CONDUCTIVITY/ TDS METER

+ PH meter

Model : DCT2001
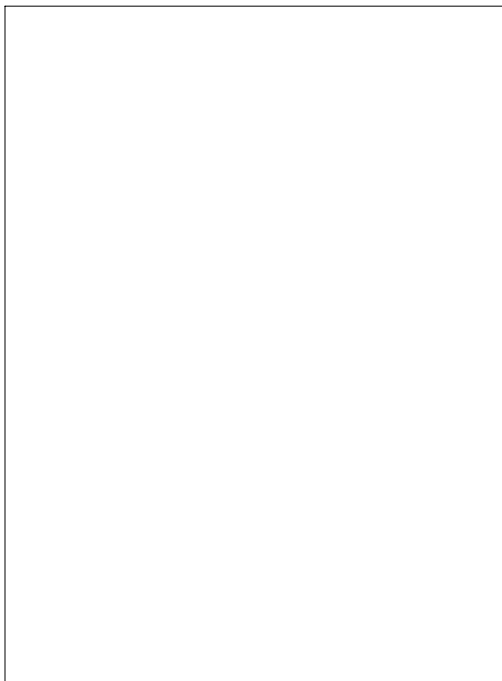
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1. FEATURES

* Conductivity/TDS (Total Dissolved Solids) Meter
   + PH Meter, multi functions & intelligent features.
* Conductivity includs 2 ranges : 2 mS, 20 mS.
  TDS has 2 ranges : 2,000 PPM, 20,000 PPM.
  Temperature measurement range from 0 - 60 蚓 /
  32 - 140蚌.
* Conductivity/TDS meter build in automatic temperature
  compensation circuit, adjustable between 0 to 5.0%
  per 蚓.
* Conductivity/TDS meter uses carbon rod electrode with
  long life using separated pobe is convenient for remote
  measurement.
* PH meter has mV (millivolt) function for
  mV measurement (Be plugged with optional ORP probe
  ORP-04 to be a professional ORP meter)
* PH meter with wide manual temperature compensation
  adjustment and optional ATC (Automatic Temp.
  Compensation) probe is available.
 * Microprocessor circuit, intelligent function.
 * Records maximum and minimum readings with recall.
 * Data hold.
 * Auto shut off saves battery life.
 * RS 232 PC serial interface.
 * Temperature function with 蚓 & 蚌 display unit.

2. SPECIFICATIONS

2-1 General specifications

Circuit	Microprocessor LSI circuit.
Display	51 mm x 32 mm, dual function LCD display, 15 mm (0.6") digit size.
Measurement	* Conductivity * TDS (Total Dissolved Solids) * Temperature (use the CD/TDS probe) * PH * mV
Memory Recall	Records maximum and minimum readings with recall.
Data hold	Hold the current reading value on the display.
Memory Recall	Maximum and minimum reading values can be saved and retrieved by record function.
Power off	Auto shut off saves battery life, or manual off by push button.
Data Output	RS 232 computer serial interface.
Overload indication	"- - - -" symbol on the display.
Operating Temperature	0 to 50 ℃ - main instrument. 0 to 60 ℃ - Conductivity/CT probe only.
Operating Humidity	Max. 80% RH.
Sampling Time	Approx. 0.8 second.
Power Supply	006P DC 9V battery (Alkaline or Heavy duty type).
Power Current	Meter only	Approx. DC 4.2 mA.
	Meter + CD/TDS probe	Approx. DC 6.0 mA.
Weight	250 g/0.55 LB (battery included). * Main meter only, not including probe.

Size	Main meter :
	195 x 68 x 30 mm (7.6 x 2.6 x 1.2 inch).
	Conductivity/TDS probe :
	Round, 22 mm Dia. x 120 mm length.
Accessories included	Conductivity/TDS probe...............1 PC.
	Operation manual....................... 1 PC.
	Carrying case, CA-06....................1 PC.
Optional Accessories	PH electrode.............PE-03, PE-11, PE-01
	ATC probe for PH meter.......... YK-200PATC
	ORP electrode.........................ORP-04
	RS232 cable, UPCB-02............. UPCB-02
	Application Software............SW-U801-WIN

