

***NeoMet***

***Portable pH/mV/ORP /Temp Meter***

***Model 77P***

***Instruction Manual***

***istek, Inc.***



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## Chapter I. Introduction

This meter is operated by battery (DC 9V) and is controlled by microprocessor for all measurement needs.

This meter 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.

This model is capable of storing up to 50 points in memory at once for each items.

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

This model is a pH meter which features auto calibration and manual calibration simultaneously (3 points).

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

pH indicates power of hydrogen( $\text{H}^+$ ). (Unit pH)  
$$\text{pH} = -\log_{10}[\text{H}^+]$$

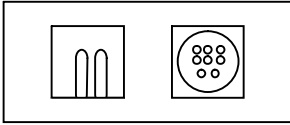
mV indicates electromotive force of each ion. (Unit mV)

ORP indicates a relative potential. (Unit mV)

ATC For automatic temperature compensation, a temperature probe supplied by *istek* must be used.  
Temperature Compensation is automatically performed while measuring.

## Chapter II. Instrument Setup

Top Panel



### **Electrode and ATC probe connection**

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

### **RS232C Interface Cable Connection**

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


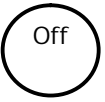
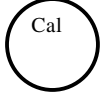

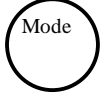

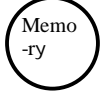
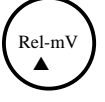
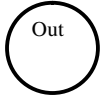

### **Power Source**

Use 9V DC Battery

If the message as ;BAT; is displayed, replace battery.

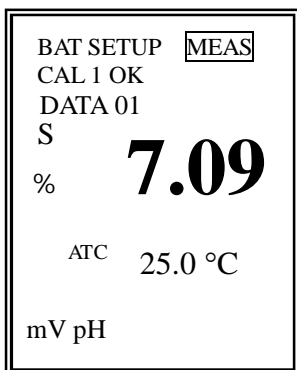
## Chapter III. General Functions

### Keypad Functions

Key	Functions
	Power
	used to turn ON/OFF.
	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.
	Mode
	used to change operating modes, such as pH or mV.
	Setup
	used to access the setup menu. This is used for setting instrument operating parameter for example, Temperature and Data logging in pH Setup.

Memory	used to store data in meter memory while measuring. In the ready condition, used to search to the memorized data.
Slope	indicates slope after pH calibration.
Out	used to exit in setup mode.
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

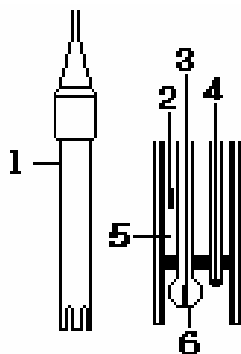


### Common Display

Display	Function
ATC	displays when a temperature probe is attached, and indicates automatic temperature compensation.
<b>MEAS</b>	indicates that meter is in measurement mode. 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 the end of calibration corresponding to number.
DATA 1	indicates number of data stored in meter.
Err(Error)	displays when it is not available to correctly measure because something is wrong in the meter or buffer while calibrating or measuring.
BAT	displays when the battery is low and needs to be replaced.
S	indicates slope value. If pH reading is stable, displays in the left field.
pH	When the pH mode is chosen, ; pH; is displayed below main field. displays power of hydrogen with range of ?2.000 to 19.999 pH.
mV	indicates mV mode. displays electromotive force.

## Electrode Structure and Storage

### 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

### pH 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.

### pH 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.

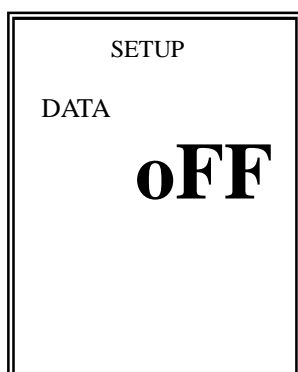
- Salt deposits  
Recover electrode by alternately immersing it three times each in 0.1N HCl and 0.1N NaOH for approx. five minutes. If this fails, immerse tip in KCl solution for 30s. After recovery, soak in pH 7.00 buffer overnight. Rinse and soak in pH 7.00 buffer. Rinse again with distilled water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

## Chapter IV. Setup Functions

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

### Data Log Setup

In pH ready condition if pressing **Setup** key to enter the setup, the display is shown as follows.



Set by using ▲ or ▼ key

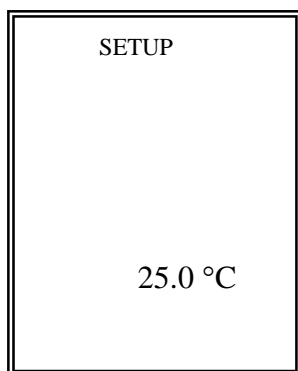
When this setup is set **on**, meter transmits data with time interval of one second.

This data can be taken by communication program or printer via RS232C interface cable.

When pH is 7.00 and temperature is 25.0°C, the following figure is an example to print.

pH 7.00 25.0

### Temperature Setup



If temperature on display differs from a real temperature, set a real temperature, press **Setup** key to enter **Data setup mode** and then press **Out** key.

