# *Instruction Manual*

Model CP-500L (*pH/ISE/Conductivity/Temp Meter*)

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# Chapter I. Instruction

istek's desktop **pH/ISE/Conductivity/TEMP Meter** (*Model CP-500L*), the latest- model is operated by AC/DC adaptor(DC 9V), a high performance model controlled by **microprocessor** for all measurement needs. This desktop meter make a feature of a wide & clear backlit color graphic LCD display, simultaneously display of various measured data¡s and a built-in printer can be installed (This is an optional) and simplified user¡s instruction manual is stored in the meter for user¡s convenience.
This high-performance multiple meter, CP-500L has a double channels system which is measuring pH/ISE and Conductivity at once. At the very moment also can be controlled each functions. It is displaying pH, ISE(mg/L), mV, ORP(Relative mV), Conductivity(¥S/cm, mS/cm), Salinity(ppt), TDS(mg/L), Resistivity(ohm, kohm, Mohm) and Temp(℃)

The model CP-500L is capable of storing up-to 500 points in it¡s memory box and storing by control of the time interval of data-log automatically. And also, by using RS232C cable, it can be remotely controlled and transmitted the measured information to the printer or computer by 1 second interval.

## CP-500L (pH/ISE/Conductivity/TEMP Meter)

If a pH value is stable, a world ¡Stable" is displaying on the screen, therefore a user can measure the sample accurately. And it features Auto/Manual calibration(each 5 Points) And displaying pH, ISE(mg/L), mV, ORP(Relative mV), Conductivity(¥S/cm, mS/cm), Salinity(ppt), TDS(mg/L), Resistivity(ohm, kohm, Mohm) and temp(℃)

pH       Indicates Power of Hydrogen($H^+$).(Unit pH)
             $pH = -log_{10}[H^+]$    It means a Hydrogen Ion Concentration

ISE      Indicates concentration of any given ion. (Unit mg/L)
             To measure an ion, must use proper electrode which according to the type of the selected. For further information, please refer the description of each ion sensor.

mV      Indicates electromotive force of each ion. (Unit mV)

ORP     Indicates a relative potential. (Unit mV)

EC       Indicates Conductivity of Solution. (Unit is µS/cm, mS/cm)

TDS     Indicates by converting the measured conductivity into concentration of the total dissolved solid present solution from. (Unit is mg/L)

Salinity   Indicates by converting the measured conductivity into salinity of solution (Unit is ppt)

Resistivity   Indicates an resistivity of the solution (Unit ohm, kohm, Mohm)

ATC     Indicates Automatic Temp Compensation, a temperature probe supplied by istek must be used. Temperature Compensation is automatically performed Indicates present temp and in case of it is unconnected with the meter, it displayed 25℃.

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# Chapter II. General Functions

## 2.1 Instrument Setup

**Rear Panel (CP-500L)**



CH 1    CH3    RS232C    POWER
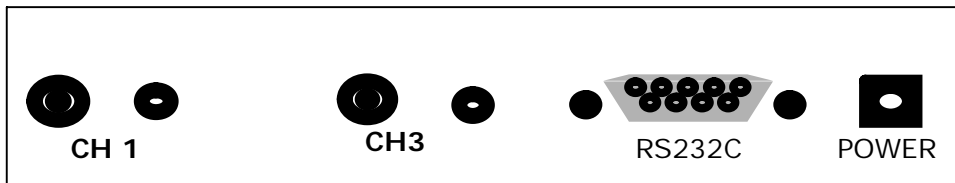
**Power Source**
Connect the supplied AC/DC adaptor to Power Jack of the meter.
istek supplies AC/DC adaptor(DC 9V) adjusting to 220V.

1) **Have built- in Printer: 12V , 300mA**
2) **Without built-in Printer: 12V, 3A**

If you would like to use this to 110V, Voltage should be converted.

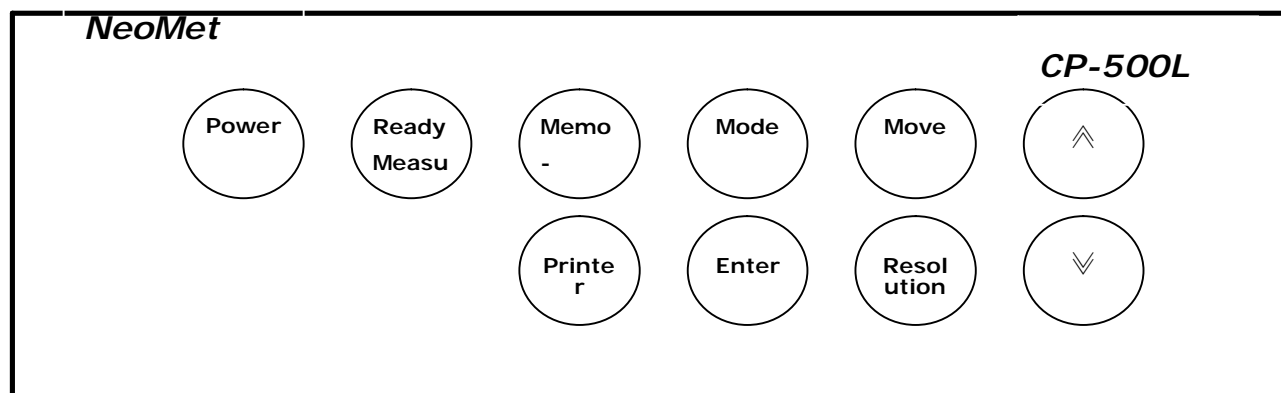**Electrode and ATC prove Connection**
Attach electrode which was provided from istek, Inc. by sliding the BNC connector onto the sensor input then push down and turn clockwise to lock into position. And Attach the ATC probe to the ATC jack by sliding the connector straight on until firmly in place.

**Printer and RS232C interface cable Connection**
Using this RS232C Interface cable, it is available to connect the meter with Printer(Or Computer) and can be printed. For further information, please refer the Chapter 5 <Data ? Log> Part

## 2.2 Key Functions

### CP-500L (pH/ISE/Conductivity/TEMP Meter)

**NeoMet**

**CP-500L**

| Power | Ready Measu | Memo - | Mode | Move | ⟰ |
|---|---|---|---|---|---|
| | Printer | Enter | Resolution | ⟱ | |

KEY                  Description

--------------------------------------------------------------------------

**Power**                Used to turn ON/OFF of Power

**Ready / Measure**      Used to change condition of meter, i.e. measure or ready.
                         This is using for converting from <Measure> to <Ready> or reversing.

**Memory / Out**         Used to store data in meter memory while measuring
                         In the ready condition, use to search the memorized data.
                         Used to exit from Memory (Data Mode).

**Mode**                 Used to checking the value of EC=> Resistivity while measuring

**Move**                 Used to move each menu.
                         From initial display, it moves <pH => EC~ =>ION~ => SAL>

**Printer**              Used to print a measured data

**Enter**                Used to select the Menu

**Resolution**           Used to change a data¡s resolution, which is displayed
                         According to measuring item, it has a resolution as 0.1, 0.01 or 0.001

≫                        Press to increase the value of data

≪                        Press to decrease the value of data

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## 2.3 Display Description

The following is initial display of a desktop pH/ISE/Conductivity Meter (CP-500L) and specially specified about each items which is displayed on. This CP-500L can measure and display simultaneously 2 items at the same time.

◉ Initial display of CP-500L

| Setup | Cal | Memory | Help | Item |
|-------|-----|--------|------|------|
| CH1 | | CH3 | | |
| pH | | EC | | |
| ORP | | TDS | | |
| ION | | SAL | | |
| Message | | 05/08/24 15:00:32 | | |
| * Move : [Move], Select : [Enter]<br>* Save & Exit : [Out] | | | | |

Display                  Function

-----------------------------------------------------------------------------

CH1          Available to select 1 item from pH, ORP and ION

CH3          Available to select 1 item from EC, TDS and SAL

Setup        Used to change the each selected value per measuring Item

Cal          Used to calibrate per each items or examine the calibrated details

Memory       Used to confirm each saved data per Item

Help          Used to check interior simplicity manual which is saved in instruments

Message      When you select each Menu or item, this message is appeared

05/08/24     Indicate of using data of the instrument

15:00:32     Indicate of using time of the instrument

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## From Channel 1

pH          Displays power of hydrogen with range of -2.000 to 19.999pH

ORP         Indicates a relative potential in range of -1999.9 ~ 1999.9mV

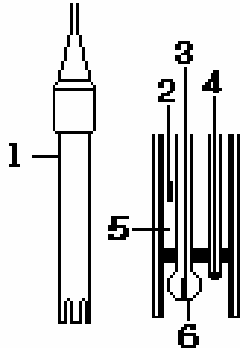ION         Indicates a strength of ION in range of 0.0001 ~ 19,999mg/L

## From Channel 3

**EC**          Indicates conductivity with range of 0 ~ 199,999 ¥S/cm

**TDS**         Indicates the amount of total dissolved solids presents in solution (Unit mg/L)

**Sal**         Indicates salinity presents in solution at a current temp(Unit ppt)

# 2.4 Electrode Structure

## General pH Combination Electrode Structure



1. Electrode Body
2. Ag/AgCl or calomel electrode ; Reference Electrode
3. pH mono electrode ; Indicator electrode
4. ATC ; Temperature sensor
5. Reference Filling Solution ; Saturated KCl Solution
6. Glass Membrane: Membrane selectively responding hydrogen ION

## pH Electrode Storage & Maintenance

**pH Electrode Storage**
Electrodes are stored in the cap of storage solution supplied by istek.
Membrane must be kept wet. If there is no storage solution, pH 4 buffer is best for the single glass electrode and saturated KCl is preferred for a calomel and Ag/AgCl reference electrode. Saturated KCl is the preferred solution for a combination electrode.
Electrode is sometimes stored in distilled water, but this method causes electrode life to decrease.

**pH Electrode Maintenance (Electrode Cleaning)**
If it takes long time to response or a stable data isn't obtained, can be often restored to normal performance by one of the following procedures;
Glass electrodes fail because of scratches, deterioration or accumulation of debris on the glass surface.

