

**Desktop
pH/ISE/mV/Temp Meter
Model 730P
Instruction Manual**

istek, Inc.

TABLE OF CONTENTS

Chapter I	Introduction	2
Chapter II	Instrument Setup	3
Chapter III	General Functions	
	Key Function	4
	Display Description	5
	Electrode Structure	6
	Electrode Storage and Maintenance	6
Chapter IV	Setup Functions	7
	Clear data(Memory)	7
Chapter V	Calibration and Measurement	8~13
	pH Calibration and Measurement	8~10
	Ion Calibration and Measurement	11~12
	Slope Feature and Functions	13
	Millivolt / Relative Millivolt Measurement	13
Chapter VI	Data-Log	14
Chapter VII	Remote Control	15~16
Chapter VIII	Troubleshooting and Error Description	17
Chapter IX	Specifications	18
Chapter X	Ordering Information	19

Chapter I. Introduction

istek's Desktop pH/ISE/mV/ORP/TEMP Meter(model 730P) is operated by AC/DC Adaptor(DC 9V) and is controlled by microprocessor for all measurement needs.

istek's Desktop pH/ISE/mV/ORP/TEMP Meter(model 730P) features a custom LCD that simultaneously displays various functions along with measurement results. *istek's* instrument is high-performance for accurate measurement of wastewater and use at laboratory and its operation is simply designed in the position of user.

The model 730P is a pH meter which features auto calibration (3 points) and manual calibration (3 points).

If pH reading is stable, S(Stable) is displayed in the left field, therefore measure accurately since user can easily know a stable value.

The model 730P is capable of storing up to 50 points in memory at once. Refer to Data-Log.

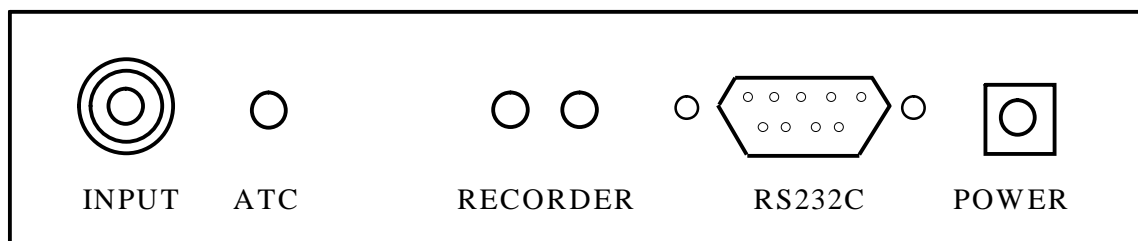
The model 730P can be remotely controlled via RS232C interface. Refer to Remote Control.

This model displays pH, ISE, mV, ORP(relative millivolt) and ATC($^{\circ}\text{C}$).

pH	indicates power of hydrogen(H^+) (unit pH) $\text{pH} = -\log_{10}[\text{H}^+]$
ISE	indicates concentration of any given ion(unit mg/L). To measure an ion must use electrode which according to the type of ion, selectively response to only any given ion.
mV	indicates electromotive force of each ion (unit mV)
ORP	indicates a relative potential (unit mV)
ATC	For automatic temperature compensation, a temperature probe supplied by <i>istek</i> must be used. Temperature Compensation is automatically performed while measuring.

Chapter II. Instrument Setup

Rear Panel



Power Source

Connect the supplied adaptor to the meter.

istek supply AC/DC Adaptor(DC 9V) adjusting 220V.

