



Instruction Manual

Model EC-470L (Conductivity/TDS/Salinity/Temp Meter)

istek, Inc.



website: www.istek.co.kr

E-mail: istek@istek.co.kr

Chapter I. Instruction

istek's desktop **Conductivity/TDS/Salinity/Temp Meter** (*Model EC-470L*), 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 meter, EC-470L has a single channels system for measuring conductivity, TDS, and Salinity. At the very moment also can be controlled each functions. The model EC-470L is capable of storing up-to 500 points in its memory box and storing by control of the time interval of Data-Logging 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.

EC-470L (Conductivity/TDS/Salinity/Temp Meter)

If an EC value is stable, a world <code>¡Stable"</code> is displaying on the screen, therefore a user can measure the sample accurately. And it features Auto/Manual calibration and displaying Conductivity (\$S/cm, mS/cm), TDS (mg/L), Salinity (ppt), Resistivity (ohm, Kohm, Mohm) and temp ($^{\circ}$ C)

- 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)
- 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 $25\,^{\circ}$ C.



Chapter II. General Functions

2.1 Instrument Setup

Rear Panel (EC-470L)



Power Source

Connect the supplied AC/DC adaptor to Power Jack of the meter. istek supplies AC/DC adaptor(DC 9V) adjusting to 220V.

Electrode Connection

Attach electrode by sliding the BNC connector onto the sensor input then push down and turn clockwise to lock into position.

ATC Probe Connection

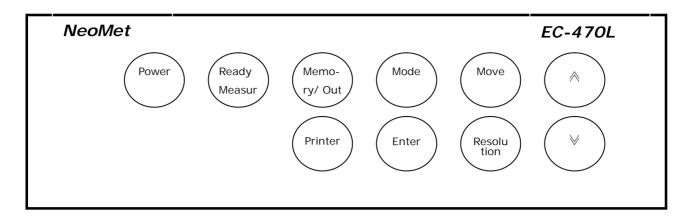
Attach the ATC probe to the ATC jack by sliding the connector straight on until firmly in place.

Printer and RS232C interface cable Connection

Insert printer and RS232C cable into the RS232C jack. Use interface cable supplied by istek.



2.2 Key Functions Ec-470L (Conductivity/TDS/Salinity/Temp Meter)



| Key | Description |
|-----------------|--|
| | |
| Power | Used to turn ON/OFF. |
| Ready / Measure | Used to change condition of meter, i.e. measure or ready. This is used for changing from ready to measure condition or reversing. |
| Memory / Out | Used to store data in meters memory while measuring In the ready condition, use to search a memorized data. Used to exit from condition of Memory (Data Mode). |
| Mode | Used to change operating modes, such as pH, ISE or mV. |
| Move | Used to move each menu. Setup => Cal => Memory => Help |
| Printer | Used to print a measured data |
| Enter | Used to set a selected data. |
| Resolution | Used to change the resolution. For pH mode, can choose 0.1, 0.01 or 0.001. |
| > | In setup, calibration and Data (Memory) mode, press to increase value. |
| « | In setup, calibration and Data (Memory) mode, press to decrease value. |

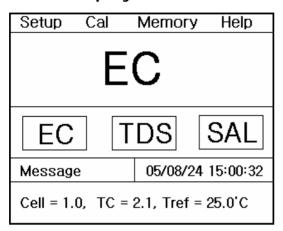


2.3 Display Description

The following display is specially specified.

Even some messages are not shown in the below display, describe together below.

Initial display of ■ EC-470L



| Display | Function |
|----------|---|
| 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) |
| Setup | Indicates to change each selected value per measuring Item |
| Cal | Indicates that meter is in calibration condition |
| Memory | Indicates for confirming each saved data per Item |
| Help | Indicates 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 |



2.4 Electrode Structure

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 (Clear Memory)

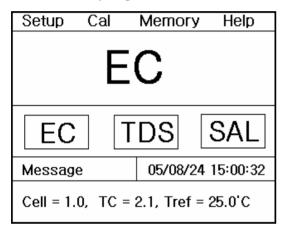
The setup menu is used to identify and change instrument parameters.

3.1 Setup in EC mode

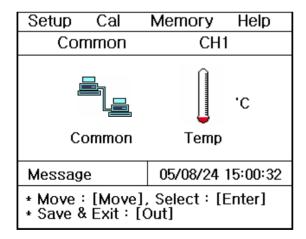
In EC ready condition if pressing **Setup Key** the display is shown as follows. The selected menu shows an emphasized black color in turn by pressing **Select Key** and the condition of each item is set by pressing **Enter Key**.