- Salt deposits          Recover electrode by alternately immersing it three times each in 0.1N HCl and 0.1N NaOH for approx. five minutes. If this fails, immerse tip in KCl solution for 30s. After recovery, soak in pH 7.00 buffer overnight. Rinse and soak in pH 7.00 buffer. Rinse again with distilled water before use

- Oil/Grease films       Remove oil/Grease films with detergent, and then rinse electrode with distilled water.

- Clogged Reference Junction    Heat a diluted KCl solution to about 60~80℃. The electrode must be stored in this solution for approx. 10 minutes, then cool electrode in not heated KCl solution.

- Protein removal        Protein coatings can be removed by soaking glass electrode in a 10% pepsin solution adjusted to pH 1 to 2.

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# Conductivity Cell Storage & Maintenance

**Conductivity Cell Storage**
A dirty cell will contaminate the solution and cause conductivity to change. It is best to store cells that are immersed in deionized water. Provided the cell has been stored in condition of drying, should be soaked in distilled water for five to ten minutes before using to keep electrode wet.

**Conductivity Cell Maintenance (Cell Cleaning)**
Glease, oil, fingerprints, and other contaminants on the sensing elements can cause erroneous measurements and sporadic responses.
If it takes long time to response or a stable data isn't obtained, can be often restored to normal performance by using the following procedures

- Clean cells with detergent and/or dilute nitric acid(1%) by dipping or filling the cell with cleaning solution and agitating for two or three minutes.

- Other diluted acids(e.g. sulfuric, hydrochloric, chromic) may be used for cleaning except for aqua regia.

- When a stronger cleaning solution is required, try concentrated hydrochloric acid mixed into 50% isopropanol

# Chapter III Setup Functions

The setup menu is used to identify and change instrument parameters.

## 3.1. Setup of items

### 3.1. 1. Setup of items

Initial display of CP-500L is as a follows. User can select easily the item which you want to measure by using [Move] Key and [Enter] Key. It is available to select single item per each channel or two items per single channel. In other world, user can select maximum 2 items only and can measure and display simultaneous.

```
Setup  Cal  Memory  Help  Item
          CH1            CH3
         ┌──────┐      ┌──────┐
         │  pH  │      │  EC  │
         └──────┘      └──────┘
         ┌──────┐      ┌──────┐
         │ ORP  │      │ TDS  │
         └──────┘      └──────┘
         ┌──────┐      ┌──────┐
         │ ION  │      │ SAL  │
         └──────┘      └──────┘
  Message         │  05/08/24 15:00:32
  * Move : [Move], Select : [Enter]
  * Save & Exit : [Out]
```

From initial display, the way to select pH or EC is as a follows.

1) Press [Enter] Key from the initial display.
2) After moving to EC by using [Move] Key and Press [Enter] Key then EC can be selected

## 3.1.2 Setup of two items and measuring

In the same way, select pH and EC, and save them by pressing [Out] Key.
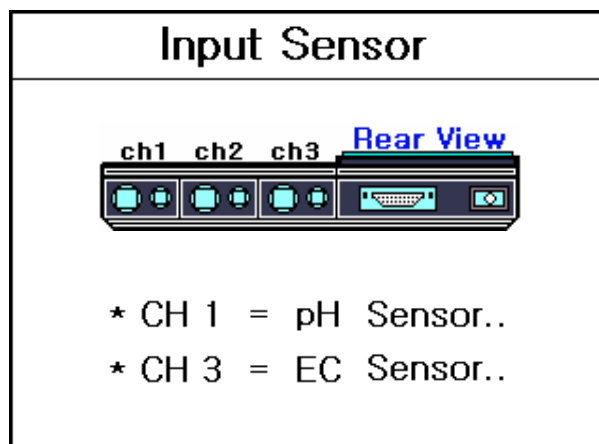


**\<Picture1\>**

**\<Picture 2\>**

After pressing [Out] Key, a <picture 1> is displayed. After that, the measured value is displayed like <Picture 2>. Pressing Measure Key, a user can move to initial display or change the item easily and pressing [Memory/Out] Key for saving the measured value.

## 3.1.3. Setup of items and measuring it

In the same way as above, select **pH** and press [Out] Key to saving, the meter display as a follow.



If user would like to change the item what he wants to measure, press [Enter] Key to out to initial display. And if you would like to measure the selected item, then press Measure Key

After selecting item pH and press Measure Key to measure, the display is as a follow.



From the above, then press Measure Key to move to initial display.
By pressing of [Memory/Out]key, user can save the measured pH value.

In the same way, it is available to select and measure single item or double items.
In the measuring of single item, you can change the item by using <item> Manu any time.

# 3.2 Setup in pH mode

## 3.2.1 Setup in pH mode

In pH ready condition if pressing [Enter] Key the display is shown as follows.



From this initial display, it is available to move each itemized list of <Setup> using [Move] Key
And select each item by pressing [Enter] Key.
1) Common: Able to set up ¡Time¡ & ¡RS232¡
2) Temp: Able to check the temp sensor¡s condition which is connected with meter and input tem also.
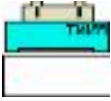
When you move to each item by pressing [Enter] Key, the display is shown as follows.



1) **Time:** Use this to change <Time> or <Date> of the meter
2) **RS232**: Used this to input or change <Time interval> of Data-Log
3) **Temp**: Used this to set exact <Temperature>, In case of a temp error between real temp and instrumental temp is large or wrong temp is displayed on a screen, you could settle it to be correct

```
┌─────────────────────────────────────────┐
│ Setup  Cal  Memory  Help  Item          │
├─────────────────────────────────────────┤
│ Common                                  │
├─────────────────────────────────────────┤
│ RS232                                   │
├─────────────────────────────────────────┤
│   ┌──────────────┐      ┌──────┐         │
│   │   Interval   │      │      │         │
│   ├───────┬──────┤      └──────┘         │
│   │  Min  │ Sec  │       COM            │
│   ├───────┼──────┤                       │
│   │  00   │  00  │                       │
│   └───────┴──────┘                       │
├─────────────────────┬───────────────────┤
│ Message             │ 05/08/24 15:00:32 │
├─────────────────────┴───────────────────┤
│ * Value Setting : [Up] [Down]           │
│ * Save & Exit : [Memory]                │
└─────────────────────────────────────────┘
```

This is a display, which <Time Interval> of Data-Log in <RS232C>

## 3.2.2 Calibration in pH Mode (Auto/Manual)

Perform calibration every two hours to compensate for electrode drift.
There are two ways of calibrations ; Auto Calibration and Manual Calibration.
Two of more than buffer calibration should be performed before pH is measured. Please note that it is not available to calibrate just only 1 Point.
First of all, it needs to select proper buffer solutions and electrode for calibration.

### <Auto Calibration>

Auto calibration is applied when you would like to calibrate 3 points from 2.00, 4.00, 7.00, 10.00, 12.00.

1) pH Meter
2) pH Electrode/ ATC Probe.
3) pH Calibration Buffer Solutions(commonly 4.00,7.00,10.00)
4) Stirrer, Magnetic Bar, Distilled water for rinse and 100ml Beaker etc.

From pH initial display, press [**Move] Key** to move **Cal**. and press [**Enter] Key** then below display is shown.

```
┌─────────────────────────────────────────┐
│ Setup  Cal  Memory  Help  Item          │
├─────────────────────────────────────────┤
│ pH               Stable Data : 0.00     │
├─────────────────────────────────────────┤
│                                         │
│           7.00                          │
│                                         │
├─────────────────────┬───────────────────┤
│                     │  ATC 25.0'C       │
├─────────────────────┼───────────────────┤
│ Message             │ 05/08/24 15:00:32 │
├─────────────────────┴───────────────────┤
│ * For starting of calibration : [Measure]│
│ * Exit : [Out]                          │
└─────────────────────────────────────────┘
```

Sink the electrode into <pH Buffer 4.00> and press Measure Key, then below display is shown.

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|
| pH | | Stable Data : 3.97 | | |

3.97

| 179.6 mV | ATC 25.0'C |
|---|---|
| Message | 05/08/24 15:00:32 |

\* In process of measuring

From above display, when ¡Stable Data¡ is appeared, press [Memory/Out] Key, then calibration for first buffer is completed. After this, it is signed on bottom message window such as a below picture and the display is passed for second calibration automatically. The display is as a below.

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|
| pH | | Stable Data : 3.97 | | |

4.00

| 179.6 mV | ATC 25.0'C |
|---|---|
| Message | 05/08/24 15:00:32 |

\* Buffer    2    4    7    10    12    pH
\* Cal              \*                            OK

->

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|
| pH | | Stable Data : 0.00 | | |

4.00

| 179.6 mV | ATC 25.0'C |
|---|---|
| Message | 05/08/24 15:00:32 |

\* For next buffer : [Measure]

When above display is appeared, rinse carefully the electrode with distilled water and calibrate of second and third buffers in the same way. If you would like to calibrate 2 points only (First and second buffers only), you can complete calibration pressing [Memory/Out] Key.

When it is completed a calibration of third buffer (10.00), below is shown as a follow.

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|
| pH | | Stable Data : 9.97 | | |

10.00

| −178.5 mV | ATC 25.0'C |
|---|---|
| Message | 05/08/24 15:00:32 |

\* Buffer    2    4    7    10    12    pH
\* Cal              \*    \*    \*              OK

->

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|
| pH | | Stable Data : 0.00 | | |

10.00

| −178.5 mV | ATC 25.0'C |
|---|---|
| Message | 05/08/24 15:00:32 |

\*For next buffer : [Measure]
\*To complete 3point calibration : [Out]

Press [Slope] key to check an electrode¡s slope after pH or Ion calibration.