pH or Ion Selective 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

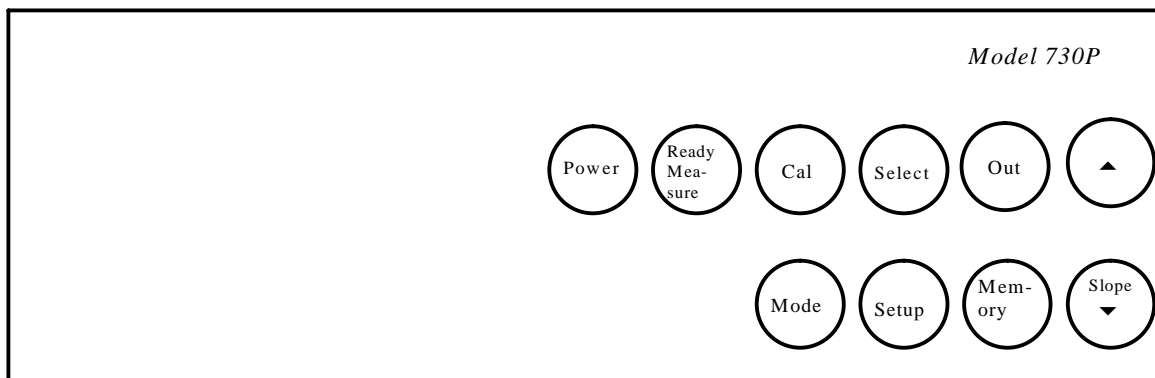
When the recorder is used, connect the recorder to the meter. Out voltage is $\pm 1999.9 \sim +1999.9$ mV with impedance of 600Ω .

Printer and Communication Cable Connection

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

Chapter III. General Functions

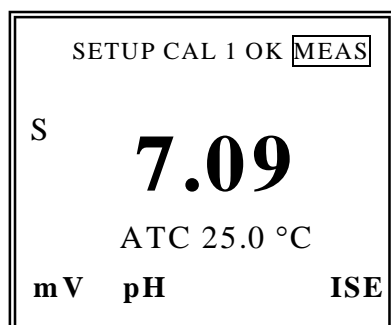
Keypad Functions



Key	Functions
Power	used to turn ON/OFF.
Mode	used to change operating modes, such as pH or mV.
Cal	used to start and set calibration. In addition, exit in the middle of calibration.
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.
Setup	used to access the setup menu. This is used for setting instrument operating parameter for example, Temperature in pH Setup.
Select	used to move position of cursor.
Memory	used to store data in meter memory while measuring. In the ready condition, used to search to the memorized data.
Out	used to print display data, or in setup mode used to exit.
Slope	displays slope after pH calibration.
Up(▲)	In setup, calibration and Data(Memory) mode, press to increase value.
Down(▼)	In setup, calibration and Data(Memory) mode, press to decrease value.

Display Description

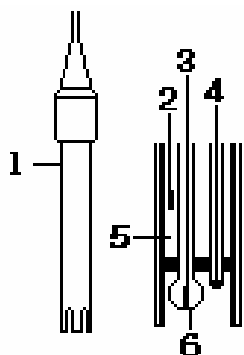
The following display is specially specified.
Even some messages are not shown in the below display, describe together below.



Display	Function
pH	indicates pH mode. displays power of hydrogen with range of ?2.000 to 19.999 pH.
ISE	indicates ISE mode.
mV	indicates electromotive force.
ATC	displayed when a temperature probe is attached, and indicates automatic temperature compensation.
MEAS	indicates that meter is in measurement condition. If this is not shown, indicates ready condition.
SETUP	indicates that meter is in setup mode.
CAL	indicates that meter is in calibration condition. used to calibration.
CAL 1 OK	indicates whenever finish calibration corresponding to number.
S	indicates slope value. If pH reading is stable, displays in the left field.
DATA 01	indicates number of data stored in meter.
Err(Error)	displayed when it is not available to correctly measure because something is wrong in the meter or buffer while calibrating or measuring.

Electrode Structure

General pH Combination Electrode



1. Reference Filling Hole ; hole filling electrode with the filling solution
2. Ag/AgCl or calomel electrode ; Reference Electrode
3. pH mono electrode ; indicator electrode
4. Temperature sensor
5. Reference Filling Solution ; Saturated KCl Solution
6. Glass Membrane ; membrane selectively responding hydrogen ion

Electrode Storage and Maintenance

Electrode Storage

Electrodes are stored in the cap 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. Electrodes are sometimes stored in distilled water, but this method causes electrode life to decrease.

Electrode Maintenance (Electrode Cleaning)

If it takes long time to response or a stable data isn't obtained, can often be 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 diluted KCl solution to about 60 ~ 80 °C. The electrode must be stored in this solution for approx. ten minutes, then cool electrode in not heated KCl solution.
- Protein removal
Protein coatings can be removed by soaking glass electrodes in a 10% pepsin solution adjusted to pH 1 to 2.

