



OPERATION MANUAL

pH Meter

MET21-06
MET21-06

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INSTRUCTION before using the instrument.

- The instrument must be sent to professions after being used for one year, and only those qualified ones can be used again.
- To check the expiration date of your electrode, the function of the electrode will be damaged if the electrode is out of date.
- To recharge the meter if it hasn't been used for a while.
- To make sure that you are using the required power adapter in case of any unnecessary damage to this meter and damage.
- Do not be connect the meter with the power adapter when the meter is not be used for a long time.

01. Installation

1.1 Unpack

The tools and accessories necessary for installation are shipped with the MET21-06 :

- 1) MET21-06 PH Meter
 - 2) Short circuit plug (Installed on the meter)
 - 3) Electrode Holder
 - 4) Electrode, for example: ATC probe
- PH electrode PH buffer

1.1The Meter

1.2.1The front view

The MET21-06 PH Meter is a state-of-the-art benchtop analytical instrument.

- PH
- ORP (with ORP probe)
- mV
- Temperature

1.2.2 The back view

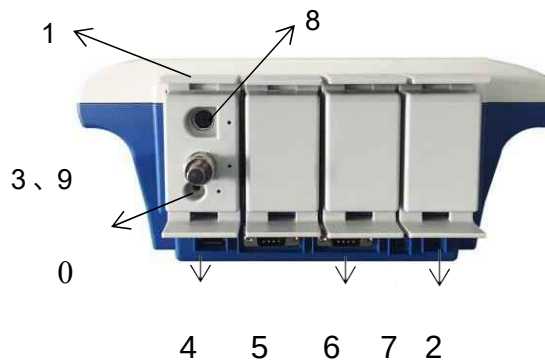


Figure 2

1. PX measurement unit
2. Power supply
3. Short circuit plug
4. USB1 socket
5. COM1 socket
6. COM2 socket
7. USB2 socket
8. ATC probe socket
9. Ion ISE probe socket (BNC)
10. Grounding

1.2 Installing the meter

Open the Meter shipping case. Remove the meter and other accessories.



1.3.1 Installing the electrode holder

Figure 3

1.3.2 Installing the PH electrode

Install pH electrode into Ion electrode socket and install ATC probe into ATC probe socket.

If you do not want to measure pH, pX and ion concentration, insert short circuit plug (shipped with the meter) into the pH/pX electrode socket to prevent damage to meter circuit.



1.3.3 Installing Power Adapter

Attention :

The universal power adapter included with your meter is the only power adapter

The meter provides lithium power charge. The external electrical power adapter is rated at 100 to 240 VAC, 2 A, 50/60Hz. Output : 24VDC, 3A. Connect the power adapter to the power input on the meter.

recommended for use with this mode.

1.3.4 Installing Printer Line

The meter supports serial printer(optical). If user needs to print measurement result, stored result,etc, set the number of serial and Baud rate after the meter is connected with the printer.

1.3.5 Daily Use of the Instrument

The socket of the meter must be kept clean and dry. Avoid contact of the socket with acid, alkaline and salt solution.

Do not take the Measurement unit out of the meter at will.



02. Operation

2.1 Introduction

Please make sure that you have read the operation and introduction chapter before using this meter.

Safety Information :

- Failing to use the original power adaptor may cause some safety problems.
- Keep the connectors of the meter clean and dry. Avoid contact with acid, alkaline and salt solutions.
- Keep good grounding.
- Prevent corrosive gas from intrusion.
- The meter can be used stably for a long time. After a measurement, soak all electrodes in distilled water. If the interval is more than 6 hours or for long-term storage, clean the electrode and store in empty protection bottle.
- The meter is an analytical instrument with high accuracy. To protect high resistance components from damage, install the short circuit plug onto the pH/pX electrode socket when the meter is not connected to a pH/pX electrode. (The short-circuit plug is installed on the pH/pX socket of the meter.) Keep the short-circuit plug clean and dry. The plug can be damaged by humidity. A damaged short-circuit plug can damage the meter.

2.1.1 Term definition

- pH Slope: The mV variation per unit of pH in mV/pH or percent theoretical slope.
- pH E0 : Also known as Zero potential and is the mV value at pH 7.
- One-point pH calibration: Calibration with one pH buffer.
- Multi-point pH calibration: Calibration with two or more pH buffers.

2.1.2 Features

The meter is a state-of-the-art bench top analytical instrument. It simultaneously measures provides the ability to make measurements:

- PH
- ORP(with ORP probe,optical)
- mV
- Temperature

Other features

- Adopts 7" TFT touch screen(up to 65K colour); UI design;
- Supports Good Laboratory Practices (GLP) and Navigation operation;
- Supports electrode ID management;
- Supports electrodes calibration and electrodes recording(up to 5pcs of electrodes for per measurement unit);
- Supports setting the guarantee period of electrodes and reminding out of the guarantee period function;
- Requires setting an operator number(up to 8 operators passport);
- Auto identify GB,DIN and NIST pH buffer(up to 6 point calibration);
- Can record, display and output calibration data displayed in curve. All saved data



meets GLP standards. The meter can store 1000 sets of pH data;

- The meter manages all measurement process with measuring method (up to 100 sets of measurement method). Supports view of measurement method, copy of measurement method, edit of measurement method, create of customer measurement method, etc.

- Supports displaying measurement method, measurement curve, measurement result;

- Can view, statistics, output and delete stored data.