2-2. Conductivity/TDS/Temp. specifications
A. Conductivity

Range	Measurement	Resolution	Accuracy
2 mS	0.2 to 2.000 mS	0.001 mS	(3 % F.S. + 1 d)
20 mS	2 to 20.00 mS	0.01 mS	* F.S. - Full scale

* Temperature Compensation :
  Automatic from 0 to 60 蚓 (32 - 140 蚌), with temperature
  compensation factor variable between 0 to 5.0% per C.
* mS - milli Simens
* @ 23 5蚓

B. TDS (Total Dissolved Dolids)

Range	Measurement	Resolution	Accuracy
2,000 PPM	132 to 1,320 PPM	1 PPM	(3 % F.S. + 1 d)
20,000 PPM	1,320 to 13,200 PPM	10 PPM	* F.S. - Full scale

* Temperature Compensation :
 Automatic from 0 to 60 ℃ (32 - 140 ℉), with temperature
 compensation factor variable between 0 to 5.0% per C.
* PPM - parts per million
* @ 23 5℃

C. Temperature

Function	Measuring Range	Resolution	Accuracy
℃	0 ℃ to 60 ℃	0.1 ℃	0.8 ℃
℉ 32	℉ to 140 ℉	0.1 ℉	1.5 ℉

* @ 23 5℃

2-3 PH meter specifications

Measurement	PH	0 to 14 PH
	mV	-1999 mV to 1999 mV
Resolution	PH	0.01 PH
	mV	1 mV
Accuracy * Meter only	PH	0.02 PH + 2 d)
	mV	0.5% + 2 d)
Input Impedance	10 -12 ohm	
Temperature Compensation for pH measurement	Manual	0 to 100 ℃, be adjusted by push button on front panel.
	Automatic (ATC)	With the optional TEMP. probe (YK-200PATC) 0 to 65 ℃.
pH Calibration	PH7, PH4, and PH10, 3 points calibration ensure the best linearity and accuracy.	
PH Optional, Electrode	Any PH electrode with BNC connector.	

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3. FRONT PANEL DESCRIPTION

Fig. 1

Fig. 1

3-1	Display
3-2	Power Button
3-3 REC.	Button
3-4	Hold Button
3-5	**A Button (蚓,蚌 Button)**
	up Button
3-6	**B Button (Range Button)**
	PH/mV Button/left Button
3-7	**C Button (CD/TDS Button)**
	CAL Button/down Button
3-8	**D Button (TEMP. C Button)**
3-9 Battery	Compartment/Cover
3-10	PH BNC Input Socket
3-11 Lock	Switch
3-12	Conductivity/TDS Input Socket
3-13	RS-232 Out Terminal
3-14	Stand
3-15	PH 7 VR
3-16	PH 4/PH 10 VR
3-17	Conductivity/TDS Probe
3-18	Conductivity/TDS Probe pLug

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4. MEASURING PROCEDURE
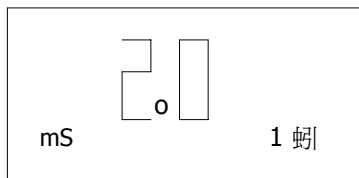
4-1 Conductivity measurement

1) Plug the " Conductivity/TDS Probe plug " (3-18, Fig.1) into the " Conductivity/TDS Socket " (3-12, Fig. 1)

   Make sure that the probe lock switch (3-11, Fig. 1) should slide to the lock position (   ).

2) Power on the instrument by pushing the " Power Button " (3-2, Fig.1)

3) Push the " CD/TDS " Button (C Button) (3-7, Fig. 1), and select the function to the conductivity measurement. The display will show the unit of " mS ".

4) The instrument will default to 2% per 蚓 Temperature Compensation factor. The meter has built-in Automatic Temperature Compensation adjustable between 0 to 5.0 % per 蚓.
   In order to change the default value carry out the following procedures :

   a. Push the " Temp. C Button (D Button) " (3-8, Fig. 1), the display will show :

   ```
   ┌─────────────────────────┐
   │        ┌─┐  ┌─┐          │
   │        └─┐  │ │          │
   │        ┌─┘o │ │          │
   │                          │
   │   mS           1 蚓       │
   └─────────────────────────┘
   ```

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b. *Use the*
   " up Button (A Button) " (3-5, Fig. 1),
   " left Button (B Button) " (3-6, Fig. 1)
   " down Button (C Button) " (3-7, Fig. 1)
   to select the desired value of Temperature
   Compensation factor.

c. *Once the desired value is reached, push the " Temp.*
   C Button (D Button) " (3-8, Fig. 1) to set the new
   value.