In case of Ion Selective Electrode, refer to ISE manual

Chapter IV. Setup Functions

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

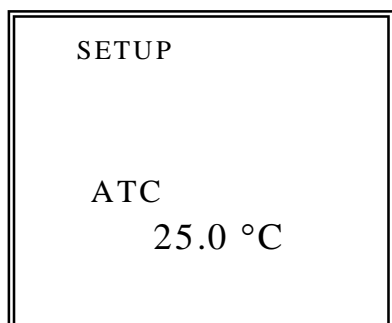
- **Clear Memory(data)**

If clearing all the stored data, press **Mode** key to enter mV mode and then press **Select** key to clear.

1. pH mode

- **Clear Memory(data)**

If clearing all the stored data, press **Mode** key to enter mV mode and then press **Select** key to clear.



Temperature Setting

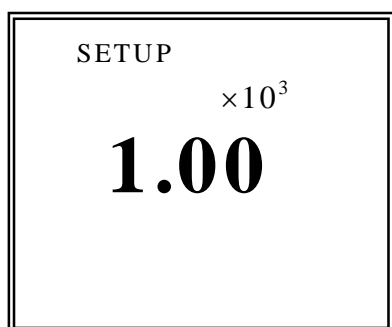
If temperature on display differs from a real temperature, set a real temperature.

After setting Date/Time, press **Setup** key and set temperature by using **▲** or **▼** key.

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

2. ISE mode

In pH ready condition press **Mode** key to enter ISE mode. In ISE ready condition if pressing **Setup** key, the display is shown as follows.



If pressing **Select** key, concentration of buffer (1.00×10^{-2} , 1.00×10^0 , 1.00×10^1 , 1.00×10^2 , 1.00×10^3) is played in turn and then set buffer by using **Memory** key. It is available to set buffer up to 5 points. Please note that it is not available to set just only 1 point.

If finishing setup press **Out** key exit setup mode.

Chapter V. Calibration and Measurement

pH Calibration and Measurement

Perform calibration every two hours to compensation for electrode drift. There are two ways of calibrations; auto calibration or manual calibration.

Two or more than buffer calibration should be performed before pH is measured. Please note that it is not available to calibrate just only 1 point. If try to exit after calibrating only 1 point, error message (iErri) is displayed. In this case press **Reset** key or continue calibration.

(1) Preparation

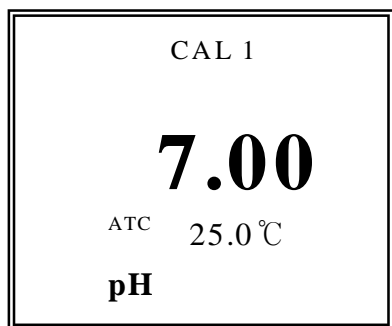
Connect meter with electrode and ATC.

Prepare calibration buffer and magnetic stirrer.

(2) Calibration

Auto calibration

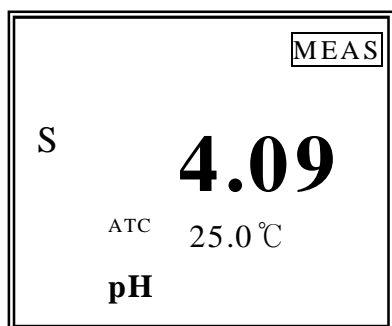
1) Calibration of CAL1(Buffer 1)



In the pH ready condition, press **Cal** key and then the displays is shown as follows.

Put electrode into the first buffer.

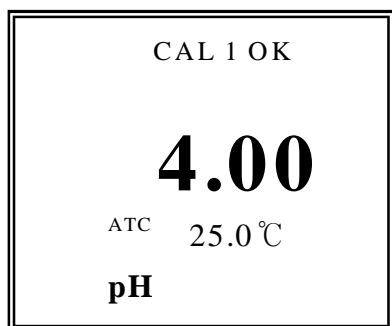
With constant, but not violent, stirring for accurate measurement, press **Measure** key.



MEAS is displayed above the main field.