Set temperature by using ▲ or ▼ key.

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

### Clear data (memory)

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



## 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 you try to exit after calibrating only 1 point, error message (¡Err¡) is displayed. In this case press **Power** key or continue calibration.

#### Preparation

Connect meter with electrode and ATC.

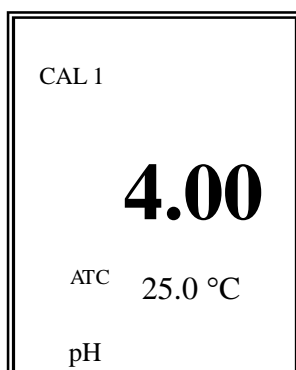
Prepare a calibration buffer and magnetic stirrer.

#### Calibration

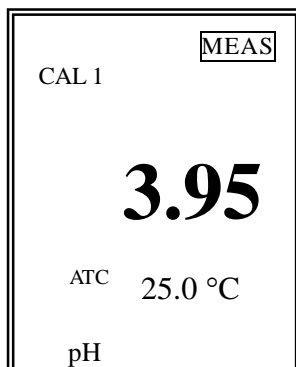
##### 1) Calibration of CAL1(Buffer 1)

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

Put electrode into the first buffer.



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

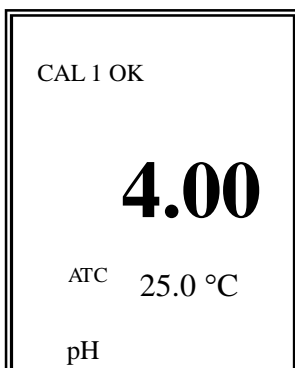


**MEAS** is displayed above the main field.

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

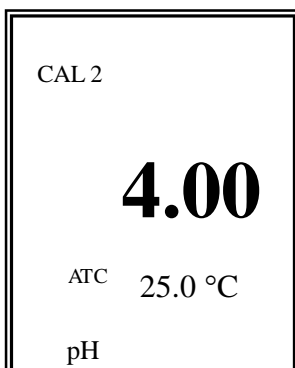
**IF CALIBRATING WITH BUFFERS OTHER THAN 4.00, 7.00 OR 10.00, ADJUST VALUE TO THE MEASURING BUFFER BY PRESSING THE ▲ OR ▼ KEY.**

Press **Cal** key therefore automatically set and then ¡CAL 1 OK¡ message is displayed in the upper field.

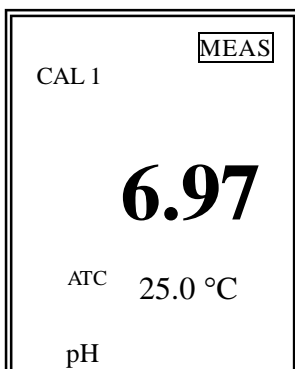


The left figure indicates the end of CAL1 calibration. And ;CAL 2; message is displayed in the upper field.

## 2) Calibration of CAL2 (Buffer2)



Clearly rinse electrode and put into the second buffer. With constant, but not violent, stirring for accurate measurement, press **Measure** key.

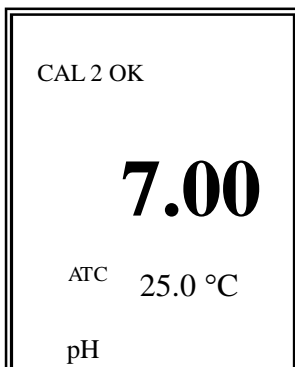


**MEAS** is displayed above the main field.

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

**IF CALIBRATING WITH BUFFERS OTHER THAN 4.00, 7.00 OR 10.00, ADJUST VALUE TO THE MEASURING BUFFER BY PRESSING THE ▲ OR ▼ KEY.**

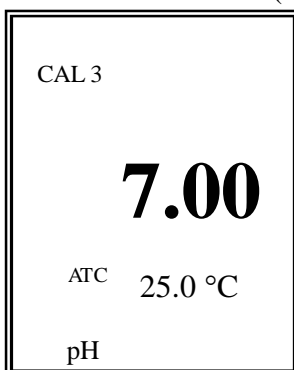
Press **Cal** key therefore automatically set and then ;CAL 2 OK; message is displayed in the upper field.



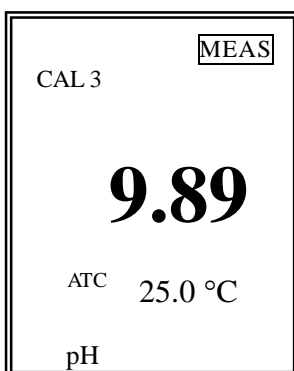
The left figure indicates the end of CAL1 calibration. And ;CAL 3; message is displayed in the upper field.

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

## 2) Calibration of CAL3 (Buffer3)



If you want to calibrate buffer up to 3 point, Clearly rinse electrode and put into the second buffer. With constant, but not violent, stirring for accurate measurement, press **Measure** key.