<Temp setting >

Initial display of **EC-470L**



From above display<initial display>, select <Setup> Menu by using **Move Key**. After select <Setup> and press **Enter Key**, then below is displayed



From this, select <Common> and press **Enter Key**, then you can go next step as a follow.



| Setup | Cal | Memory | Help |
|--|------|------------|---------|
| Commo | on | | |
| Т | Time | | |
| | | 7 | |
| Т | ime | RS232 | |
| Message | | 05/08/24 1 | 5:00:32 |
| * Move : [Move], Select : [Enter] * Save & Exit : [Out] | | | |

Please select <Time> and press **Enter Key** then you can go to next display, which can be selecting Current Time. You can set a correct current time by using **Move Key** and \gg , \ll **key**. After completing it, Press **Memory Key** for saving the time and exiting.

| Setup | Cal | Memory | Help |
|------------------|------|---------------|----------|
| Cor | nmon | CH1 | |
| Common | | Temp | .c |
| Message | | 05/08/24 | 15:00:32 |
| * Move : [Move], | | , Select : [E | Enter] |

Save & Exit : [Out]

From this initial display, using **Move Key**, can move to each **Setup** item and also could select each item by using **Enter Key**.

- 1) Common: able to set up ¡Time¡ & ¡RS232¡
- 2) **Temp**: able to **check ¡Temp¡**, **check** of Sensor¡s condition and input exact temp.

| Setup | Cal | Memory | Help |
|--|-----|------------|---------|
| Commo | on | | |
| 7 | ime | RS232 | |
| (| | 3 | |
| 1 | īme | RS232 | |
| Message | | 05/08/24 1 | 5:00:32 |
| * Move : [Move], Select : [Enter] * Save & Exit : [Out] | | | |

| Setup | Cal | Memory | Help |
|--|-----|----------|----------|
| Channel | 1 | | |
| 25.0 'C | | | |
| Message | е | 05/08/24 | 15:00:32 |
| Value setting : [Up] / [Down]Save & Exit : [Memory] | | | |

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. Input or change a selected value according to message which is near the bottom on the meter.

- (1) **Time:** Use this to change ¡Time¡ or ¡Data¡ on the meter.
- (2) RS232: Used this to input or change ¡Data-Logging¡
- (3) **Temp**: Used this to set an exact temp.



| S | etup | Cal | Memory | Help |
|----------|--|-------|--------|---------|
| C | Common | | | |
| | RS232 | | | |
| Interval | | THEFT | | |
| | Min | Sec | 42 100 | |
| | 00 | 00 | СОМ | |
| м | Message 05/08/24 15:00:32 | | | 5:00:32 |
| ± ; | Value Setting: [Up] [Down]Save & Exit: [Memory] | | | |

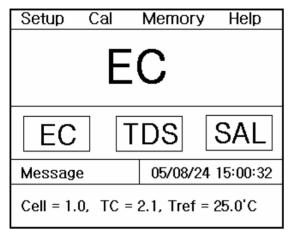
This display is shown that item of RS232 is changing to item of Data-Logging interval.

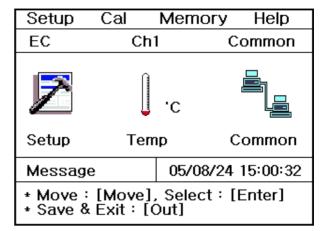


3.2. Setup in EC Mode (Conductivity)

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.





From the left display, move <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

3.2.1. Selecting of cell constant, Tref, TC

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

<EC setup display>

| Setup | Cal | Memory | Help |
|---|-------------|----------|----------|
| EC | | | |
| Cell | T | ref | TC |
| Cell | | ref | TC |
| Message | | 05/08/24 | 15:00:32 |
| * Value setting : [Up] / [Down] * Save & Exit : [Memory] | | | |

<Selecting display of Cell constant>

| Setup Ca | al | Memo | гу | Help |
|--|----|------|----|------|
| EC | | | | |
| Cell | | | | |
| 0.01 | 0 | .1 | 1 | .0 |
| 10.0 | 10 | 0.0 | | |
| Message 05/08/24 15:00:32 | | | | |
| Value setting : [Up] / [Down] Save & Exit : [Memory] | | | | |