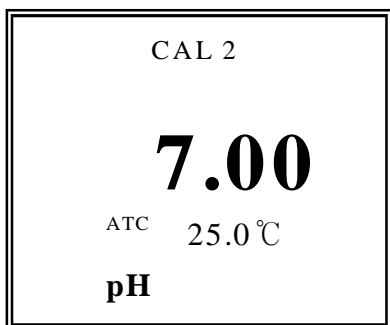
If pH reading is stable, iSi appears in the left field.

Press **Cal** key therefore automatically set and then iCAL 1 OKi message is displayed in the upper field.



The left figure indicates the end of CAL1 calibration. Then iCAL 2i message is displayed in the upper field.

2) Calibration of CAL2.to CAL3 (Buffer2 to Buffer3)



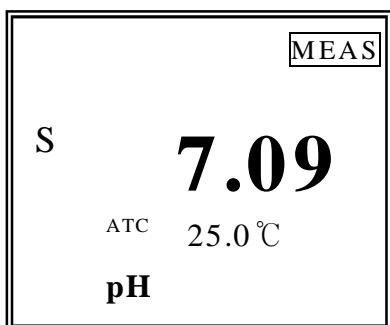
Clearly rinse electrode and put into the second buffer. The calibration method of CAL2 ~ CAL3 is the same as done in CAL1.

It is available to calibrate buffer up to 3 points, if calibrating up to 3 points change into the initial display.

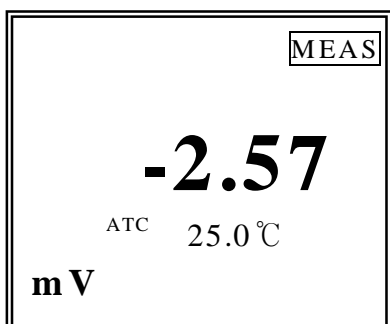
If pressing **Cal** key after calibrating 2 points, change to the initial display.

Put electrode into sample, and press **Measure** key.

If pH reading is stable, ;S_i appears in the left field.



While measuring, can also know millivolt by pressing **Mode** key.

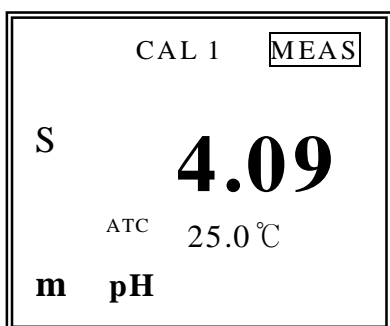


The measured data is stored by pressing **Memory** key manually. Refer to Data-Log of Chapter VI.

Manual Calibration

To calibrate with buffers other than 4.00, 7.00 or 10.00, use the manual calibration.

1) Calibration of CAL1(Buffer 1)



In the pH ready condition, press **Cal** key.

Put electrode into the first buffer.

With constant, but not violent, stirring for accurate measurement, press **Measure** key.

If pH reading is stable, ;S_i appears in the left field.

Adjust value to the measuring buffer by pressing the

▲ or ▼ key and then ;m_i to indicate manual

calibration appears in the lower field and ;S_i is

disappeared.

Press the **Cal** key to set pH value, and then ;CAL 1 OK; message is displayed in the upper field and ;CAL 2; message is displayed in the upper field.

2) Calibration CAL2 to CAL3 (Buffer 2 to Buffer3)

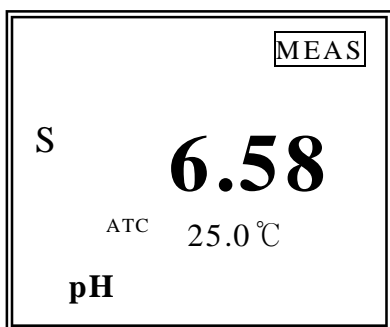
Clearly rinse electrode and put into the second buffer. The calibration method of CAL2~CAL3 is the same as done in CAL1.

It is available to calibrate buffer up to 3 points, if calibrating up to 5 points, change into the initial display automatically.

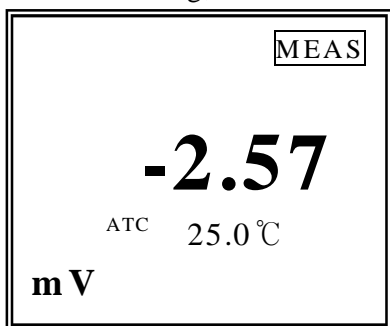
If pressing **Cal** key after calibrating 2 points, change to the initial display.

Put electrode into sample, and press **Measure** key.

If pH reading is stable, ;S; appears in the left field.



While measuring, can also know millivolt by pressing **Mode** key.



The measured data is stored by pressing **Memory** key manually. Refer to Data-Log of Chapter VI.

ISE Calibration and Measurement

Please note that it is not available to calibrate just only 1 point. If try exit after calibrating only 1 point, error message(Err) is displayed. In this case press **Reset** key or continue calibration.

(1) Preparation

Connect meter with electrode and ATC.

Prepare a required solution for measurement and magnetic stirrer.

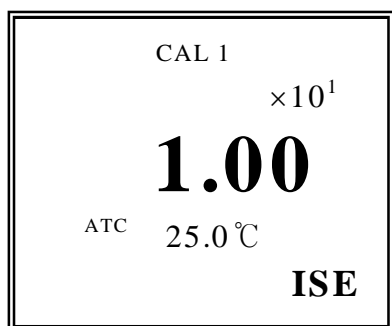
Set buffer(standard) solution in Setup. Refer to Setup.

Calibration should be done in order from the lower concentrated solution to the more concentrated solution.

(2) Calibration and Measurement

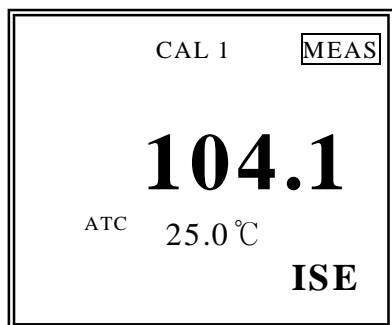
1) Calibration of CAL1 (Buffer 1)

In ISE ready condition, press **Cal** key and then the set buffer in Setup is shown as follows.



After rinsing electrode with distilled water and put electrode into the first buffer.

With constant, but not violent, stirring for accurate measurement, press **Measure** key.

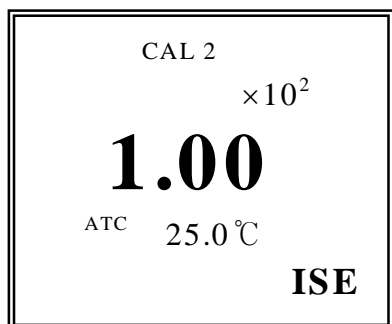


Millivolts corresponding to concentration of ion are displayed.

If mV reading is stable, press **Cal** key.

The left figure indicates the end of CAL1 calibration.

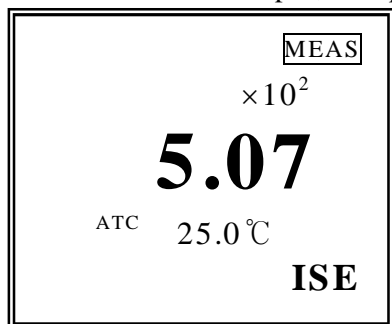
2) Calibration of CAL2 to CAL5 (Buffer 2 to Buffer 5)



Clearly rinse electrode and put into the second buffer. The calibration method of CAL2~CAL5 is the same as done in CAL1. If finishing calibration, is changed into the initial display automatically.

If pressing **Cal** key after calibrating 2 points, change to the initial display.

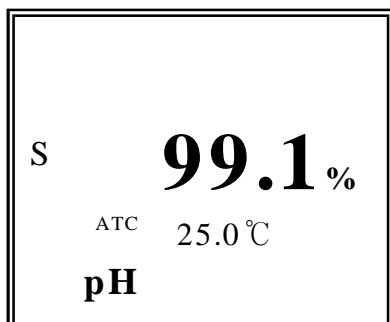
Put electrode into sample, and press **Measure** key.



The measured data is stored by pressing **Memory** key manually. Refer to Data-Log of Chapter VI.

Slope Feature & Functions

Press **Slope** key to confirm electrode slope after pH or Ion calibration.



The slope displays in the main field and then disappeared. The left figure indicates pH slope.