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The slope displays in the main field and then disappeared. The left figure indicates pH slope. For the correct operation, the range of slope must be within 80 ~ 120%. If the slope is not within this range, prefer newly calibrating in order to prevent the higher error. It also makes to estimate time of exchange of electrode since can know error through slope. From above display, when you complete calibration pressing [Memory/Out] Key, a Slope value is appeared as a below.

```
┌──────────────────────────────────────┐
│ Setup    Cal    Memory    Help       │
├──────────────────────────────────────┤
│ Slope                                │
├──────────────────────────────────────┤
│                                      │
│                                      │
│          98.6 %                      │
│                                      │
│                                      │
├────────────────┬─────────────────────┤
│ Message        │ 05/08/24 15:00:32   │
├────────────────┴─────────────────────┤
│ ∗For next buffer : [Measure]         │
│ ∗To complete 3point calibration : [Out] │
└──────────────────────────────────────┘
```

If you would like to know the Slope later on, press [Memory/Out] Key after selecting <Cal> menu.

```
┌──────────────────────────────────────┐
│ Setup    Cal    Memory    Help       │
├──────────────────────────────────────┤
│ Slope                                │
├──────────────────────────────────────┤
│                                      │
│                                      │
│          98.6 %                      │
│                                      │
│                                      │
├────────────────┬─────────────────────┤
│ Message        │ 05/08/24 15:00:32   │
├────────────────┴─────────────────────┤
│ ∗ For starting of calibration : [measure] │
│ ∗ Exit : [Out]                       │
└──────────────────────────────────────┘
```

When the calibration is completed and moved back to pH initial display, a below is shown.

```
┌──────────────────────────────────────┐
│ Setup    Cal    Memory    Help       │
├──────────────────────────────────────┤
│                                      │
│            pH                        │
│                                      │
├─────────┬──────────┬─────────────────┤
│   pH    │   ORP    │    ION          │
├─────────┴──────────┴─────────────────┤
│ Message        │ 05/08/24 15:00:32   │
├────────────────┴─────────────────────┤
│ ∗ Calibrated Date : 05/08/24  15:00  │
│ ∗ Calibrated Buffer : 2, 7, 10 pH    │
└──────────────────────────────────────┘
```

Rinse the pH electrode with distilled water carefully and put it in the sample which you would like to measure and press Measure Key to get a value.

`

## <Manual Calibration>

Manual calibration is applied to calibrate with another buffer not 2.00, 4.00, 7.00, 10.00, 12.00.
It is described based buffers pH 3.06, pH7.00, pH9.21 here.
From pH initial display, press [Move] Key to move Cal and press [Enter] Key, then you can find
below display.

| Setup | Cal | Memory | Help |
|-------|-----|--------|------|
| pH | | Stable Data : 0.00 | |

**7.00**

| | ATC 25.0'C |
|---|---|
| Message | 05/08/24 15:00:32 |

* For starting of calibration : [Measure]
* Exit : [Out]

Sink the Electrode into a first buffer (3.06) and press Measure Key

| Setup | Cal | Memory | Help |
|-------|-----|--------|------|
| pH | | Stable Data : 3.01 | |

**3.01**

| 236.6 mV | ATC 25.0'C |
|---|---|
| Message | 05/08/24 15:00:32 |

* In Process of measuring

From above display, when ¡Stable Data¡ is appeared, put the first value by using [Up/Down]
Key *Value input; Using [Up] / [Down] key. Below display is shown.

| Setup | Cal | Memory | Help | Item |
|-------|-----|--------|------|------|
| pH | | Stable Data : 3.01 | | |

**3.06**

| 236.6 mV | ATC 25.0'C |
|---|---|
| Message | 05/08/24 15:00:32 |

* Manual calibrate mode
* Value setting : [Up]/ [Down]

After input first buffer value (3.06) and complete first calibration pressing [Memory/Out key
When the first calibration is completed, below display is shown.

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```
┌─────────────────────────────────────┐   ┌─────────────────────────────────────┐
│ Setup  Cal  Memory  Help   Item     │   │ Setup  Cal  Memory  Help   Item     │
├─────────────────────────────────────┤   ├─────────────────────────────────────┤
│ pH           Stable Data : 3.01     │   │ pH           Stable Data : 0.00     │
│                                     │   │                                     │
│            3.06                     │   │            3.06                     │
│                                     │   │                                     │
├──────────────┬──────────────────────┤   ├──────────────┬──────────────────────┤
│  236.6 mV    │   ATC 25.0'C         │   │  236.6 mV    │   ATC 25.0'C         │
├──────────────┼──────────────────────┤   ├──────────────┼──────────────────────┤
│ Message      │  05/08/24 15:00:32   │   │ Message      │  05/08/24 15:00:32   │
├──────────────┴──────────────────────┤   ├──────────────┴──────────────────────┤
│ * Buffer  2  4  7  10  12  pH       │   │ * For next buffer : [Measure]       │
│ * Cal        *              OK      │   │                                     │
└─────────────────────────────────────┘   └─────────────────────────────────────┘
```

When you find the message ¡For next buffer¡: Measure¡, rinse the electrode with distilled water and calibrate with second and third buffers with same method.

If you would like to calibrate 2 points only, you can complete calibration pressing [Memory/Our] Key. After third buffer (9.21), below is shown as a follow.

```
┌─────────────────────────────────────┐   ┌─────────────────────────────────────┐
│ Setup   Cal   Memory    Help        │   │ Setup  Cal  Memory  Help   Item     │
├─────────────────────────────────────┤   ├─────────────────────────────────────┤
│ pH           Stable Data : 9.15     │   │ pH           Stable Data : 0.00     │
│                                     │   │                                     │
│            9.21                     │   │            9.21                     │
│                                     │   │                                     │
├──────────────┬──────────────────────┤   ├──────────────┬──────────────────────┤
│ −130.7 mV    │   ATC 25.0'C         │   │ −130.7 mV    │   ATC 25.0'C         │
├──────────────┼──────────────────────┤   ├──────────────┼──────────────────────┤
│ Message      │  05/08/24 15:00:32   │   │ Message      │  05/08/24 15:00:32   │
├──────────────┴──────────────────────┤   ├──────────────┴──────────────────────┤
│ * Buffer  2  4  7  10  12  pH       │   │ *For next buffer : [Measure]        │
│ * Cal        *  *  *        OK      │   │ *To complete 3point calibration : [Out]│
└─────────────────────────────────────┘   └─────────────────────────────────────┘
```

From above display, press [Memory/Out] Key to check pH Slope .

```
┌─────────────────────────────────────┐
│ Setup   Cal   Memory    Help        │
├─────────────────────────────────────┤
│ Slope                               │
│                                     │
│                                     │
│          98.6 %                     │
│                                     │
│                                     │
├──────────────┬──────────────────────┤
│ Message      │  05/08/24 15:00:32   │
├──────────────┴──────────────────────┤
│ * For starting of calibration : [measure]│
│ * Exit : [Out]                      │
└─────────────────────────────────────┘
```

## 3.2.3 Memory in pH mode

From pH initial display, press [Move] Key twice to move <Memory>.
After that press [Enter] Key, then below display is shown.

```
┌─────────────────────────────────────┐
│ Setup    Cal    Memory    Help       │
├─────────────────────────────────────┤
│                    Number [001]      │
├─────────────────────────────────────┤
│ Date & Time  :  05/08/24  15:00      │
│ pH    7.00             Temp  25.0'C   │
│                                      │
│                                      │
│                                      │
├──────────────────┬──────────────────┤
│ Message          │ 05/08/24 15:00:32 │
├──────────────────┴──────────────────┤
│ ＊ Number change : [Up] / [Down]     │
│ ＊ Exit : [Out]                      │
└─────────────────────────────────────┘
```

It is available to be indicated <Measuring date>, <Time> and <Saved data>, besides this, you can search a former date which was saved before also.
If you would like to <Memory Clear>, press [Memory/out] key to move Memory Clear Display. After memory clear, whole data and selected values in Setup will be deleted completely. In case of the instrument can¡t sense a connected electrode or wrong time settled or wrong data memories are saved, you can try <Memory Clear>