<Selecting display of Tref>

| Setup | Cal | Memory | Help |
|--|-----|----------|----------|
| EC | | | |
| Tref | | | |
| 2 | 0/ | 25 (| C |
| Message | е | 05/08/24 | 15:00:32 |
| Value setting : [Up] / [Down]Save & Exit : [Memory] | | | |

<Selecting display of TC >

| Setup | Cal | Memory | Help |
|--|-----|----------|----------|
| 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 $^{\circ}{\rm C}$ to 25 $^{\circ}{\rm C}$
- (3) Selecting display of Temperature Coefficient: Available to set proper Temp Coefficient Unit is %/% and it is settled 2.1 %/% basically.

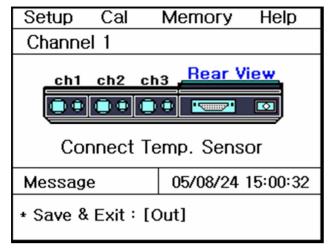
| Temp Coefficient(Between 25 to 50℃) [Variation of ECis % /℃] | | |
|---|------|--|
| Sample %/℃ | | |
| Ultrapure Water | 4.55 | |
| Salt (NaCl) | 2.12 | |
| 5% NaOH | 1.72 | |
| Dilute Ammonia | 1.88 | |
| 10% HCI | 1.32 | |
| 5% Sulfuric Acid | 0.96 | |
| 98% Sulfuric Acid | 2.84 | |
| Sugar Syrup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



3.2.2. Setting Temp in Setup

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

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



| Setup | Cal | Memory | Help |
|--|-----|--------|------|
| Channel | 1 | | |
| 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 $_i$ Connect Temp Sensor $_i$ 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.

3.2.3. Setting Common in Setup

From this <code><Setup></code>, move to <code><Common></code> mode by pressing Move Key.

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

| Setup | Cal | Memory | Help |
|--|-----|------------|----------|
| Commo | n | | |
| Т | ime | RS232 | |
| <u> </u> | ime | RS232 | |
| Message | , | 05/08/24 1 | 15:00:32 |
| * Move : [Move], Select : [Enter] * Save & Exit : [Out] | | | |

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-Logging>.

| Setup | Cal | | Mer | nory | Help |
|---|------|---|-----|-------|----------|
| Commo | חכ | | | | |
| Time | | | | | |
| 05 | / 08 | / | 24 | 15 : | 00 |
| Messag | је | | 05/ | 08/24 | 15:00:32 |
| * Value setting : [Up] / [Down] * Save & Exit : [Memory] | | | | | |

| S | etup | Cal | Memory | Help |
|---|--|------|--------|------|
| (| Common | | | |
| | RS232 | | | |
| | Inte | rval | THE | |
| | Min | Sec | | |
| | 00 | 00 | СОМ | |
| М | Message 05/08/24 15:00:32 | | | |
| ± | Value Setting : [Up] [Down]Save & Exit : [Memory] | | | |

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

3.2.4. 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 °C
- ☐ Temperature Coefficient (TC): 2.10 %/°C



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 |
|--|-----|----------|----------|
| EC | | | |
| EC | T | DS [| SAL |
| Message | ; | 05/08/24 | 15:00:32 |
| You should calibrate for gaining stable data | | | |

| Setup | Cal | Memory | Help |
|--|-----|----------|----------|
| EC | | | |
| 1413 µS/cm | | | |
| | | ATC 2 | 5.0'C |
| Messag | е | 05/08/24 | 15:00:32 |
| * Buffer selecting.* Buffer change = [Move]/[Up]/[Down] | | | |

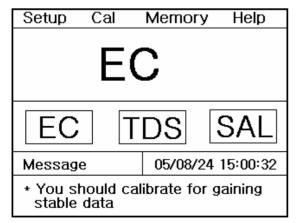
From above display, select a standard solution what you want to use and save it by pressing **Memory/Out Key**. After rinsing the sensor with distilled water carefully and put the sensor in the buffer and press **Measure Key**. Below display is shown.

| Setup | Cal | Memory | Help |
|--|------|-------------|----------|
| EC | | | |
| | 141 | 3 µS | c/cm |
| Tref 2 | 25.0 | ATC 2 | 5.0'C |
| Messag | ie | 05/08/24 | 15:00:32 |
| For starting of calibration: [Measure]Exit: [Out] | | | |

| Setup | Cal | Memo | эгу | Help |
|--|------|--------|--------|---------|
| EC | | Buffer | 1413 | µS/cm |
| 1395 µS/cm | | | | |
| Tref 2 | 25.0 | ATC | 25. | .0'C |
| Messa | ge | 05/0 | 8/24 1 | 5:00:32 |
| * 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_is detail are displayed on the LCD. (Please refer below drawing)





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 | |
|----------------------------|-------------------|--|
| EC | | |
| 139 | 9 5 μS/cm | |
| Tref 25.0 | ATC 25.0'C | |
| Message | 05/08/24 15:00:32 | |
| * In process of measuring. | | |

3.2.5. Saving memory in EC Mode

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

| Setup Cal | Memory Help | |
|---------------------------|-------------------|--|
| EC | | |
| 13 | 95 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 |
|--|-----|-------------------------|----------|
| | | Numbe | er [001] |
| | | 5/08/24 15 [25] Temp | |
| Messag | е | 05/08/24 | 15:00:32 |
| Number change : [Up] / [Down]Exit : [Out] | | | |

| Setup | Cal | Memory Help | | |
|---|-----|-------------------|--|--|
| Clear | | | | |
| YE | S | ИО | | |
| 16 KByte Memory | | | | |
| Message | е | 05/08/24 15:00:32 | | |
| * Value setting : [Up]/[Down] * Select : [Enter] | | | | |



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 canit sense a connected electrode or wrong time settled or wrong data memories are saved, you can try <Memory Clear>

3.2.6. Measuring Resistivity.

While measuring EC, you can see the data of resistivity by pressing **Mode Key**. If you want to see EC data again, press **Mode Key** once again.

| Setup Cal | Memory Help | | | | |
|----------------------------|-------------------|--|--|--|--|
| Resistivity | Resistivity | | | | |
| 5.5 Kohm | | | | | |
| Message | 05/08/24 15:00:32 | | | | |
| * In process of measuring. | | | | | |

3.2.7. 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.





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

Help –

pH Calibration

EC Calibration

Memory Clear
Sensor

Help –

02 Calibration

ION Calibration

Key

A/S

EC calibration

- (1) EC 화면에서 Cal 모드로 이동한다.
- (2) [Move]를 눌러 보정액을 선택한다.
- (3) [Measure]를 누른다.
- (4) [Memory]를 누른다.(보정완료)
- (5) 보정이 완료되면 EC 화면으로 돌아간다.

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 <code>ipH</code> Calibration; below is displayed.

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

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

| Setup Cal | Memory Help | | |
|--|-------------------|--|--|
| EC | | | |
| 141 | 3 μS/cm | | |
| Tref 25.0 | ATC 25.0'C | | |
| Message | 05/08/24 15:00:32 | | |
| * For starting of calibration: [Measure] * Exit: [Out] | | | |

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

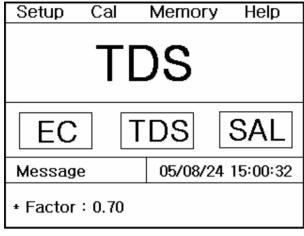
| Setup Cal | Memory Help | | | |
|--|-------------------|--|--|--|
| EC E | Buffer 1413 µS/cm | | | |
| 1413 µS/cm | | | | |
| Tref 25.0 | ATC 25.0'C | | | |
| Message 05/08/24 15:00:32 | | | | |
| * For finish of calibration : [Memory] | | | | |

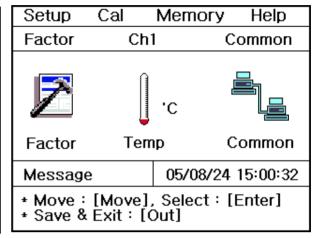


3.3. Setup in TDS Mode

3.3.1. Setup in TDS Mode

From the initial display of EC, 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_is condition which is connected with the meter and input new temp also
- (3) Common: Able to set up ¡Time¡ and ¡RS232¡

3.3.2. 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**.

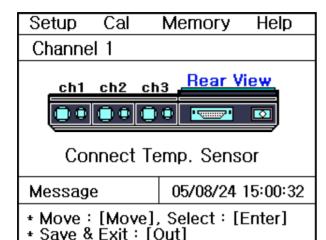
| Setup | Cal | Memory | Help | Item |
|--|-----|--------|------|------|
| Factor | | | | |
| 0.70 | | | | |
| Message 05/08/24 15:00:32 | | | | |
| * Value setting : [Up] / [Down]* Save & Exit : [Memory] | | | | |



3.3.3. 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 | |
|--|-----|--------|------|--|
| Channel | 1 | | | |
| 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 $_i$ Connect Temp Sensor $_i$ 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.

3.3.4. Setting Common in TDS mode

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

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

| Setup | Cal | Memory | Help | |
|--|------|------------|----------|--|
| Commo | on | | | |
| Т | ime | RS232 | | |
| 5 | ime | RS232 | | |
| ' | iiie | | | |
| Message | | 05/08/24 1 | 15:00:32 | |
| * Move : [Move], Select : [Enter] * Save & Exit : [Out] | | | | |

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 | | Men | nory | Help |
|---|------|---|-----|------|------|
| Commo | on | | | | |
| Time | | | | | |
| 05 | / 08 | / | 24 | 15 : | 00 |
| Message 05/08/24 15:00:32 | | | | | |
| <pre>* Value setting : [Up] / [Down] * Save & Exit : [Memory]</pre> | | | | | |

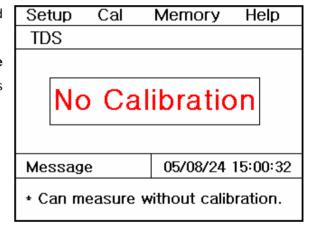
| S | etup | Cal | Memory | Help | |
|--|---------------------------|------|--------|------|--|
| C | Commo | n | | | |
| | RS232 | | | | |
| | Inte | rval | THAT | | |
| | Min | Sec | | | |
| | 00 | 00 | СОМ | | |
| М | Message 05/08/24 15:00:32 | | | | |
| + Value Setting : [Up] [Down] + Save & Exit : [Memory] | | | | | |

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

3.3.5. 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.



3.3.6. Memory in TDS Mode

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

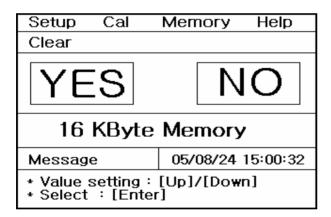
| Setup Cal | Memory Help | |
|---------------------------|----------------|--|
| TDS | | |
| 95 | 50 mg/L | |
| Tref 25.0 | ATC 25.0'C | |
| Message 05/08/24 15:00:32 | | |
| * Measured data is saved. | | |



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 |
|--|-----|-----------------------|----------|
| | | Numbe | r [001] |
| | | 5/08/24 15 5] Temp | |
| Messag | e | 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 canit sense a connected electrode or wrong time settled or wrong data memories are saved, you can try <Memory Clear>



3.3.7. Help in TDS Mode

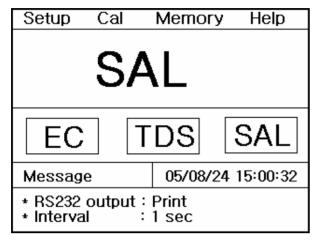
From initial display of TDS, press **Move Key** three times to move <Help>. After that, press **Enter Key** then, a display is shown as the EC Mode.

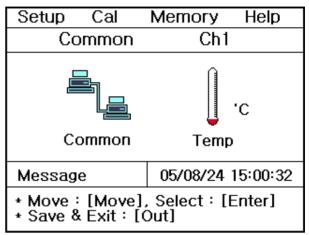


3.4. Setup in Salinity

3.4.1 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_is condition which is connected with the meter and also able to input new Temp also.

3.4.2. Setting Common in Salinity mode

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

| Setup | Cal | Memory | Help |
|--|-----|------------|---------|
| Commo | on | | |
| 1 | ime | RS232 | |
| 5 | | 7 . | |
| Τ . | ime | RS232 | |
| Messag | е | 05/08/24 1 | 5:00:32 |
| * Move : [Move], Select : [Enter] * Save & Exit : [Out] | | | |

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-Logging >.



| Setup | Cal | Memory | Help |
|--|--------|----------|----------|
| Commo | n | | |
| Time | | | |
| 05 / | ′ 08 / | 24 15 | : 00 |
| Messag | e | 05/08/24 | 15:00:32 |
| Value setting : [Up] / [Down]Save & Exit : [Memory] | | | |

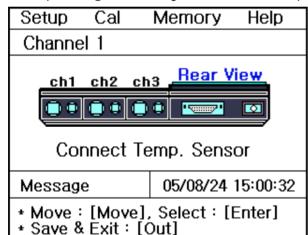
| S | etup | Cal | Memory | Help |
|-----|--|------|--------|------|
| C | commo | n | | |
| | RS232 | | | |
| | Inte | rval | THEFT | |
| | Min | Sec | | |
| | 00 | 00 | СОМ | |
| М | Message 05/08/24 15:00:32 | | | |
| ± ' | Value Setting : [Up] [Down]Save & Exit : [Memory] | | | |

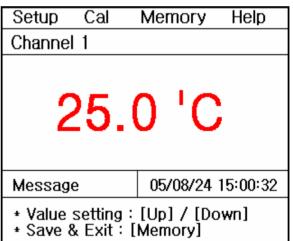
Above is showing Time setting or Interval changing of Data-Logging.

3.4.3 Setting Temp in Salinity mode

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

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





<ATC Probe is disconnected>

<ATC Probe is connected>

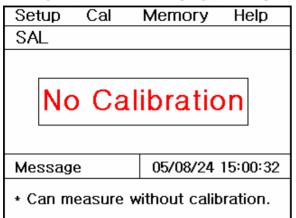
If the ATC probe is disconnected with the meter, left display with direction ¡Connect Temp Sensor¡ is shown. And the ATC is connected with it; you can go to right display directly. And user is able to put temp manually. If there are quite difference between temp in the Meter and Real Temp, you can set correct time by the direction appear the bottom of screen.



3.4.4. 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 Initial display, below is displayed.



3.3.5. Saving memory in Salinity Mode

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

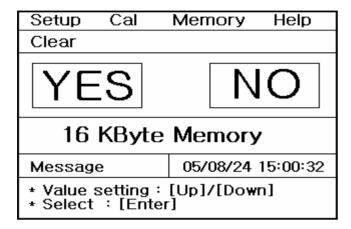
| Setup | Cal | Memory Help |
|---------------------------|-----|-------------------|
| SAL | | |
| | 2. | O ppt |
| | | ATC 25.0'C |
| Message | 9 | 05/08/24 15:00:32 |
| * Measured data is saved. | | |

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 | Memor | у | Help |
|---|-----------------|--------|------|-------------|
| | | Nur | nber | [001] |
| Date & T SAL 2.0 | ime : 09 ppt | | | 0 25.0'C |
| Messag | е | 05/08/ | 24 1 | 5:00:32 |
| * 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 canit sense a connected electrode or wrong time settled or wrong data memories are saved, you can try <Memory Clear>



3.3.6. 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 IV Data-Logging

4.1. Data-Logging

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 save in EC Mode>>

| Setup | Cal | Memory | Help |
|---|-----|--------------------------|----------|
| | | Numbe | r [001] |
| | | 5/08/24 15: [25] Temp | |
| Message | е | 05/08/24 | 15:00:32 |
| * Number change : [Up] / [Down] * Exit : [Out] | | | |

<<Data save in Salinity Mode>>

| Setup | Cal | Memory | Help |
|---|-----|-------------------|------------------|
| | | Numbe | er [001] |
| Date & T SAL 2.0 | | 5/08/24 15 Tem | ∺00 p 25.0 °C |
| Messag | e | 05/08/24 | 15:00:32 |
| * Number change : [Up] / [Down] * Exit : [Out] | | | |

<<Data save in TDS Mode>>

| Setup | Cal | Memory | Help |
|--|-----|-----------------------|----------|
| | | Numbe | er [001] |
| | | 5/08/24 15 5] Temp | |
| Messag | e | 05/08/24 | 15:00:32 |
| Number change : [Up] / [Down]Exit : [Out] | | | |

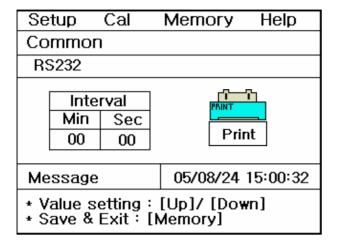
It is available to search former data by using **Up/Down Key**, it is also available to print by using built-in printer. Press **Print Key** to print the data

| | | Numbe | er [001] | |
|------|----------|----------|-----------------|-----|
| Date | & Time (| 05/08/24 | 15:00 | :32 |
| EC | 1395 ¥S/ | cm Te | emp 25 | .0 |
| TDS | 950mg/l | L To | e mp 2 5 | 0.0 |
| SAL | 2.0ppt | Te | mp 25. | .0 |



4.2 Data-Logging in Printer

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



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

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

When you select ¡Printer¡, it is available Data-Logging automatically by selected time on Interval. For example) Condition of **Data-Logging:** 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

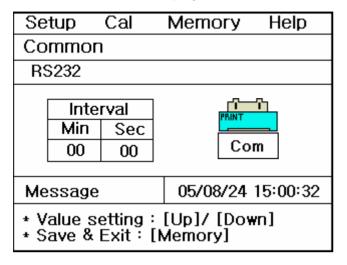
The following figure is an example of printed paper.

Date & Time05/08/2415:00:32EC1395 ¥S/cmTemp25.0TDS950mg/LTemp25.0SAL2.0pptTemp25.0



4.3 Computer Data-Logging

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



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

And also, move to Data-Logging and select ¡Com¡ When you select ¡com¡, it is available Data-Logging automatically by selected time on Interval. For example) Condition of **Data-Logging:** 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 software and connect cable (RS232C cable) for Data-Logging in computer.



Chapter V. Troubleshooting & Error Description

| MALFUNCTION | POSSIBLE CAUSE | REMEDY |
|--|---|--|
| No display | No power to meter | Press Power key. |
| | The Electrode is not connected well. | Check the EC Cell and ATC is connected with Meter well |
| Can not read the data exactly or found error | The Electrode has been polluted. | Rinsing the sensor clearly |
| in the display. | The Buffer Solution has been polluted. | Change buffer solution as a new one. |
| | The cell in electrode has been broken. | Change to another cell. |
| | There is an air bubble on the surface of the electrode. | Remove the air bubble by stirring up and down. |

If the cause cannot be found, clear memories (data) for eliminating all data. 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: <u>istek@istek.co.kr</u>)



Chapter VI. Specifications.

| Model | | EC-470L | |
|--------------------------|--|---|--|
| Conductivity | Range Resolution Relative Accuracy | 0 to 199,999¥S/cm 0.01/0.1 i 0.5% | |
| TDS | Range Resolution Relative Accuracy | 0 to 19,999mg/l 1mg/l i 0.2% | |
| Salinity | Range Resolution Relative Accuracy | 0.0 to 80.0 ppt 0.1 i 0.1 | |
| Resistivity | Range | 5Ω x cm to 100M Ω x cm | |
| Temperature | Range Resolution Relative Accuracy | -10 to 110℃ 0.1℃ i 0.4℃ | |
| Data Logging | | 500 Points | |
| Temperature Compensation | | Auto | |
| Calibration | | Auto | |
| Input | | BNC, ATC , Power, RS232C | |
| Output | | RS232C (Computer/Printer) | |
| Power | | AC DC Power Adaptor | |



Chapter VII. Ordering Information

Other items contact istek.

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

A. Standard

- * Conductivity Cell (K=1.0) / ATC Probe
- * Conductivity Standard Solution (1413 ¥S/cm) 125ml
- * AC/DC Power Adaptor
- * Instruction Manual

B. Option

- * Conductivity cell
- * Conductivity Standard Solution
- * SDIS Program
- * RS232C Interface Cable
- * Printer
- * Luxury Third-Arm Stand

istek, Inc.

Room 1011 Hanshin IT-Tower, #235 Kuro-Dong, Kuro-Ku, Seoul, Korea

Tel: +82-2-2108-8400 Fax: +82-2-2108-8430

Homepage: http:/www.istek.co.kr

E-mail: istek@istek.co.kr













Room 1011, Hanshin IT-Tower #235, Kuro-Dong, Kuro-ku, Seoul,

CERTIFICATE OF WARRANTY

- * We guarantee as following,
- 1. This product has been passed our strict inspection process. (It comes under the meters with the exception of an electrode)
- 2. Defects occurring within 2 years from delivery date shall be remedied free of charge at our works when it has been used in a normal situation. (But we can make a user pay for mending charge in the case of trouble caused by a careless user.)
- 3. We will repair the good with fee about problems caused by user's mistake even if warranty period has not been over.
- 4. Please present this form with the good when you want to repair it.
- 5. Please keep this certificate with care because this sheet will not be reissued.

| Product Name | Desktop | Warranty period |
|--------------------------|---------|-----------------|
| Model Name | EC-470L | |
| Serial Number | | 2years |
| Manufacturing Month/Year | | |

Date. . , 20

Authorized signature