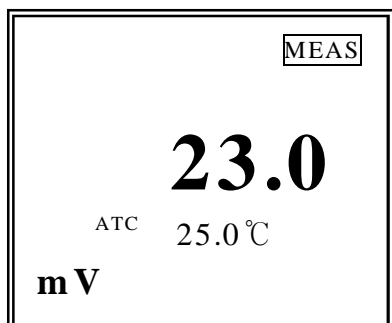
For the correct operation, the range of slope must be within 80 ~ 120%. If the slope is not within this range, prefer newly calibrating in order to prevent the higher error.

It also makes to estimate time of exchange of electrode since can know error through slope.

Millivolt / Relative Millivolt Measurement

Meter can measure absolute or relative millivolt. The millivolt modes are useful when performing potentiometric titration or preparing calibration curves.

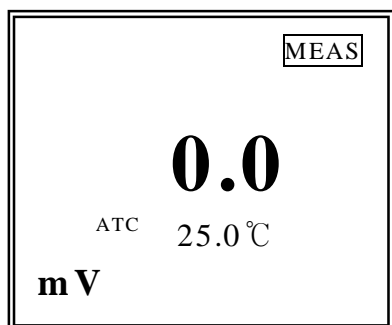
1. Millivolt



Millivolt is displayed to 0.1mV resolution in the range of -1999.9 to +1999.9 mV. Access the millivolt mode by pressing **Mode** key and then **Measure** key.

In addition, while measuring pH, can also know millivolt by pressing **Mode** key.

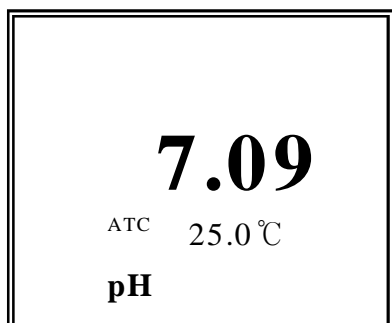
2. Relative Millivolt



Relative millivolt is displayed to 0.1mV resolution in the range of -1999.9 to +1999.9 mV. 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.

Chapter VI. Data-Log

Memory Data-Log

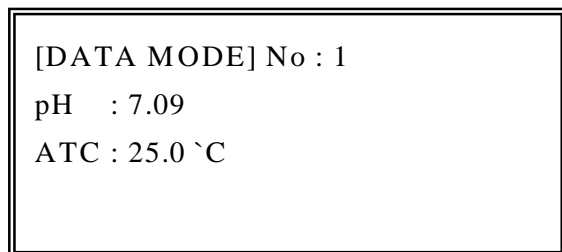


The measured data is stored by pressing **Memory** key manually.

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 **Select** key, press **Out** key to print data.

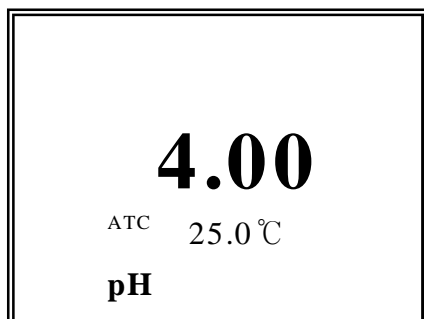
The following figure is an example to print.



Chapter VII. Remote Control

The meter can be remotely controlled by PC.

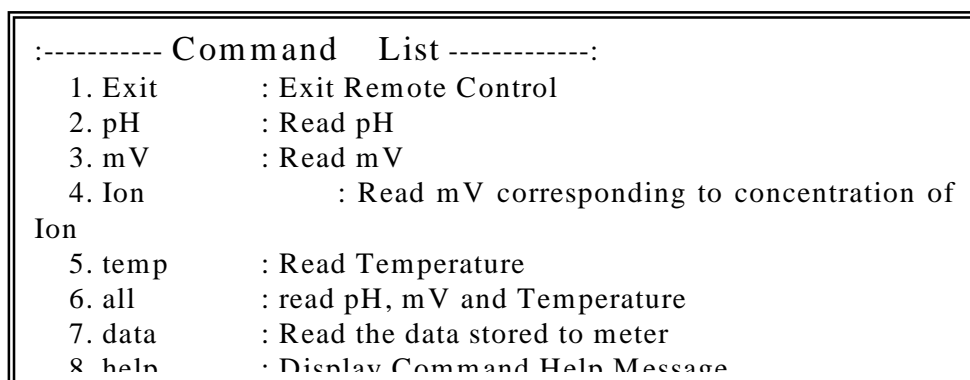
After connecting your meter to PC by RS232C interface cable and performing communication program of PC, if pressing **Enter** key of keyboard, remotely controlled and keypad button of meter doesn't work.