```
┌─────────────────────────────────────┐
│ Setup    Cal    Memory    Help       │
├─────────────────────────────────────┤
│ Clear                                │
│   ┌─────────┐      ┌─────────┐       │
│   │  YES    │      │  NO     │       │
│   └─────────┘      └─────────┘       │
│                                      │
│          16 KByte Memory             │
├──────────────────┬──────────────────┤
│ Message          │ 05/08/24 15:00:32 │
├──────────────────┴──────────────────┤
│ ＊ Value setting : [Up]/[Down]       │
│ ＊ Select  : [Enter]                 │
└─────────────────────────────────────┘
```

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## 3.2.4 Help in pH mode

From pH initial display of pH Mode, press [Move] Key three times to move <Help Menu>
After that, press [Enter] Key then, a display is shown as follows.



From above display, select Language by using [Move] Key, after that press [Enter] Key to see
the Help Manu. If you selected KOREAN then below display is shown.
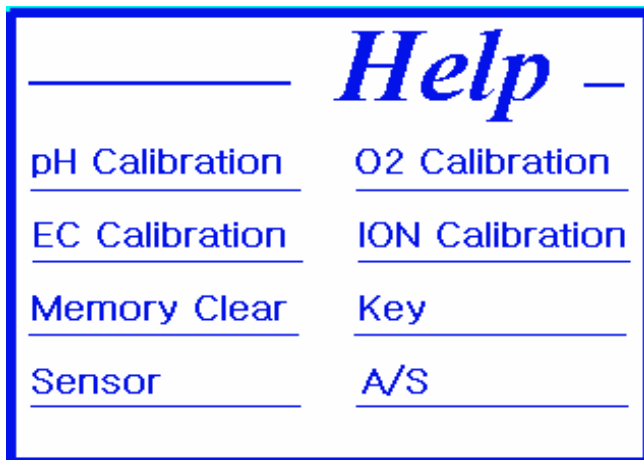


From above display, it is available to select proper item which you want to know about by
using [Move Key]. After selecting, press [Enter] Key then you can see the concerned
information. When you select ¡pH Calibration¡ below is displayed.
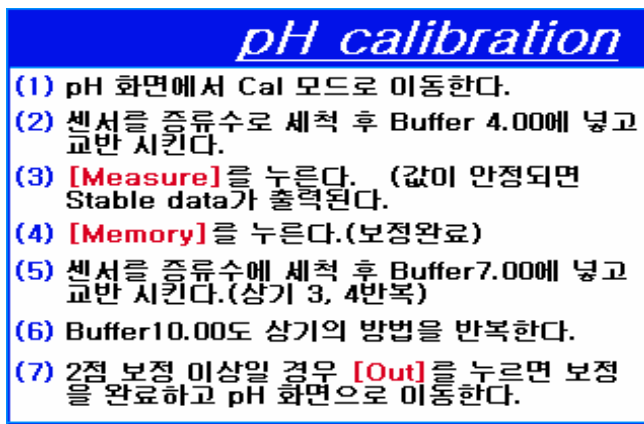
When you select **pH Calibration,** below display is shown for 5 seconds interval between each.

| Setup | Cal | Memory | Help |
|---|---|---|---|
| | p | H | |
| pH | | ORP | ION |
| Message | | 05/08/24 15:00:32 | |
| * Move : [Move], Select : [Enter] | | | |
| * It enters in a Cal mode. | | | |

| Setup | Cal | Memory | Help |
|---|---|---|---|
| pH | | Stable Data : 0.00 | |
| | 7 | .00 | |
| 0.0 mV | | ATC 25.0'C | |
| Message | | 05/08/24 15:00:32 | |
| * For starting of calibration : [Measure] | | | |
| * Exit : [Out] | | | |

| Setup | Cal | Memory | Help |
|---|---|---|---|
| | | Stable Data : 7.00 | |
| | 7 | .00 | |
| 0.0 mV | | ATC 25.0'C | |
| Message | | 05/08/24 15:00:32 | |
| * Stable data is under printing. | | | |

| Setup | Cal | Memory | Help |
|---|---|---|---|
| | | Stable Data : 7.00 | |
| | 7 | .00 | |
| 0.0 mV | | ATC 25.0'C | |
| Message | | 05/08/24 15:00:32 | |
| * For finish of calibration : [Memory] | | | |

| Setup | Cal | Memory | Help |
|---|---|---|---|
| | | Stable Data : 7.00 | |
| | 7 | .00 | |
| 0.0 mV | | ATC 25.0'C | |
| Message | | 05/08/24 15:00:32 | |
| * For next buffer : [Measure] | | | |

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# 3.3 Setup in ORP mode

## 3.3.1 Calibration in ORP Mode

From the initial display, after selecting <ORP> by pressing [Move] Key, press [Memory/Out] Key then below display is shown.



From this **ORP Mode** display, select **Setup Manu** and press **[Enter]Key**
And below display is shown.



Refer <Setup> in pH Mode when you select item or change the selected value from above

## 3.3.2 Calibration in ORP Mode

Because this ORP is unnecessary to calibrate, so if you select **Cal** it is displayed message as **¡No Calibration¡** . In case of ORP, you could measure a sample without calibration. Sensor¡s condition can be checked by ORP standard solution from istek, inc.

### 3.3.3 Measure of Relative Millivolt in ORP Mode

Meter can measure absolute or relative millivolt. This relative millivolt value will be needed when performing potentiometric titration or preparing calibration curves. Relative Millivolt is displayed to 0.1mV resolution in the range of ?1999.9 to +1999.9 mV.

```
Setup    Cal    Memory    Help
ORP          Compare Data  50.6mV

            0.0  mV

                 ATC 25.0 'C
Message          05/08/24 15:00:32

* In process of measuring
```

In the measuring condition of mV, changed from a currently displayed value to 0 value by pressing Rel-mV key and then measures relative millivolt.

### 3.3.4 Memory in ORP Mode

From ORP initial display, press [Move] Key twice and move to Memory Menu and press [Enter Key], then a below is displayed.

```
Setup    Cal    Memory    Help
               Number [001]

Date & Time  :  05/08/24  15:00
ORP -203.7mV           Temp 25.0'C

Message          05/08/24 15:00:32
* Number change : [Up] / [Down]
* Exit : [Out]
```

It is available to be indicated measured data, time and saved-data. Beside this, you also can search the former dates which were saved by using [Up/Down] Key. And If you would like to <Memory Clear>, press [Memory /out] key to move <Memory clear> display.
Whole data and selected values in Setup will be deleted completely and the instrument¡s condition will be initialized

```
┌─────────────────────────────────────┐
│ Setup    Cal    Memory    Help       │
├─────────────────────────────────────┤
│ Clear                                │
├─────────────────────────────────────┤
│  ┌─────────┐      ┌─────────┐        │
│  │  YES    │      │  NO     │        │
│  └─────────┘      └─────────┘        │
├─────────────────────────────────────┤
│       16 KByte Memory                │
├──────────────────┬──────────────────┤
│ Message          │ 05/08/24 15:00:32 │
├──────────────────┴──────────────────┤
│ * Value setting : [Up]/[Down]        │
│ * Select  : [Enter]                  │
└─────────────────────────────────────┘
```

## 3.3.5   Help in ORP Mode

From ORP initial display, press 3 times [Move] Key, then you can move to Help Menu.
Press [Enter] Key to move Help display. Please refer to the pH part for details.

# 4.1  Setup in ION

## 4.1.1   Setup in ION

From pH initial display, press [Move Key] for selecting <ION>, and press [Memory/Out] Key
Then below is displayed

```
┌─────────────────────────────────────┐
│ Setup   Cal   Memory   Help   Item   │
├─────────────────────────────────────┤
│ Channel 1                            │
├─────────────────────────────────────┤
│   ION                                │
│                        Rear View     │
│   ch1   ch2   ch3                    │
│  ┌──┐ ┌──┐ ┌──┐ ┌──────────┐ ┌──┐    │
│  │▫▫│ │▫▫│ │▫▫│ │▪▪▪▪▪▪▪▪▪│ │▫▫│    │
│  └──┘ └──┘ └──┘ └──────────┘ └──┘    │
├──────────────────┬──────────────────┤
│ Message          │ 05/08/24 15:00:32 │
├──────────────────┴──────────────────┤
│ * RS232 output : Computer            │
│ * Interval      :    0 sec           │
└─────────────────────────────────────┘
```

From this <ION Mode>, select <Setup Menu> and press [Enter] Key to move a below display.

```
┌─────────────────────────────────────┐
│ Setup   Cal   Memory   Help   Item   │
├─────────────────────────────────────┤
│ ION         Ch1         Common       │
├─────────────────────────────────────┤
│  ┌───┐        │                      │
│  │▤▤▤│        │ 'C      ▦▦           │
│  └───┘        │                      │
│  Setup       Temp       Common       │
├──────────────────┬──────────────────┤
│ Message          │ 05/08/24 15:00:32 │
├──────────────────┴──────────────────┤
│ * Move : [Move], Select : [Enter]    │
│ * Save & Exit : [Out]                │
└─────────────────────────────────────┘
```

Functions of this <Setup> are as follows.
1) **Setup**: Able to selected proper Buffer Solution and ION.
2) **Temp**: Able to input exact temperature or examine the temp sensor¡s condition.
3) **Common:** Able to select ¡Time¡ and ¡RS232¡ .

If you would select <Setup>, below is displayed.

| Setup | Cal | Memory | Help |
|---|---|---|---|
| ION | | | |
| Buffer | | Select ION | |
| | Buffer | | Select |
| Message | | 05/08/24 15:00:32 | |
| * Move : [Move], Select : [Enter] * Save & Exit : [Out] | | | |

1) **Buffer**: There are 6 kinds of Buffer Solutions (0.01/ 0.1/ 1/ 10/ 100/ 1000ppm), and you can select at least 2 kinds of different buffers which you would like to use

2) **Select:** Able to select the <ION> which you would like to measure.

After selecting of proper Buffer or ION, below display is shown.

**<< Buffer >>**

| Setup | Cal | Memory | Help |
|---|---|---|---|
| ION | | | |
| Buffer | | | |
| 0.01 | 0.1 | 1 | |
| 10 | 100 | 1000 | |
| Message | | 05/08/24 15:00:32 | |
| * Value setting : [Move] * Save & Exit : [Memory] | | | |

**<< Select ION>>**

| Setup | Cal | Memory | Help |
|---|---|---|---|
| Select ION | | | |
| $NH_3$ $NH_4^+$ $Br^-$ $Cd^{+2}$ $Ca^{+2}$ $CO_2$ $K^+$ $Cl^-$ $Cu^{+2}$ $CN^-$ $F^-$ $BF_4^-$ $I^-$ $Pb^{+2}$ $Li^+$ $NO_3^-$ $NO_x$ $ClO_4^-$ $Na^+$ $Ca^{+2}/Mg^{+2}$ $Ag^+/S^{-2}$ Others | | | |
| Message | | 05/08/24 15:00:32 | |
| * Value setting : [Move] * Save & Exit : [Memory] | | | |

From this display, it is able to move proper solution which you would like to use by using **[Move Key]**, press **[Enter Key]** for selecting what you want to use or measure. With same way, select two different solutions and press [**Memory /Out Key**] to save them.
In the same way, you also select ION, which you want to measure from ION Section.

Besides, ¡Set up¡ and ¡Common¡ has same method with pH mode. Please refer that section.

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## 4.1.2  Calibration in ION Mode

For calibrating of ION electrode in ION Mode, it needs to select <Proper probe> and <Standard solution> from <Setup>mode.

<Calibration>
For calibrating ION electrode, a preparation is as a follows.
   1) ION Meter
   2) Proper ION sensor (According as a preparation progress which was written in ION sensor¡s Manual, sink the sensor in the standard solution for 30 minute to 2 hours. Shake the sensor, you should remove the airdrops on surface of the Membrane. )
   3) Ion Standard Solution (Generally 100ppm, 1000ppm)
   4) ION ISA Solution
   5) Stirrer, Magnetic Bar, 100ml Beaker, Pipette etc.

**\* A prerequisite of sample**

   ① It needs to measure the sample and standard solution in same temperature
   ② A 1℃ difference between the sample and standard solution brings about 2% errors.

After finishing, drop ISA solution for removing Interferences in the sample (The ratio is 100% (sample) to 2% (ISA solution)) to the 2 kinds of standard solutions (100ppm, 1000ppm) and the sample. **In the case of ION calibration & measuring, careful rinsing and stirrer of the sensor is surely essential.**

It is explained herewith up to the standard as a below.
\* ION sensor: **NH₃**      \* Standard Solution: **100ppm** and **1000ppm**
Select <Cal menu> in ION Mode, and then press [Enter]Key, then below is displayed



After rinsing the sensor with distilled water carefully and put in the electrode the first buffer (100ppm). With constant, but not violent, stirring(I recommend you to use ¡Stirrer¡ for accurate measurement, press **Measure key**