5) Select the applicable range, by using the " Range Button
   (B Button) " (3-6, Fig. 1).

   * If the display shows "- - - -", it indicates an overload
     condition, select the next higher range.
   * If the display shows "_ _ _ _", it indicates an
     out-of-range condition, select the next lower range.

6) Immerse the head of " Conductivity/TDS Probe " (3-17, Fig. 1)
   into the solution, up to the immersion level.

7) During the measurement, the lower LCD Display will
   show the temperature of the solution.

   * Push the " 蚓/蚌 Button " (3-5, Fig. 1) to change
     the temperature display unit from " 蚓 to 蚌 "
     or " 蚌 to 蚓 ".

4-2 TDS measurement

The operation procedures are same as the above 4-1,
except that push the " CD/TDS " Button (C Button) (3 -7,
Fig. 1), and select the function to the TDS measurement. The
lower display will show the text of " P ".

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4-3 Calibration procedures of Conductivity meter

The meter has been calibrated during manufacture.
However, it may be necessary to re-calibrate periodically.
Particularly when the instrument is used for a long period or
when the conductivity electrode is changed.
To re-calibrate the instrument, follow the procedures
shown below :

Range 1 (2 mS range) calibration

1) Prepare a " 1.413 mS Calibration Solution ".
2) Immerse the head of " Conductivity Probe " (3-17, Fig. 1)
   into the 1,413 mS solution up to the immersion level.
3) Select the range to the " 2 mS " position.
4) Set the temperature coefficient factor value to " 2.0% per
   蚓 "
5) At the same time push the following buttons together :

   a. REC.(MAX./MIN.) Button (3-3, Fig. 1)
   b. HOLD Button (3-4, Fig. 1)

   The upper display will show the flashing text of " CAL ".
   The low display will show the flashing text of " 1.413 ".

6) Please release the two buttons when the display shows as
   above and start flashing and then when the text stop
   flashing, the range 1 will be calibrated to 1.413 mS
   (There maybe a little deviation, and it is normal).

   *After released two buttons but before the text (CAL,
    1.413) stop flashing, if push the " HOLD Button " will
    cancel the calibration procedures, the meter will return
    to previous calibration value.*

Range 2 (20 mS range) calibration

1) Prepare a " 12.88 mS Calibration Solution ".
2) Immerse the head of " Conductivity Probe " (3-17, Fig. 1) into the 12.88 mS solution up to the immersion level.
3) Select the range to the " 20 mS " position.
4) Set the temperature coefficient factor value to " 2.0% per 蚓 "
5) At the same time push the following buttons together :

   a. REC.(MAX./MIN.) Button (3-3, Fig. 1)
   b. HOLD Button (3-4, Fig. 1)

   The upper display will show the flashing text of " CAL ".
   The low display will show the flashing text of " 12.88 "

6) Please release the two buttons when the display shows as above and start flashing and then when the text stop flashing, the range 2 will be calibrated to 12.88 mS (There maybe a little deviation, and it is normal).

   After released two buttons but before the text (CAL, 12.88) stop flashing, if push the " HOLD Button " will cancel the calibration procedures, the meter will return to previous calibration value.

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4-4 PH meter

 * **Make sure that the probe lock switch (3-11, Fig. 1)
   had switched to the lock position (   ).**
 * **Make sure that the " Conductivity/TDS Plug "
   (3-18, Fig. 1) had taken away from the meter.**

a. PH Measurement

Whenever the calibration procedures are recommended to
be done before PH measurement.
1) Connect the PH ELECTRODE to the " PH BNC Input
   Socket " (3-10, Fig. 1).
2) Power on the instrument by pressing the " Power
   Button " (3-2, Fig. 1).
3) Press the " PH/mV Button " (3-6, Fig. 1) to select
   the PH function with a "PH" symbol on the display.
4) * If the operating is under the " Manual temperature
      compensation ", then please refer to the " 4-4, d "
      calibration procedures.
     * If the operating is under the " Automatic temperature
      compensation ", then please refer to the " 4-4, e "
      calibration procedures.
5) Place the electrode into the solution, and then the instrument
   will have the PH value on the display.
6) After the measurement, please rinse the electrode with
   distilled water.

b. mV Measurement

The instrument built in mV (millivolt) measurement function, which enable you to make ion-selective, ORP (oxidation-reduction potential), and other precise mV measurements.