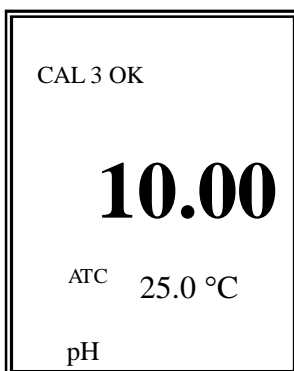


**MEAS** is displayed above the main field.

If pH reading is stable,  $\downarrow$  S  $\downarrow$  appears in the left field.

**IF CALIBRATING WITH BUFFERS OTHER THAN 4.00, 7.00 OR 10.00, ADJUST VALUE TO THE MEASURING BUFFER BY PRESSING THE  $\blacktriangle$  OR  $\blacktriangledown$  KEY.**

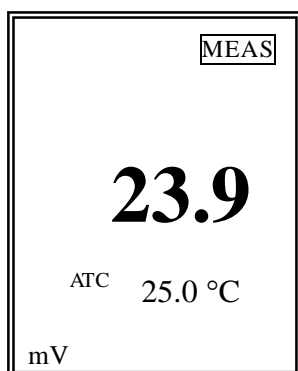
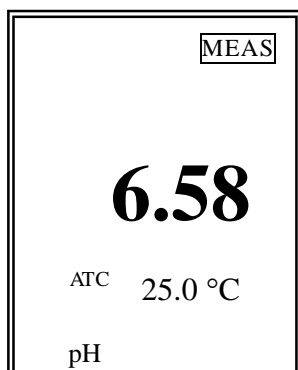
Press **Cal** key therefore automatically set and then  $\downarrow$  CAL 3 OK  $\downarrow$  message is displayed in the upper field.



The left figure indicates the end of CAL calibration.

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

Put electrode into sample, and press **Measure** key.  
If pH reading is stable,  $\downarrow S \downarrow$  appears in the left field.



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

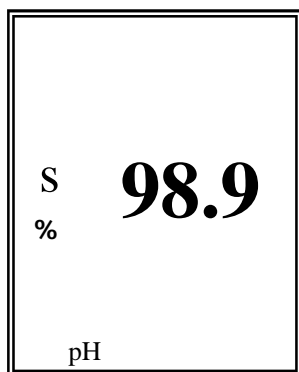
The measured data is stored by pressing **Memory** key manually. Refer to Data-Log of Chapter VI.

## Slope Feature & Functions

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

The slope displays in the main field and then disappeared.

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.

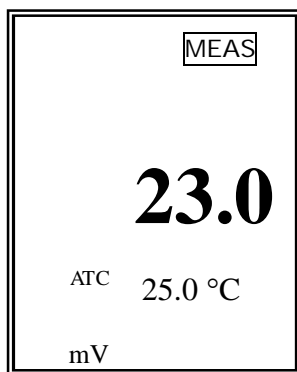


It also makes to estimate time of exchange of electrode since can know error through slope.

## Millivolt / Relative Millivolt Measurement

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

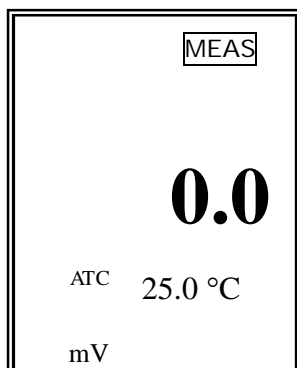
### Millivolt



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.

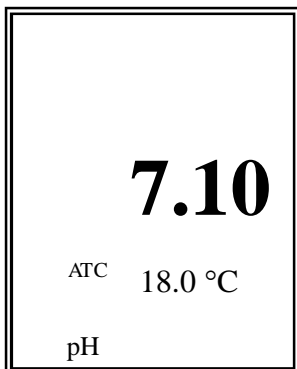
### Relative Millivolt



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*.

In ready or measure condition, enter Data(Memory) Mode by **Memory** key, search data stored in meter by using **▲** or **▼** key, and press **Memory** key to exit

## Chapter VII. Troubleshooting & Error Description

MALFUNCTION	POSSIBLE CAUSE	REMEDY
No display	No power to meter	Press Power key.  Check that battery is inserted correctly and polarity signs match.
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 probe.  Buffer used may be out of specification. Repeat calibration using a fresh buffer.  Press Power 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 probe.  Check Calibration Slope

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. Specifications

Model		79P
pH	Range Resolution Relative Accuracy	-2.00 to 19.99 0.01 ±0.02
Millivolt (ORP)	Range Resolution Relative Accuracy	±1999.9 mV 1mV ±0.1mV
Temperature	Range Resolution Relative Accuracy	-10 to 110 °C 0.1 °C ±0.4°C
Data Logging		50 Pints
Temperature Compensation		Auto
Calibration		Auto
Input		8 pin Din, RS232C
Output		RS232C(Computer/Printer)
Power		DC 9V Battery



## Chapter IX. 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
- \* Battery
- \* Buffer Solutions (pH4.00, 7.00, 10.00) 125ml
- \* Carrying Case
- \* Instruction Manual

### B. Option

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