```
Setup   Cal   Memory   Help   Item
NH₃

         − 50.6 mV

                    ATC  25.0'C
Message             05/08/24 15:00:32
* For completion of calibration
  [Memory]
```

As an above, the concentration of ION is displayed by Mllivolts corresponding. After this Mllivolts corresponding is stable, press[Memory/Out] Key. It is first Calibration of ION sensor.

After this, clearly rinse again the electrode carefully and put into the second buffer (1000ppm). With constant, but not violent, stirring for accurate measurement, press **Measure key**

A Millivolts corresponding to concentration of ION are displayed. If mV reading is stable, press [Cal] key. The below figure indicates the end of CAL2 calibration

```
Setup    Cal    Memory    Help
NH₃

                  × 10³
       1.00 mg/L

                    ATC  25.0'C
Message             05/08/24 15:00:32
* Start on calibration with 1000ppm
  Solution : [Measure]
```

```
Setup    Cal    Memory    Help
NH₃

       −110.7 mV

                    ATC  25.0'C
Message             05/08/24 15:00:32
* For completion of calibration
  [Memory]
```

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After completion of calibrations as an above, it is appeared in LCD 1) the calibrated data, 2) time, 3) A sort of calibration solution etc. Rinse the electrode with distilled water and put in a sample and press **Measure Key** to measure.

```
Setup    Cal    Memory    Help

              ION

   ┌──────┐ ┌──────┐ ┌──────┐
   │  pH  │ │ ORP  │ │ ION  │
   └──────┘ └──────┘ └──────┘
Message          05/08/24 15:00:32
* Calibrated Data : 05/08/24 15:00
* Buffer : 100 / 1000ppm
```

The following figure is an example to measure

```
Setup    Cal    Memory    Help
NH₃
                        × 10³
      1.03            mg/L

                  ATC  25.0˚C
Message          05/08/24 15:00:32
* In Process of measuring.
```

## 4.1.3 Memory in ION Mode

From initial display of ION, press **Move Key** twice and move to <Memory> Menu and press **Enter Key**, then a below is displayed. You can search a saved data by using **Up/Down Key.**

```
Setup    Cal    Memory    Help
                    Number [001]

Date & Time : 05/08/24  15:00

ION  1.06 × 10³mg/L    Temp 25.0˚C

Message          05/08/24 15:00:32
* Number change : [Up] / [Down]
* Exit : [Out]
```

it is appeared in LCD 1) measured data, 2) Time 3) Saved data etc.

Beside this, you can search a former data which were saved before test by using **Up/Down Key**.

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If you want to make <Memory Clear>, press **Memory /out key** to move Memory clear display.
Whole data and selected values in Setup will be deleted completely.
Then, the meter came back to initial condition when it was released from the factory.

```
┌─────────────────────────────────────────┐
│ Setup  Cal  Memory  Help   Item          │
├─────────────────────────────────────────┤
│ Clear                                    │
│                                          │
│  ┌─────────────┐    ┌─────────────┐      │
│  │   YES       │    │    NO       │      │
│  └─────────────┘    └─────────────┘      │
│                                          │
│          16 KByte Memory                 │
├──────────────────┬──────────────────────┤
│ Message          │ 05/08/24 15:00:32     │
├──────────────────┴──────────────────────┤
│ * Value setting : [Up]/[Down]            │
│ * Select  : [Enter]                      │
└─────────────────────────────────────────┘
```

# 4.1.4 Help in ION Mode

From the initial display of ION, press 3 times the **Move Key**, then you can move to **Help Menu.**   Please refer to the pH part for details.

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# 5.1 Setup in EC Mode (Conductivity)

## 5.1.1 Setup in EC Mode (Conductivity)

From the Initial display, select <EC> Item by pressing **Move Key.**

After selecting <EC> and press **Memory/Out** Key, then below (right one) is displayed.

| Setup Cal Memory Help Item | Setup Cal Memory Help Item |
|---|---|
| Channel 3 | EC          Ch3          Common |
| EC | |
| ch1  ch2  ch3  Rear View | Setup    Temp    Common |
| Message          05/08/24 15:00:32 | Message          05/08/24 15:00:32 |
| * RS232 output : Computer<br>* Interval        :       0 sec | * Move : [Move], Select : [Enter]<br>* Save & Exit : [Out] |

From the display, move to <Setup> by using **Move Key**. Each single item can be selected by pressing **Enter Key**.

(1) Setup: Available to select Cell constant, Tref and TC

(2) Temp: Available to check ATC connecting with the Meter and set a temp.

(3) Common: Available to select Time and RS232C

## 5.1.2 Selecting of cell constant, Tref, TC

From EC Setup display, press **Enter Key** then below display is shown.

<EC setup display>                          <Selecting display of Cell constant>

| Setup Cal Memory Help Item | Setup Cal Memory Help Item |
|---|---|
| EC | EC |
| Cell          Tref          TC | Cell |
| | 0.01  0.1  1.0 |
| Cell          Tref          TC | 10.0  100.0 |
| Message          05/08/24 15:00:32 | Message          05/08/24 15:00:32 |
| * Value setting : [Up] / [Down]<br>* Save & Exit : [Memory] | * Value setting : [Up] / [Down]<br>* Save & Exit : [Memory] |

```
Setup  Cal  Memory  Help  Item
EC
Tref
20/ 25 ˚C
Message        05/08/24 15:00:32
* Value setting : [Up] / [Down]
* Save & Exit : [Memory]
```

```
Setup  Cal  Memory  Help  Item
EC
TC
2.1
Message        05/08/24 15:00:32
* Value setting : [Up] / [Down]
* Save & Exit : [Memory]
```

From above displays, you can enter the value by pressing **Up/Down Key**.

(1) Selecting display of Cell Constant: It is available to select proper cell constant by the range which you would like to measure

| < EC range per Cell Constant> | |
|---|---|
| Cell constant | Range |
| 0.01 | 0.055 ~ 20 ¥S/cm |
| 0.1 | 0.5 ~ 200 ¥S/cm |
| 1.0 | 0.01 ~ 2  mS/cm |
| 10.0 | 1 ~ 200   mS/cm |

(2) Selecting display of Tref.: Available to select proper compensation temp between 20℃ to 25℃

(3) Selecting display of Temperature Coefficient: Available to set proper Temp Coefficient
Unit is %/℃ and it is settled 2.1 %/℃ basically.

| Temp Coefficient ( Between 25 to 50℃ ) [Variation of EC¡s % /℃] | |
|---|---|
| Sample | %/℃ |
| Ultrapure Water | 4.55 |
| **Salt(NaCl)** | **2.12** |
| 5% NaOH | 1.72 |
| Dilute Ammonia | 1.88 |
| 10% HCl | 1.32 |
| 5% Sulfuric Acid | 0.96 |
| 98% Sulfuric Acid | 2.84 |
| Sugar Syrup | 5.64 |

## 5.1.3 Setting Temp in Setup

From this <Setup>, move to <Temp> mode by pressing **Move key.**

After pressing **Enter Key**, then below is displayed.



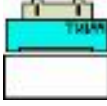| <ATC Probe is disconnected> | <ATC Probe is connected> |

If the ATC probe is disconnected with the meter, left display with direction ¡Connect Temp Sensor ¡is shown. And the ATC is connected with it, you can go to right display directly.

And user is able to put temp manually. If there are quite difference between temp in the Meter and Real Temp, you can set correct time by the direction appear the bottom of screen.

## 5.1.4 Setting Common in Setup

From this <Setup>, move to <Common> mode by pressing **Move key**.

After pressing **Enter Key**, then below is displayed.



By itemize, it is available to input or change a value following as the message from the bottom of LCD

(1) Time: Available to change <temp> and <date>, which is displayed on the LCD

(2) RS232: Available to input or change a time Interval of <Data-Log>.

| Setup  Cal  Memory  Help  Item | | Setup  Cal  Memory  Help  Item |
|---|---|---|



Above is showing Time setting or Interval changing of Data-Log.

# 5.2 Calibration in EC Mode (Conductivity)

## 5.2.1. Calibration in EC Mode

For calibrating of EC Sensor, It needs to select <Proper Probe> and <Standard Solution>

For Calibration of ION Electrode, a preparation is as a follows.

(1) EC Meter

(2) EC sensor / ATC Probe

(3) Standard solution

| < Buffer per Cell Constant > | |
|---|---|
| Cell Constant | Standard solution |
| 0.01 | No needed |
| 0.1 | 146.9 ¥S/cm |
| 1.0 | 1413 ¥S/cm |
| 10.0 | 6.67 mS/cm   or 12.89 mS/cm |

 (4) Stirrer, Magnetic Bar, Distilled water for rinsing

**Default conditions in setup Mode is as a follows.**

☐ Cell Constant: 1.0

☐ Compensating Temp (Tref.): 25.0 ℃

☐ Temperature Coefficient (TC): 2.10 %/℃

On the initial display of EC, press [move ] Key to move <Cal>, and press [Enter]Key, then a below is displayed.

| Setup Cal Memory Help Item |
| --- |
| Channel 3 |
| ch1 ch2 ch3 **Rear View** |
| Connect Temp. Sensor |
| Message \| 05/08/24 15:00:32 |
| * Save & Exit : [Out] |

| Setup Cal Memory Help Item |
| --- |
| EC |
| **1413** µS/cm |
| ATC 25.0'C |
| Message \| 05/08/24 15:00:32 |
| * Buffer selecting. <br> * Buffer change = [Move]/[Up]/[Down] |

From above display, select a standard solution what you want to use and save it by pressing [Memory/Out] Key. After rinsing the sensor with distilled water carefully and put the sensor in the buffer and press Measure Key. Below display is shown.

| Setup Cal Memory Help Item |
| --- |
| EC |
| **1413** µS/cm |
| Tref 25.0 \| ATC 25.0'C |
| Message \| 05/08/24 15:00:32 |
| * For starting of calibration : [Measure] <br> * Exit : [Out] |

| Setup Cal Memory Help Item |
| --- |
| EC Buffer 1413 µS/cm |
| **1395** µS/cm |
| Tref 25.0 \| ATC 25.0'C |
| Message \| 05/08/24 15:00:32 |
| * For finish of calibration : [Memory] |

When a value is stable, press **Memory/Out Key** for finishing calibration

After this first calibration, it came back to the initial display of EC and calibrated date and buffer¡s detail are displayed on the LCD. (Please refer below drawing)

| Setup Cal Memory Help Item |
| --- |
| EC |
| EC TDS SAL |
| Message \| 05/08/24 15:00:32 |
| * Calibration Date : 05/08/24 15:00 <br> * Buffer : 1413 µS/cm |

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After rinsing the sensor again with distilled water carefully and soak it the sample which you want to measure. And press Measure Key for measuring. Below is the display what is measuring.