Press the " PH/mV Button " (3-6, Fig. 1) to select the mV function with a " mV " symbol on the display.

c. Temp. Measurement

1) Plug the " Optional ATC Temp. Probe, YK-200PATC " into the " Probe Input Socket " (3-12, Fig. 1).
2) * If you intend to measure " 蚓| ", then press the " 蚓/ 蚌 Button " (3-5, Fig. 1) and select the " 蚓| " unit.
   * If you intend to measure " 蚌 ", then press the " 蚓/ 蚌 Button " (3-5, Fig. 1) and select the " 蚌 " unit.
3) Place the " Temp. Probe " into the solution, and the instrument will have the temperature value on the display.

d. Manual temperature compensation

Before the manual temperature compensation adjust procedures, make sure there are no ATC probe or other probe in the " Probe Input Socket" (3-12, Fig. 1).

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

2) Press the " PH/mV Button " (3-6, Fig. 1) to select
   the PH function with a " PH " symbol on the display

   * Press the " TEMP. C Button " (3-8, Fig. 1) first,
     The upper display will show the measured PH values.
     the lower display will show the manual temperature
     compensation value.
   * Use the " Left Button " (3-6, Fig. 1), " Up Button "
     (3-5, Fig. 1) and the " Down Button " (3-7, Fig. 1) to
     adjust the manual temperature compensation value.

e. Automatic temperature compensation

1) Plug the " Optional ATC Temp. Probe, YK-200PACT "
   into the " Probe Input Socket " (3-12, Fig. 1).

   **Make sure that the probe lock switch (3-11, Fig. 1)
   should slide to the lock position (   ).**

2) Power on the meter.
3) Press the " PH/mV Button " (3-6, Fig. 1) to select
   the PH function with a "PH" symbol on the display
4) Place the "Temp. Probe" into the solution, then
   temperature will be compensated automatically for PH
   measurement.

f. Two Points Calibration

PH 7 calibration
    Connect the PH ELECTRODE with the " BNC socket "
(3-10, Fig. 1) and immerse the electrode in the PH7
buffer solution (optional).
Press the " CAL Button " (3-7, Fig. 1) then the upper
display shows texts of " CAL " and the lower display
shows the default calibration value.

    * The texts " CAL " will flash for around 5 seconds.
      After that, the meter calibrates itself automatically.
      The upper display will show the calibrated value,
      the lower display will show the temperature value.

PH 4 or PH 10 calibration
1) Rinse the electrode with distilled water.
2) Immerse the electrode in the PH4 buffer solution (or PH10
   buffer solution).
3) Press the " CAL Button " (3-7, Fig. 1) then the upper
   display shows texts of " CAL " and the lower display
   shows the default calibration value.

    * The texts " CAL " will flash for around 5 seconds.
      After that, the meter calibrate itself automatically.
      The upper display will show the calibrated value,
      the lower display will show the temperature value.

4) Rinse the electrode with distilled water again and then
5) Repeat above (2) to (4) procedures two times at least.
6) The instrument and electrode are now finished the
   " TWO POINTS CALIBRATION " & ready for the
   measurement.

4-5 Other functions (Hold, Memory)

Data Hold

 Press the " Hold Button " (3-4, Fig. 1) will hold the
 measured value & the LCD will indicate a " HOLD " symbol
on the display during the measuring.
* Press the " Hold Button " again to exit the data hold
  function.

