U801-WIN	The SW-U801-WIN is a multi displays (1/2/4/6/8 displays) powerful application software, provides the functions of data logging system, text display, angular display, chart display, high/low limit, data query, text data recorder high/low limit, data query, text report, chart report.. xxx.mdb data file can be retrieved for EXCEL, ACESS.., wide intelligent applications.

Power adapter	AC 110V to DC 9V. USA plug.
	AC 220V/230V to DC 9V. Germany plug.
Conductivity standard solution	1.413 mS standard solution. Model : CD-14

16. PATENT

The meter（SD card structure）already get patent or patent pending in following countries :

Germany	Nr. 20 2008 016 337.4
JAPAN	3151214
TAIWAN	M 358970
	M 359043
CHINA	ZL 2008 2 0189918.5
	ZL 2008 2 0189917.0
USA	Patent pending

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