```
┌─────────────────────────────────────┐
│ Setup  Cal  Memory  Help  Item       │
├─────────────────────────────────────┤
│ EC                                   │
│                                      │
│        1395 µS/cm                    │
│                                      │
├──────────────────┬──────────────────┤
│ Tref  25.0       │ ATC    25.0'C     │
├──────────────────┼──────────────────┤
│ Message          │ 05/08/24 15:00:32 │
├──────────────────┴──────────────────┤
│ * In process of measuring.           │
└─────────────────────────────────────┘
```

## 5.2.2. Memory in EC Mode

On the way of measuring EC, press [Memory]Key for saving the data.

```
┌─────────────────────────────────────┐
│ Setup  Cal  Memory  Help  Item       │
├─────────────────────────────────────┤
│ EC                                   │
│                                      │
│        1395 µS/cm                    │
│                                      │
├──────────────────┬──────────────────┤
│ Tref  25.0       │ ATC    25.0'C     │
├──────────────────┼──────────────────┤
│ Message          │ 05/08/24 15:00:32 │
├──────────────────┴──────────────────┤
│ * Measured data is saved.            │
└─────────────────────────────────────┘
```

If you would like to find the measuring data which you¡ve saved, In the initial display of EC, move to <Memory> by pressing **Move Key** twice. And press **Enter Key** to move memories.

```
┌─────────────────────────────────────┐
│ Setup  Cal  Memory  Help  Item       │
├─────────────────────────────────────┤
│                      Number [001]    │
│                                      │
│ Date & Time : 05/08/24  15:00        │
│ EC  1395 µS/cm [25]   Temp 25.0'C    │
│                                      │
│                                      │
├──────────────────┬──────────────────┤
│ Message          │ 05/08/24 15:00:32 │
├──────────────────┴──────────────────┤
│ * Number change : [Up] / [Down]      │
│ * Exit : [Out]                       │
└─────────────────────────────────────┘
```

.

It is available to be indicated measured data, time and saved-data. Beside this, you also can search the former dates which were saved by using **Up/Down Key**. And if you would like to <Memory Clear>, press **Memory /out key** to move Memory Clear Display. **After memory clear, whole data and selected values in Setup will be deleted completely**. In case of the instrument can¡t sense a connected electrode or wrong time settled or wrong data memories are saved, you can try <Memory Clear>
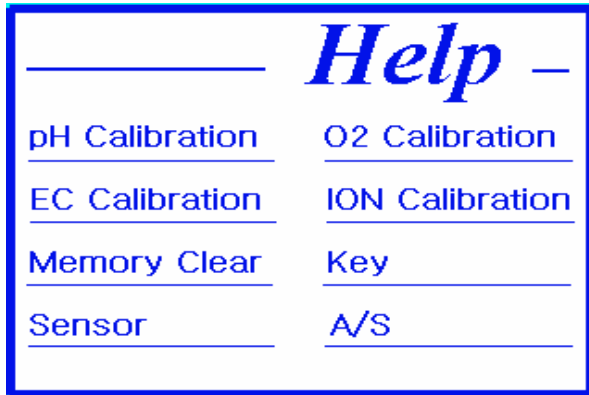
```
┌─────────────────────────────────────┐
│ Setup  Cal  Memory  Help  Item      │
├─────────────────────────────────────┤
│ Clear                               │
├─────────────────────────────────────┤
│   ┌─────────┐      ┌─────────┐       │
│   │  YES    │      │  NO     │       │
│   └─────────┘      └─────────┘       │
├─────────────────────────────────────┤
│         16 KByte Memory             │
├──────────────────┬──────────────────┤
│ Message          │ 05/08/24 15:00:32│
├──────────────────┴──────────────────┤
│ * Value setting : [Up]/[Down]       │
│ * Select  : [Enter]                 │
└─────────────────────────────────────┘
```

## 5.2.3. Help in EC Mode

From initial display of EC, press [Move] Key three times to move <Help>.

After that, press [Enter]Key then, a display is shown as follows.

```
┌─────────────────────────────────────┐
│ ─────────      Help ─               │
│                                     │
│                                     │
│  English       Korea               │
│  ───────       ─────                │
│                                     │
│                                     │
└─────────────────────────────────────┘
```

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From above display, select Language by using [Move] Key, after that press [Enter] Key to see the Help Menu. If you selected KORAN then below display is shown.



From above display, it is available to select proper item which you want to know about by using **Move Key**. After selecting, press **Enter Key** then you can see the concerned information. When you select ¡pH Calibration¡ below is displayed.



When you select **pH Calibration,** below display is shown for 5 seconds interval between each.

# 6.1 Setup in TDS

## 6.1.1. Setup in TDS Mode

From the initial display of CE, press **Mode Key** to move TDS Mode and press **Enter Key** then below TDS Setup display is shown.





(1) Factor: Available to set TDS Factor

(2) Temp: Available to check the temp sensor¡s condition which is connected with the mete and input new temp also

(3) Common: Able to set up ¡Time¡ and ¡RS232¡

## 6.1.2. Setting the Factor

On the TDS, press **Enter Key** to move below display where you can input the factor value by using [Up /Down] Key.

```
┌─────────────────────────────────────┐
│ Setup  Cal  Memory  Help   Item      │
├─────────────────────────────────────┤
│ Factor                               │
├─────────────────────────────────────┤
│                                      │
│                                      │
│          0.70                        │
│                                      │
│                                      │
├──────────────────┬──────────────────┤
│ Message          │ 05/08/24 15:00:32 │
├──────────────────┴──────────────────┤
│ * Value setting : [Up] / [Down]      │
│ * Save & Exit : [Memory]             │
└─────────────────────────────────────┘
```

## 6.1.3. Setting the Temp

From this <TDS>, move to <Temp> mode by pressing **Move key**.

After pressing **Enter Key** then below is displayed.

```
┌─────────────────────────────────────┐   ┌─────────────────────────────────────┐
│ Setup  Cal  Memory  Help   Item      │   │ Setup  Cal  Memory  Help   Item      │
├─────────────────────────────────────┤   ├─────────────────────────────────────┤
│ Channel 3                            │   │ Channel 3                            │
├─────────────────────────────────────┤   ├─────────────────────────────────────┤
│  ch1  ch2  ch3   Rear View           │   │                                      │
│                                      │   │         25.0 'C                      │
│   Connect Temp. Sensor               │   │                                      │
├──────────────────┬──────────────────┤   ├──────────────────┬──────────────────┤
│ Message          │ 05/08/24 15:00:32 │   │ Message          │ 05/08/24 15:00:32 │
├──────────────────┴──────────────────┤   ├──────────────────┴──────────────────┤
│ * Move : [Move], Select : [Enter]    │   │ * Value setting : [Up] / [Down]      │
│ * Save & Exit : [Out]                │   │ * Save & Exit : [Memory]             │
└─────────────────────────────────────┘   └─────────────────────────────────────┘
```

**<ATC Probe is disconnected>**                **<ATC Probe is connected>**

If the ATC probe is disconnected with the meter, left display with direction ¡Connect Temp Sensor ¡ is shown. And the ATC is connected with it, you can go to right display directly.

And user is able to put temp manually. If there are quite difference between temp in the Meter and Real Temp, you can set correct time by the direction appear the bottom of screen.

## 6.1.4. Setting the Temp

From this <TDS>, move to <Common> mode by pressing **Move key**.
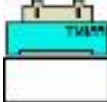
After pressing **Enter Key** then below is displayed.



By itemize, it is available to input or change a value following as the message from the bottom of LCD

(1) Time: Available to change <temp> and <date>, which is displayed on the LCD

(2) RS232: Available to input or change a time Interval of <Data-Log>.



Above is showing Time setting or Interval changing of Data-Log.

## 6.2. Calibration in TDS Mode

Just use the value in EC Mode. You do not need calculate in TDS Mode specially.

When you press **Enter Key** by pressing **Move Key** from the TDS Initial display, below is displayed.

```
Setup  Cal  Memory  Help  Item
TDS


      ┌─────────────────────┐
      │  No Calibration     │
      └─────────────────────┘


Message          │  05/08/24 15:00:32
* Can measure without calibration.
```

## 6.3. Memory in TDS Mode

On the way of measuring TDS, press **Memory/Out Key** for saving the data.

```
Setup  Cal  Memory  Help  Item
TDS

          950  mg/L

Tref   25.0      │  ATC    25.0'C
Message          │  05/08/24 15:00:32
* Measured data is saved.
```

If you would like to find the measuring data which you¡ve saved, in the initial display of TDS, move to <Memory> by pressing **Move Key** twice. And **press Enter** Key to move memories.

```
┌─────────────────────────────────────────┐
│ Setup  Cal  Memory  Help  Item          │
│                    Number [001]          │
├─────────────────────────────────────────┤
│                                          │
│ Date & Time : 05/08/24  15:00            │
│ EC  1395 µS/cm [25]   Temp 25.0°C        │
│                                          │
│                                          │
│                                          │
├──────────────────┬──────────────────────┤
│ Message          │ 05/08/24 15:00:32     │
├──────────────────┴──────────────────────┤
│ * Number change : [Up] / [Down]          │
│ * Exit : [Out]                           │
└─────────────────────────────────────────┘
```

.

It is available to be indicated measured data, time and saved-data. Beside this, you also can search the former dates which were saved by using **Up/Down Key**. And if you would like to <Memory Clear>, press **Memory/out key** to move Memory Clear Display. **After memory clear, whole data and selected values in Setup will be deleted completely**. In case of the instrument can¡t sense a connected electrode or wrong time settled or wrong data memories are saved, you can try <Memory Clear>

```
┌─────────────────────────────────────────┐
│ Setup  Cal  Memory  Help  Item          │
├─────────────────────────────────────────┤
│ Clear                                    │
├─────────────────────────────────────────┤
│  ┌───────────┐        ┌───────────┐      │
│  │  YES      │        │  NO       │      │
│  └───────────┘        └───────────┘      │
├─────────────────────────────────────────┤
│          16 KByte Memory                 │
├──────────────────┬──────────────────────┤
│ Message          │ 05/08/24 15:00:32     │
├──────────────────┴──────────────────────┤
│ * Value setting : [Up]/[Down]            │
│ * Select  : [Enter]                      │
└─────────────────────────────────────────┘
```
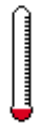
# 6.4. Help in TDS Mode

From initial display of TDS, press **Move Key** three times to move <Help>.

After that, press **Enter Key** then, a display is shown as the EC Mode.

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# 7.1 Setup in Salinity

## 7.1.1 Setup in Salinity mode

From the initial display of EC, press **Move Key** twice to move Salinity Mode and press **Enter Key** then below Salinity Setup display is shown.



(1) Common: Able to set up ¡Time¡ and ¡RS232¡

(2) Temp: Available to check the temp sensor¡s condition which is connected with the meter and also able to input new Temp also.

## 7.1.2 Setting Common in Salinity mode

From the <Salinity>, move to <Common> mode by pressing **Move key**.
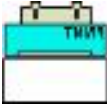
After pressing **Enter Key** then below is displayed.



By itemize, it is available to input or change a value following as the message from the bottom of LCD

(1) Time: Available to change <temp> and <date>, which is displayed on the LCD

(2) RS232: Available to input or change a time Interval of <Data-Log>.

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|

Common

Time

05 / 08 / 24   15 : 00

| Message | 05/08/24 15:00:32 |
|---|---|

* Value setting : [Up] / [Down]
* Save & Exit : [Memory]

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|

Common

RS232

| Interval | |
|---|---|
| Min | Sec |
| 00 | 00 |

COM

| Message | 05/08/24 15:00:32 |
|---|---|

* Value Setting : [Up] [Down]
* Save & Exit : [Memory]

Above is showing Time setting or Interval changing of Data-Log.

## 7.1.3 Setting Temp in Salinity mode

From this <Salinity>, move to <Temp> mode by pressing **Move key.**

After pressing **Enter Key** then below is displayed.

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|

Channel 3

ch1   ch2   ch3   **Rear View**

Connect Temp. Sensor

| Message | 05/08/24 15:00:32 |
|---|---|

* Move : [Move], Select : [Enter]
* Save & Exit : [Out]

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|

Channel 3

# 25.0 'C

| Message | 05/08/24 15:00:32 |
|---|---|

* Value setting : [Up] / [Down]
* Save & Exit : [Memory]

**<ATC Probe is disconnected>**          **<ATC Probe is connected>**

If the ATC probe is disconnected with the meter, left display with direction ¡Connect Temp
Sensor ¡is shown. And the ATC is connected with it, you can go to right display directly.

And user is able to put temp manually. If there are quite difference between temp in the Meter
and Real Temp, you can set correct time by the direction appear the bottom of screen.

## 7.2. Calibration in Salinity Mode

Just use the value in EC Mode. You do not need calculate in Salinity Mode specially.

When you press **Enter Key** by pressing **Move Key** from the TDS Initial display, below is displayed.

```
Setup   Cal   Memory   Help   Item
SAL

        ┌──────────────────────┐
        │   No Calibration     │
        └──────────────────────┘

Message          05/08/24 15:00:32

* Can measure without calibration.
```

## 7.3. Memory in Salinity Mode

On the way of measuring Salinity, press **Memory/Out Key** for saving the data.

```
Setup   Cal   Memory   Help   Item
SAL


        2.0  ppt


                 ATC     25.0˚C
Message          05/08/24 15:00:32

* Measured data is saved.
```

If you would like to find the measuring data which you¡ve saved, In the initial display of Salinity, move to <Memory> by pressing **Move Key** twice. And press **Enter Key** to move memories.

```
Setup   Cal   Memory   Help   Item
                 Number [001]

Date & Time : 05/08/24  15:00
EC 1395 µS/cm [25]   Temp 25.0˚C



Message          05/08/24 15:00:32

* Number change : [Up] / [Down]
* Exit : [Out]
```

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It is available to be indicated measured data, time and saved-data. Beside this, you also can search the former dates which were saved by using **Up/Down Key**. And if you would like to <Memory Clear>, press **Memory/out key** to move Memory Clear Display. **After memory clear, whole data and selected values in Setup will be deleted completely**. In case of the instrument can¡t sense a connected electrode or wrong time settled or wrong data memories are saved, you can try <Memory Clear>

```
┌─────────────────────────────────────┐
│ Setup  Cal  Memory  Help  Item      │
├─────────────────────────────────────┤
│ Clear                               │
│  ┌───────────┐     ┌───────────┐    │
│  │   YES     │     │    NO     │    │
│  └───────────┘     └───────────┘    │
│        16 KByte Memory              │
├──────────────┬──────────────────────┤
│ Message      │  05/08/24 15:00:32   │
├──────────────┴──────────────────────┤
│ * Value setting : [Up]/[Down]       │
│ * Select  : [Enter]                 │
└─────────────────────────────────────┘
```

## 7.4. Help in Salinity Mode

From initial display of Salinity, Press **Move Key** three times to move <Help>.

After that, press **Enter Key** then, a display is shown as the EC Mode.

# Chapter VIII Data-Log

## 8.1 Memory Data-Log

The measured data is stored by pressing **Memory** key manually.

If the data stored in meter is required to print, it is available to output by using printer supplied by *istek*. After searching data stored in instrument by using **Select** key, press **Out** key to print data.

**<<Data ?log in pH Mode>>**

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|
| | | | | Number [001] |

Date & Time : 05/08/24  15:00
pH    7.00              Temp  25.0˚C

| Message | 05/08/24 15:00:32 |
|---|---|

\* Number change : [Up] / [Down]
\* Exit : [Out]

**<< Data ?log in ORP Mode >>**

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|
| | | | | Number [001] |

Date & Time : 05/08/24  15:00
ORP −203.7mV            Temp 25.0˚C

| Message | 05/08/24 15:00:32 |
|---|---|

\* Number change : [Up] / [Down]
\* Exit : [Out]

**<< Data ?log in ION Mode>>**

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|
| | | | | Number [001] |

Date & Time : 05/08/24  15:00

ION  $1.06 \times 10^3$mg/L    Temp 25.0˚C

| Message | 05/08/24 15:00:32 |
|---|---|

\* Number change : [Up] / [Down]
\* Exit : [Out]

**<< Data ?log in EC Mode>>**

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|
| | | | | Number [001] |

Date & Time : 05/08/24  15:00

EC  1395 µS/cm [25]   Temp 25.0˚C

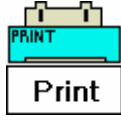| Message | 05/08/24 15:00:32 |
|---|---|

\* Number change : [Up] / [Down]
\* Exit : [Out]

**< Data ?log in TDS Mode >>**

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|
| | | | | Number [001] |

Date & Time : 05/08/24  15:00

TDS 950 mg/L [25]    Temp 25.0˚C

| Message | 05/08/24 15:00:32 |
|---|---|

\* Number change : [Up] / [Down]
\* Exit : [Out]

**<< Data ?log in Salinity Mode >>**

| Setup | Cal | Memory | Help | Item |
|---|---|---|---|---|
| | | | | Number [001] |

Date & Time : 05/08/24  15:00

SAL  2.0 ppt            Temp 25.0˚C

| Message | 05/08/24 15:00:32 |
|---|---|

\* Number change : [Up] / [Down]
\* Exit : [Out]

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## 8.2 Printer Data-Log

From each Mode, it is move like [Setup Menu] ->[Common Menu]->[RS232 Menu] one after the other and below display is shown. .

```
Setup    Cal    Memory    Help
Common
RS232

    Interval              ┌─────┐
  Min  │ Sec            │PRINT│
  00   │  00            └─────┘
                          Print

Message          05/08/24 15:00:32
* Value setting : [Up]/ [Down]
* Save & Exit : [Memory]
```

By using **Move Key**, you can move to ¡Min¡, ¡Sec¡ section of Interval and select ¡Time¡ .

And also, move to Data-Log and select ¡Printer¡

When you select ¡Printer¡ , it is available Data-Log automatically by selected time on Interval.

For example) Condition of **Data-Log:** Interval - 3Sec, subject ? Printer

: In case you select same as a above and measure a data, this data is printed every 3 sec from built-in printer

The following figure is an example of printed paper

```
Date & Time   05/08/24   15:00:32
pH    7.09          Temp  25.0
ORP  120mV          Temp  25.0
ION   256mg/L        Temp  25.0
```

## 8.3 Computer Data-Log

From each Mode, it is move like [Setup Menu] ->[Common Menu]->[RS232 Menu] one after the other and below display is shown.