Data Record (Max., Min. reading)

* The data record function records the maximum and
  minimum readings. Press the " REC. Button " (3-3, Fig. 1)
  to start the Data Record function and there will be a
  " REC " symbol on the display.
* With the " REC " symbol on the display :
  a) Press the " REC. Button " (3-3, 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 " (3-4, Fig. 1) for a while, and then
     the display will show the " REC " symbol only &
     execute the memory function continuously.

  b) Press the " REC. Button " (3-3, 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 " (3-4, Fig. 1) for a while, and 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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5. AUTO POWER OFF DISABLE

The instrument has " Auto Power Off " function in order to prolong battery life. The meter will shut off automatically if none of the buttons are pressed in approx. 10 min.
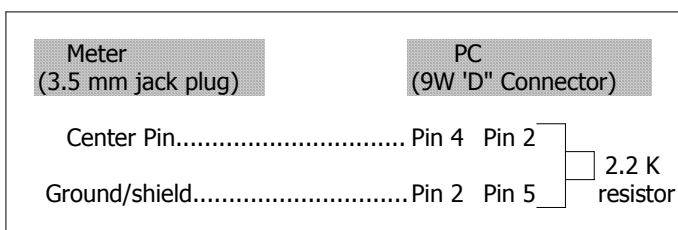
To disable this function, Select the memory record function during the measurement by pressing the " REC. Button " (3-3, Fig. 1).

6. RS232 PC SERIAL INTERFACE

The instrument features RS232 output via 3.5 mm Terminal (3-13, Fig. 1).

The signal output is a 16 digits data 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 interface.

Meter (3.5 mm jack plug)	PC (9W 'D" Connector)	
Center Pin.............................. Pin 4	Pin 2	2.2 K resistor
Ground/shield.............................Pin 2	Pin 5	

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 :

D0	End Word		
D1 & D8	Display reading, D1 = LSD, D8 = MSD *For example :* *If the display reading is 1234, then D8 to D1 is :* *00001234*		
D9	Decimal Point(DP), position from right to the left 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP		
D10	Polarity 0 = Positive 1 = Negative		
D11 & D12	Annunciator for Display		
	蚓 = 01	蚌 = 02	PH = 05
	mV = 18	mS = 14	PPM = 19
	OF2= 06	mg/L = 07	
D13	When send the upper display data = 1 When send the lower display data = 2		
D14	4		
D15	Start Word		

RS232 FORMAT : 9600, N, 8, 1

7. 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.
2) Slide the " Battery Cover " (3-14, Fig. 1) away from the instrument and remove the battery.
3) Replace with 9V battery (Alkaline or Heavy duty type) and reinstate the cover.
4) Make sure the battery cover is secured after changing the battery.

8. OPTIONAL PROBES & ACCESSORIES

ORP ELECTRODE Model : ORP-04	ORP electrode ORP-04 plug into the meter (select to the mV function) to become a professional ORP (oxidation-reduction potential) Meter.

ATC PROBE Model : YK-200PATC	Measurement	Range
	蚓	0 蚓 to 65 蚓
	蚌	32蚌 to 149 蚌
	* Automatic Temperature Compensation Probe for PH function.	

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PH ELECTRODE Model : PE-03	General purpose, laboratory & field usage. 12 mm dia. x 130 mm. Epoxy body, 1 - 13 pH.
PH ELECTRODE Model : PE-11	General purpose, laboratory & field usage. 9.5 mm dia. x 120 mm. Epoxy body, 1 - 13 pH. (0 - 14 pH typical)
PH ELECTRODE Model : PE-01	Professional, laboratory & field usage. 9.5 mm dia. x 120 mm. Epoxy body, 0 - 14 pH.
SPEAR TIP PH ELECTRODE Model : PE-04HD	The " Spear Tip pH electrode " is perfect for those pH measurements in applications where sample piercing is required. Meat, sausage and cheese are ideal applications. The electrode features a very durable glass measuring spear packaged in a rugged virtually unbreakable epoxy body. Measuring range : 0 to 14 pH . Size 12 mm dia. x 150 m.

BUFFER SOLUTION PH-07	PH 7.00 standard buffer solution. for calibration purpose.
BUFFER SOLUTION PH-04	PH 4.00 standard buffer solution. for calibration purpose.

RS232 cable UPCB-02	RS232 cable for connecting between the meter & the computer.
SOFTWARE SW-U801-WIN	Windows version application software applies as the performance of data logging system & data recorder...

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