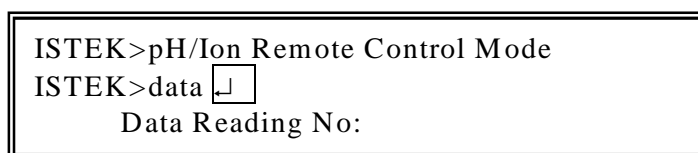
If inputting ;help; while performing communication program, the remote control commands are displayed on the monitor of PC.

Istek>help

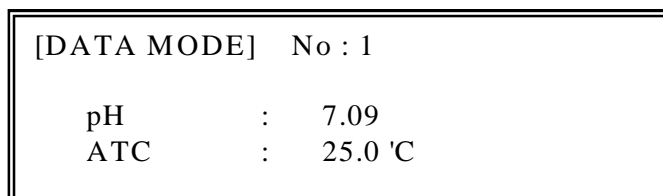
The following messages are the remote control commands.



The following figure is an example of the remote control using communication program and described on the base of the display.



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 ;display capture; or recording.



The following message is to read a measuring pH.

```
ISTEK>pH ↵  
7.09
```

The following message is to read three data.

```
ISTEK>all ↵  
pH : 7.09  
mV : -0.5  
ATC : 25.0 °C
```

Chapter VIII. Troubleshooting & Error Description

MALFUNCTION	POSSIBLE CAUSE	REMEDY
No display	No power to meter	Press Power key. Check that the line converter is correctly plugged.
Error occurred in Cal mode ? Reading Out of Range	Electrode failure Out of Range for Buffer When trying to exit after calibrating only 1 point, error message (Err) appears.	Check that meter is correctly connected with electrode and ATC. Press Reset key or continue calibration.
Error occurred in measure mode	Out of measuring Range of pH	Check that meter is correctly connected with electrode and ATC. Check Calibration Slope

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

When using Ion Selective Electrode, refer to ISE manual

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

Chapter IX. Specifications

The details refer to catalog or contact *istek*.

Model	730P
pH	
Range	-2.000 to 19.999
Resolution	0.001/0.01/0.1
Relative Accuracy	±0.002
Auto-Buffer-Recognition	4.00, 7.00, 10.00
Concentration	
Range	0.00001 to 99999 mg/L
Resolution	± one least significant
Relative Accuracy	± 0.25 % of reading
Millivolts	
Range	±1999.9 mV
Resolution	0.1 mV
Relative Accuracy	±0.1 mV
Relative Millivolts	
Range	±1999.9 mV
Resolution	0.1 mV
Relative Accuracy	±0.1 mV
Temperature	
Range	-10 °C to 110 °C
Resolution	0.1 °C
Relative Accuracy	± 0.4 °C
pH/ISE Slope	80 % to 120 %
Temperature Compensation	Auto
pH Calibration	Auto(3 points)/Manual(3 points)
Data-Log	50 points
Print Capability	Yes
Display	Custom LCD
Inputs	One BNC, ATC, Power, RS232C
Outputs	Recorder, RS-232C(Computer/Printer)
Power	AC/DC Adaptor

Chapter X. Ordering Information

Other items contact *istek*.

For further information, please feel free to contact *istek* at any time.

A. Standard

- * Combination pH Electrode/ATC Probe
- * AC/DC Adaptor
- * Buffer Solutions (pH4.00, 7.00, 10.00) 125ml
- * Instruction Manual

B. Option

- * Luxury Third-Arm Stand
- * pH Electrode Storage Solution
- * pH Electrode Filling Solution
- * Buffer Solutions (pH4.00, 7.00, 10.00) 475ml
- * RS232C Interface Cable