- Supports U disk to view and save the results;

- Supports USB, RS232, serial printer; output measurement result and measurement curve;

- Supports three measuring modes: Continuous Mode, Timed Reading Mode and Auto-Lock Mode.

- Has power-off protection. When the meter is turned off or automatically shuts off, the stored measurement data, calibrated data, and settings remain.

- Provides LCD back lighting for use under dim lighting conditions.

2.1.3 Specifications

Measuring range

- pH: (0.000~14.000) pH unit: (-2.000~20.000) pH;
- mV : (-1999.99~1999.99) mV
- Temperature : (-5.0~130.0)°C

Resolution

- pH : 0.001pH
- mV : 0.01mV
- Temperature : 0.1°C

Accuracy

- pH : ±0.002pH
- mV : 0.03%FS
- Temperature : ±0.1°C

Normal operating conditions

- Ambient temperature : (5.0~35.0) °C ;
- Relative humidity : ≤80% ;
- No performance-affecting vibrations nearby
- No corrosive gases in ambient air
- No strong electromagnetic interference except the geomagnetic field

Power supply : Adaptor (input: 100-240VAC,1.35A; output: 24VDC,3A) Size, depth
×width×height(mm) : 280 mm×280 mm×130 mm.



Weight (kg) : approximately 2.5kg

2.1.4 Operation

The meter will highlight the selected button and grey the others. Click the highlighted button to accessing next function interface.

The character and digit keyboard are provided for users.

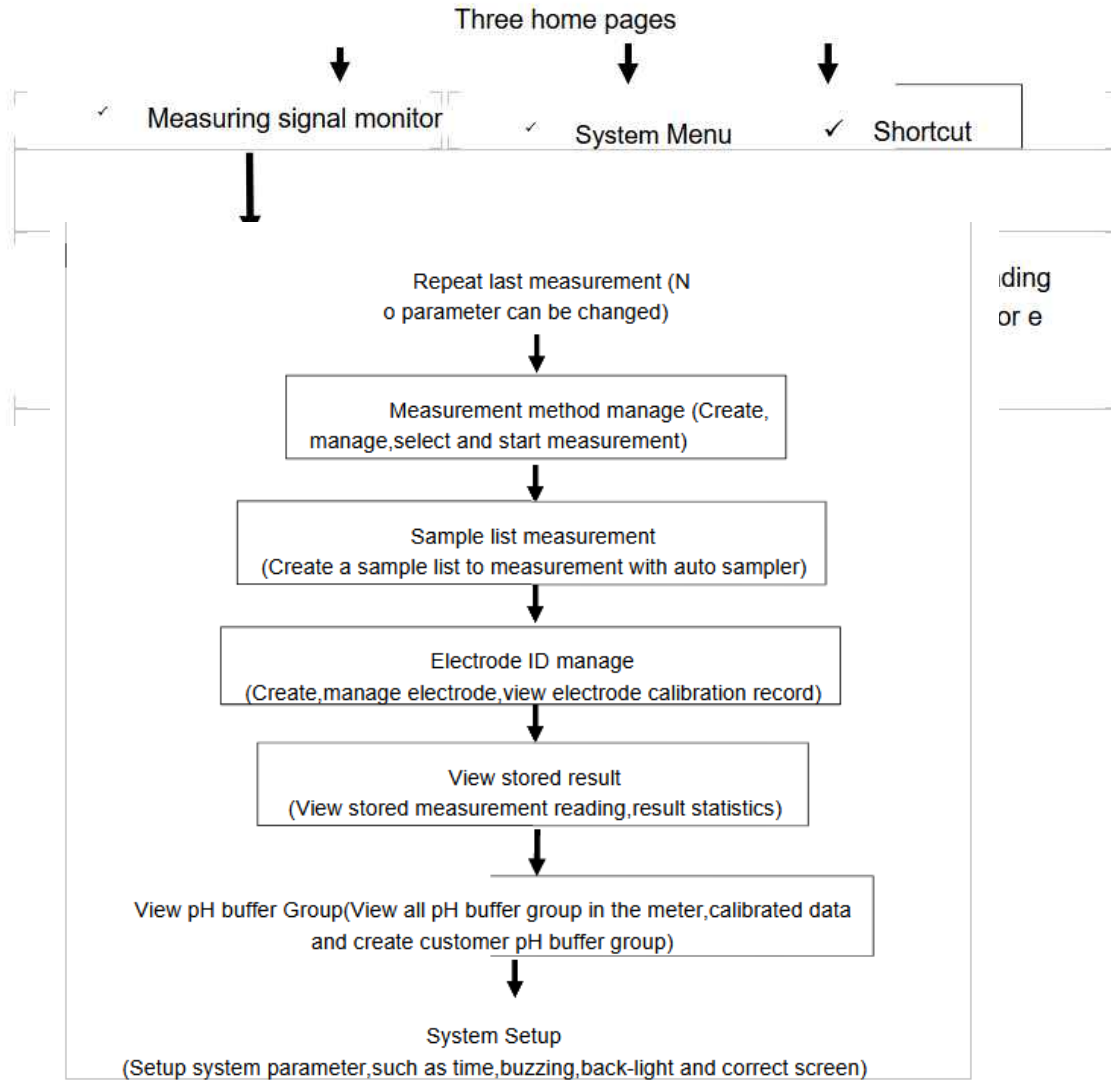
- Press 'