

**Desktop  
Conductivity/Salinity/Temp  
Meter  
Model 430C  
Instruction Manual**

*istek, Inc.*



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## **Chapter I. Introduction**

*istek's* Desktop Conductivity/Salinity/Temp Meter(model 430C) is operated by AC/DC adaptor(DC 9V) and is controlled by microprocessor for all measurement needs.

*istek's* Desktop Conductivity/Salinity/TEMP Meter(model 430C) features a custom LCD which simultaneously displays various functions along with measurement.

*istek's* Desktop Conductivity/Salinity/TEMP Meter(model 430C) features to obtain a reliable data since its program is treated by setting in detail about compensation factor for an accurate measurement.

The model 430C is capable of storing up to 50 points in memory at once.

The model 430C displays Conductivity( $\mu\text{S}$ , mS), Salinity(ppt), and ATC( $^{\circ}\text{C}$ ).

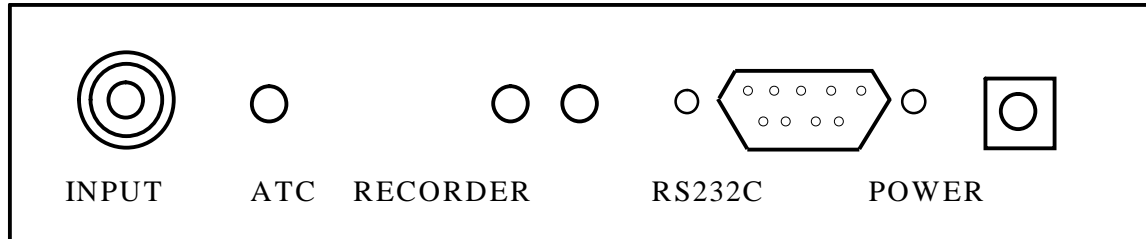
Conductivity            indicates conductivity of solution. (unit  $\mu\text{S}/\text{cm}$  and  $\text{mS}/\text{cm}$ )

Salinity                indicates by conversion salinity of solution from the measured conductivity. (unit ppt)

ATC                    For automatic temperature compensation, a temperature probe supplied by *istek* must be used.  
Temperature is automatically compensated on the base of Tref adjusted in Setup. Tref can be set with  $25.0^{\circ}\text{C}$  or  $20.0^{\circ}\text{C}$  for a basis.

## Chapter II. Instrument Setup

Real Panel



### Power Source

Connect the supplied adaptor to 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.

### Recorder Connection

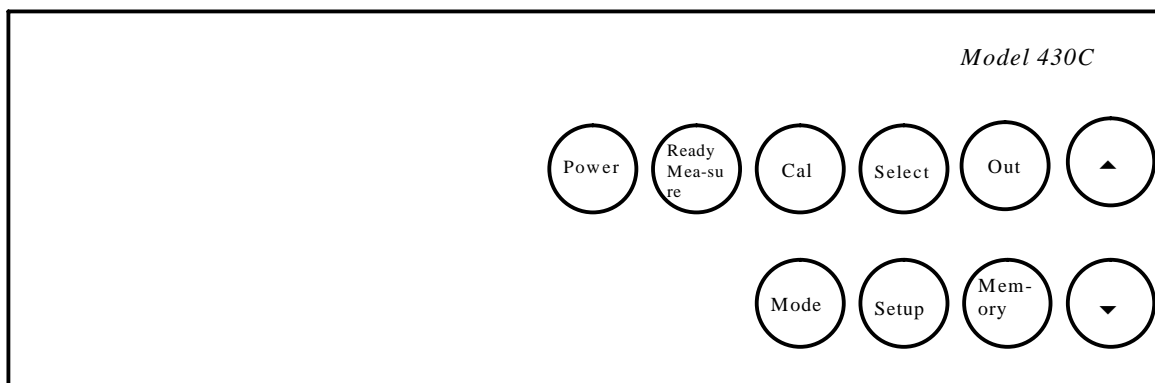
When the recorder is used, connect the recorder to the meter. Output voltage is -1999.9 ~ +1999.9 mV with impedance of 600  $\Omega$ .

### Printer and RS232C interface cable Connection

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

## Chapter III. General Functions

### Key Function

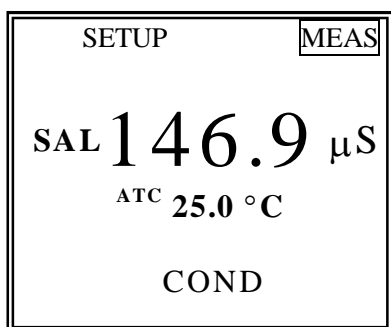


<b>Key Name</b>	<b>Description</b>
Power	used to turn ON/OFF.
Mode	used to change operating modes, such as conductivity or salinity.
Ready/measure	used to change condition of meter, i.e. measure or ready. This is used for changing from ready to measure condition or reversing.
Cal	used to start or set calibration.
Setup	used to access the setup menu. This is used for setting instrument parameters. Can set Date/Time, Temperature Coefficient, Cell Constant, Standard Solution, Temperature Compensation.
Select	used to move position of cursor. used to measure conductivity without temperature compensation.
Enter	used to set a selected data.
Memory	used to store data in meter's memory while measuring. In the ready condition, used to search the memorized data.
Out	used to print data. used to exit in Setup mode.
up(▲)	In setup and Data(Memory) mode, press to increase value.
down(▼)	In setup and Data(Memory) mode, press to decrease value.

## Display Description

The following display is specially specified.

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



Display	Function
COND	indicates conductivity with range of 0 ~ 199,999 $\mu\text{S}/\text{cm}$ .
SAL	indicates salinity presents in solution(unit ppt).
ATC( $^{\circ}\text{C}$ )	displays when a temperature probe is attached, and indicates automatic temperature compensation. Temperature is automatically compensated on the base of Tref adjusted in Setup. Tref can be set with 25.0 $^{\circ}\text{C}$ or 20.0 $^{\circ}\text{C}$ for a basis.
MEAS	indicates that meter is in measurement mode. If this is not shown, indicates ready mode.
25.0	indicates that compensation of temperature is performed at 25.0 $^{\circ}\text{C}$ .
20.0	indicates that compensation of temperature is performed at 20.0 $^{\circ}\text{C}$ .
Data	When storing data, displays in Memory(Data) mode.
SETUP	indicates that meter is in setup mode.

## **Electrode 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)**

Gleaze, 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 IV. Setup Functions

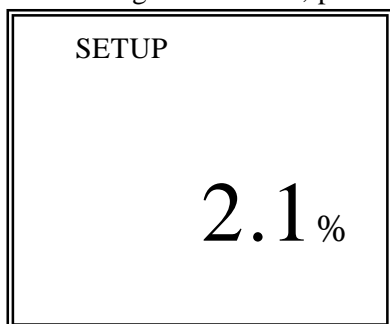
The setup menu is used to identify and change instrument parameters.

### Clear data(memory)

If clearing all the stored data, press **Mode** key to enter salinity mode and then press **Select** key to clear. Therefore, all data which set at setup, is changed to a basic value.

### Temperature Coefficient

After setting Date/Time, press **Setup** key, and then the display is shown as follows.



The conductivity of solution with a specific electrolyte concentration will change in accordance with the change of temperature. Each conductive ion has a different temperature coefficient.

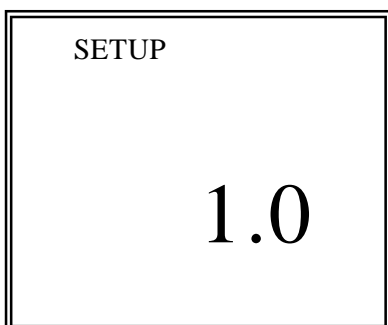
All *istek's* meters allow adjusting coefficient for the advanced performance.

Press ▲ or ▼ key until the desired value is displayed.

The following table is a typical temperature coefficients(percentage of change of conductivity per).

<b>Solution</b>	<b>%/°C °C</b>
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

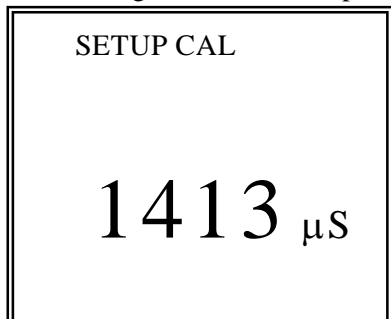
## Cell Constant



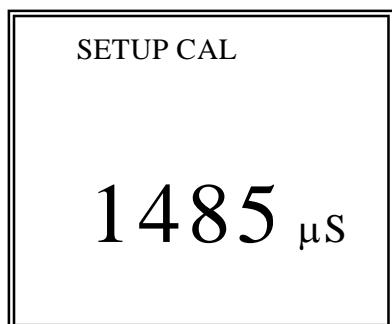
For conductivity measurement of a solution, can accurately measure by adjusting cell constant. Cell constants consist of 0.01, 0.1, 1.0, 10 and 100, and set by using ▲ or ▼ key.

## Standard Solution

After setting cell constant, press **Setup** key, and then the display is shown as follows.



If pressing **Select** key, conductivity of standard solution(146.9μS, 1413μS, 6.67mS, 12.9mS, 111.9mS) is displayed in turn.



If using standard solution that not showing on screen, adjust conductivity by using ▲ or ▼ key.

The following table is shown correlation conductivity with concentration of KCl solution.

KCl solution(M)	Conductivity
0.001	146.9 μS/cm
0.01	1413.0 μS/cm
0.05	6.67 mS/cm

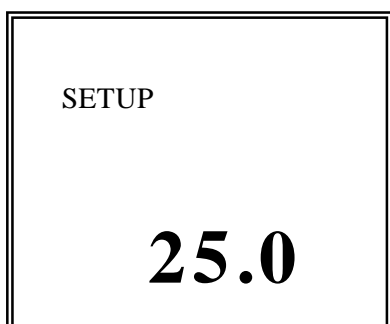
0.1	12.89 mS/cm
1	111.9 mS/cm

## Chapter IV Setup Functions

### *Conductivity/Salinity/TEMP Meter*

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### Compensation Temperature

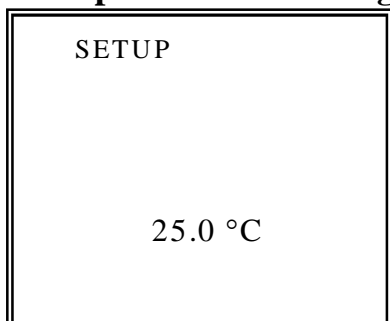


After setting standard solution, press **Setup** key.

Press ▲ or ▼ key to change 25.0 or 20.0.

The conductivity of a solution exhibits at 25.0°C or 20.0°C.

### Temperature Setting



If temperature on display differs from a real temperature, set a real temperature.

After setting Temperature Compensation, press **Setup** key and set temperature by using ▲ or ▼ key.

If finishing setup, press **Setup** or **Out** key to return to conductivity initial display.

## Chapter V. Calibration and Measurement

The basic condition is as follows.

- i Cell Constant (Cell) : 1.0
- i Compensation Temperature (Tref) : 25.0
- i Temperature Coefficient(TC) : 2.10 %/°C
- i Data-Log : memory

### (1) Preparation

Connect meter with cell and ATC jack.

Prepare a required buffer for measurement and magnetic stirrer.

Clearly rinse cell with the distilled water and blot dry.

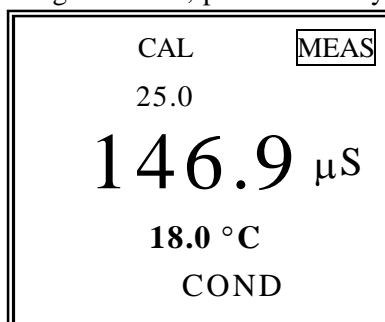
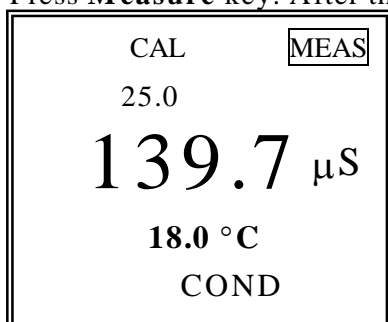
### (2) Calibration and Measurement

#### -Conductivity Mode-

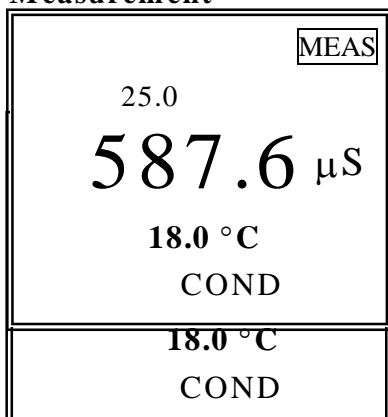
##### Calibration

Put cell into standard solution and press **Cal** key.

Press **Measure** key. After the reading is stable, press **Cal** key.



##### Measurement



Clearly rinse electrode and put into sample, and press **Measure** key.

If the reading is stable, record or store it. Refer to Data-Log.

*In the calibration, TC(i.e. Temperature Compensation Coefficient) is automatically selected by standard solutions and measuring temperature. KCl solution have*

a lower temperature coefficient (app. 1.9%/°C) of conductivity than typical potable water. Sodium chloride (NaCl) has a temperature coefficient (2.12%/°C) that closely approximates that found in most waters from wells and surface sources.

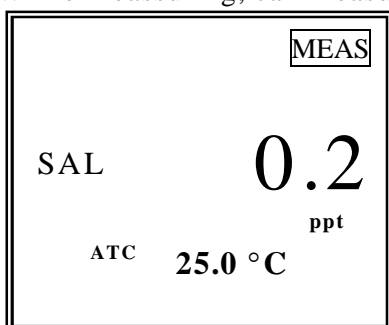
If measuring conductivity without compensation of temperature, press **Select** key to measure conductivity at measuring temperature without compensation of temperature.

#### Chapter IV Setup Functions

##### Conductivity/Salinity/Temp Meter

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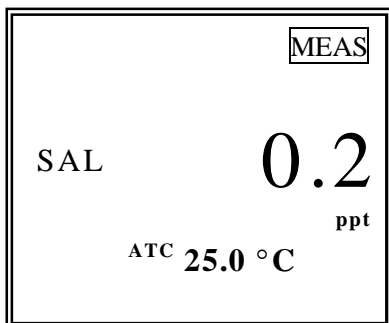
While measuring, can measure salinity by pressing **Mode** key.



#### - Salinity Mode ?

Press **Mode** key to change salinity mode.

Press **Measure** key to measure salinity of solution.

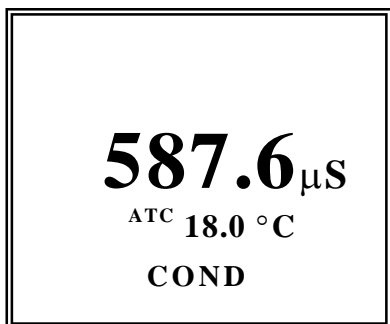


While measuring conductivity, can measure salinity by pressing **Mode** key

## Chapter VI. Data -Log

Model 430C can transmit information to printer or computer via RS232 interface.

### Memory Data-Log

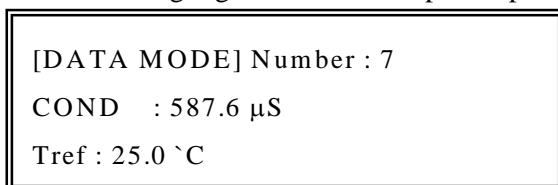


The measured data is stored by pressing **Memory** key manually.

Up to 50 points is stored in memory at once.

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 **▲** or **▼** key, press **Memory** key to exit or press **Out** key to print data.

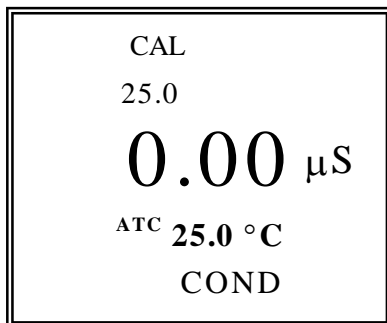
The following figure is an example to print.



## Chapter VII. Remote Control

The meter can be remotely controlled by PC.

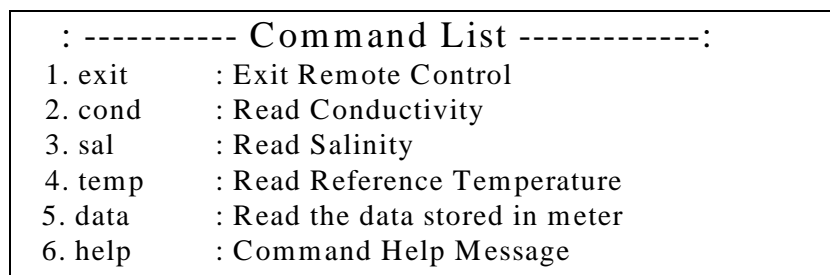
After connecting your meter to PC by communication cable and performing communication program of computer, if pressing **Enter** key of keyboard, remotely controlled and key button of meter doesn't work.



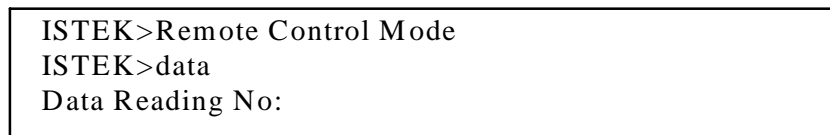
If inputting ;help; while performing communication program, the remote control commands are displayed on the monitor of computer.

ISTEK>help

The following messages are the remote control commands.



The following figure is an example of the remote control using communication program.



In case of reading the data stored in meter if inputting data, message "Data Reading No : " is displayed and if inputting Data Number the data stored in meter is displayed as follows. This is also used by storing in "screen capture" or recording.

[DATA MODE] Number : 7
conductivity : 587.6 $\mu$ S
ATC : 25.0 'C

The following message is to read a measuring conductivity.

ISTEK>cond <input type="button" value="↓"/>
conductivity : 587.6 $\mu$ S

## Chapter VIII. Troubleshooting & Error Description

Symptom	Possible cause	Remedy
No display	No power to meter	Press Power key.  Check that battery is inserted correctly and polarity signs match.
Erratic reading	Faulty connection between meter and sensor	Tighten connection
	Broken cable	Replace cable
	Air trapped in conductivity Cell	Agitate cell up and down to expel trapped air
	Change of water temperature	Measure in situ
	Broken conductivity cell	Replace cell
When calibrating, for standard solution conductivity is very	Standards may be old or contaminated	Use fresh standards



	Electrodes dirty	Clean with a detergent solution. Refer to 3. General Functions
	Temperature compensation incorrect	Check temperature.
	Cell constant incorrect	Replace cell

If the cause can't know, clear memory(data) to eliminate all data.  
Refer to Clear Memory(data) of Setup Functions.

If the problem persists, please contact **istek Product Service Department**.

Chapter VIII Troubleshooting & Error Description  
*Conductivity/Salinity/Temp Meter*

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## Chapter IX. Specifications

<b><i>Model</i></b>	<b><i>430C</i></b>
<b><i>Conductivity</i></b>	
<i>Range</i>	<i>0 to 199,999 <math>\mu</math>S/cm</i>
<i>Resolution</i>	<i>0.01/0.1</i>
<i>Relative Accuracy</i>	<i><math>\pm 0.5\%</math></i>
<b><i>Salinity</i></b>	
<i>Range</i>	<i>0.0 to 70.0 ppt</i>
<i>Resolution</i>	<i>0.1</i>
<i>Relative Accuracy</i>	<i><math>\pm 0.1</math></i>
<b><i>Temperature</i></b>	
<i>Range</i>	<i>-10<math>^{\circ}</math>C to 110<math>^{\circ}</math>C</i>
<i>Resolution</i>	<i>0.1<math>^{\circ}</math>C</i>
<i>Relative Accuracy</i>	<i><math>\pm 0.4<math>^{\circ}</math>C</math></i>
<i>Temperature Compensation</i>	<i>Auto</i>
<i>Data-Log</i>	<i>50 points</i>
<i>Print Capability</i>	<i>Yes</i>
<i>Display</i>	<i>Custom LCD</i>
<i>Inputs</i>	<i>BNC, ATC, Power, RS232C</i>
<i>Outputs</i>	<i>Recorder, RS-232C(Computer/Printer)</i>
<i>Power</i>	<i>AC/DC Adaptor</i>

## **Chapter X. 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)
- \* AC/DC Adaptor
- \* Conductivity Standard Solutions(1413  $\mu\text{S}/\text{cm}$ )
- \* Instruction Manual

### **B. Option**

- \* Luxury Third-Arm Stand
- \* Conductivity Standard Solutions
- \* RS232C Interface Cable

## Chapter X Ordering Information