```
Setup    Cal    Memory    Help
Common
 RS232

      Interval              ┌──┐
   Min  │  Sec          │PRINT │
   00   │  00           │ Com  │

 Message          05/08/24 15:00:32
 * Value setting : [Up]/ [Down]
 * Save & Exit : [Memory]
```

By using **[Move Key]**, you can move to ¡Min¡, ¡Sec¡ section of Interval and select ¡Time¡ .

And also, move to Data-Log and select ¡Com¡ When you select ¡com¡ , it is available Data-Log automatically by selected time on Interval.  For example) Condition of **Data-Log:** Interval - 3Sec, subject ? Com

: In case you select same as a above and measure a data, this data is came out every 3 sec via Computer/

**IT is necessary to buy SDIS softer ware and connect cable(RS232C cable) for making Data-Long In computer.**

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# Chapter VI Troubleshooting & Error Description

| MALFUNCTION | POSSIBLE CAUSE | REMEDY |
|---|---|---|
| No display | No power to meter | Press Power key. |
| | | Check that the adaptor is correctly plugged. |
| **Channel 1 < pH >** Cause Error, when you press the [Memory]Key for input the measured value during the pH calibration. | The Sensor is connected unstably | Check the sensor is connect with ATC correctly (Refer the instrument Setup part) |
| | In the case of setting <Auto Calibration>, It is not correspond between with the settled Buffer and the pH range of the sample | Check the buffer what you using now with is same one which was settled in the Meter (Refer the Calibration & Measurement part) |
| **Channel 1 < pH >** Cause Error in measuring | Failed the calibration | Try to calibrate again with new Buffer |
| | Get out of the range of pH and mV | Check the sensor and ATC are correctly connect with the Meter |
| **Channel 3 < EC >** Can not read the data exactly | Can not get an stable data or very slow measure | Check the EC Cell and ATC is connected with Meter well |
| | | Rinsing the sensor clearly |

If you have failed to figure out what is matter on the meter then, make <Memory Clear> Then whole data is deleted completely. Please refer to Clear Memory (data) of Setup Functions.

※ If the problem persists, please contact istek, Inc Product Service Department. (Tel: 82-2-2108-8400, E-mail: istek@istek.co.kr)

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# Chapter VII Specifications.

| Model | | CP-500L |
|---|---|---|
| pH | Range<br>Resolution<br>Relative Accuracy | -2.000 to 19.999<br>0.001/0.01/0.1<br>¡ 0.002 |
| Milli-volt<br>(ORP) | Range<br>Resolution<br>Relative Accuracy | ¡ 1999.9 mV<br>0.1 mV<br>¡ 0.1 mV |
| Concentration<br>(ISE) | Range<br>Resolution<br>Relative Accuracy | 0.00001 to19999<br>¡ 1 least significant<br>¡ 0.25% of reading |
| Temperature | Range<br>Resolution<br>Relative Accuracy | -10 to 110℃<br>0.1℃<br>¡ 0.4℃ |
| Conductivity | Range<br>Resolution<br>Relative Accuracy | 0 to 199,999¥S/cm<br>0.01/0.1<br>¡ 0.5% |
| TDS | Range<br>Resolution<br>Relative Accuracy | 0 to 1999¥S/cm<br>1mg/l<br>¡ 2% |
| Salinity | Range<br>Resolution<br>Relative Accuracy | 0.0 to 80.0 ppt<br>0.1<br>¡ 0.1 |
| Data Logging | | 500 Points |
| Temperature Compensation | | Auto |
| Input | | Three BNC , Three ATC , Power, RS232C |
| Output | | Recorder, RS232C (Computer/Printer) |
| Power | | Adaptor |

# * ISE Specifications

ISE Specification is simply described.
The details refer to catalog or contact istek.

| ISE | Sensing Type | Measurement Range | | Slope | pH Range | Temp(℃) Range | Response Time | Reference Electrode & Filling solution |
|---|---|---|---|---|---|---|---|---|
| | | Molar(M) | mg/L(ppm) | | | | | |
| $NH_3$ | GS | $1.0 \sim 5 \cdot 10^{-7}$ | 17,000~0.01 | 56±3 | above11 | 0~50 | 20 | N/A, $NH_4Cl$ |
| $NH_4^+$ | PM | $1.0 \sim 5 \cdot 10^{-6}$ | 18,000~0.1 | 56±2 | 4~10 | 0~50 | 30 | Dbl, NaCl |
| $Br^-$ | SSM | $1.0 \sim 5 \cdot 10^{-6}$ | 79,900~0.4 | 57±2 | 0~14 | 0~80 | 20 | Dbl, $KNO_3$ |
| $Cd^{+2}$ | SSM | $0.1 \sim 1 \cdot 10^{-7}$ | 11,200~0.01 | 27±2 | 2~12 | 0~80 | 20 | Dbl, $KNO_3$ |
| $Ca^{+2}$ | PM | $1.0 \sim 5 \cdot 10^{-6}$ | 40,000~0.2 | 27±2 | 3~10 | 0~50 | 30 | Sgl, KCl |
| $CO_2$ | GS | $0.01 \sim 1 \cdot 10^{-4}$ | 440~4.4 | 56±3 | 4.8~5.2 | 0~50 | 20 | N/A, $NaHCO_3$ |
| $Cl^-$ | SSM | $1.0 \sim 5 \cdot 10^{-5}$ | 35,500~1.8 | 56±2 | 2~12 | 0~80 | 20 | Dbl, $KNO_3$ |
| $Cu^{+2}$ | SSM | $0.1 \sim 1 \cdot 10^{-8}$ | 6,350~0.0006 | 27±2 | 2~12 | 0~80 | 20 | Dbl, $KNO_3$ |
| $CN^-$ | SSM | $0.01 \sim 5 \cdot 10^{-6}$ | 260~0.1 | 57±2 | 11~13 | 0~80 | 20 | Dbl, $KNO_3$ |
| $F^-$ | SSM | Sat'd~$1 \cdot 10^{-6}$ | Sat'd~0.02 | 57±2 | 5~8 | 0~80 | 20 | Sgl, KCl |
| $BF_4^-$ | PM | $1.0 \sim 7 \cdot 10^{-6}$ | 10,8,00~0.1(B) | 56±2 | 2.5~11 | 0~50 | 30 | Dbl, $(NH_4)_2SO_4$ |
| $I^-$ | SSM | $1.0 \sim 5 \cdot 10^{-8}$ | 127,000~0.006 | 57±2 | 0~14 | 0~80 | 20 | Dbl, $KNO_3$ |
| $Pb^{+2}$ | SSM | $0.1 \sim 1 \cdot 10^{-6}$ | 20,700~0.2 | 25±2 | 3~8 | 0~80 | 20 | Dbl, $KNO_3$ |
| $Li^+$ | PM | $1.0 \sim 1 \cdot 10^{-5}$ | 6,900~0.7 | 56±2 | 5~10 | 0~50 | 30 | Dbl, $(NH_4)_2SO_4$ |
| $NO_3^-$ | PM | $1.0 \sim 7 \cdot 10^{-6}$ | 62,000~0.5 | 56±2 | 2.5~11 | 0~50 | 30 | Dbl, $(NH_4)_2SO_4$ |
| $NO_X$ | GS | $5 \cdot 10^{-3} \sim 5 \cdot 10^{-6}$ | 220~0.2 | 56±3 | 1.1~1.7 | 0~50 | 30 | N/A, $NaNO_3$ |
| $ClO_4^-$ | PM | $1.0 \sim 7 \cdot 10^{-6}$ | 98,000~0.7 | 56±2 | 2.5~11 | 0~50 | 30 | Dbl, $(NH_4)_2SO_4$ |
| $K^+$ | PM | $1.0 \sim 1 \cdot 10^{-6}$ | 39,000~0.04 | 56±2 | 2~12 | 0~50 | 30 | Dbl, NaCl |
| $Ag^+ / S^{-2}$ | SSM | $1.0 \sim 1 \cdot 10^{-7}$ / $1.0 \sim 1 \cdot 10^{-7}$ | 107,900~0.01 / 32,100~0.003 | 57±2 / 27±2 | 2~12 / 2~12 | 0~80 / 0~80 | 20 / 20 | Dbl, $KNO_3$ / Dbl, $KNO_3$ |
| $Na^+$ | PM | $1.0 \sim 1 \cdot 10^{-5}$ | 23,000~0.2 | 55±2 | 5~10 | 0~50 | 30 | Dbl, $NH_4Cl$ |
| $X^+/X^-$ | SSM | $5 \cdot 10^{-2} \sim 1 \cdot 10^{-6}$ | 12,000~1.0 | Titration | 2~12 | 0~50 | 30 | Sgl, KCL |
| $Ca^{+2}/ Mg^{+2}$ | PM | $1.0 \sim 1 \cdot 10^{-5}$ | 40,000~0.4(Ca) | 26±3 | 5~10 | 0~50 | 30 | Sgl, KCl |

* Sensing Type ;   GS(Gas Sensing),   PM(Polymer Membrane),
                  SSM(Solid State Membrane)

* Response Time ;   Indicates response time.

* Reference electrode   ; N/A (No Reference Electrode),
                       Dbl (Double Junction Reference Electrode),
                       Sgl (Single Junction Reference Electrode)

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# Chapter VIII. Ordering Information

※ Other items contact istek.
For further information on other accessories, please feel free to contact istek at any time.

## A. Standard

* Combination pH Electrode/ATC Probe

* AC/DC Power Adaptor

* Buffer Solutions (pH4.00, 7.00, 10.00) each 125ml

* Instruction Manual

## B. Option

* pH, ORP, ION Electrode Set

* Luxury Third-Arm Stand

* Electrode Storage Solution 475ml

* Electrode Filling Solution 125ml

* Buffer Solutions (pH4.00, 7.00, 10.00) 475ml

* RS232C Interface Cable

* SDIS Program

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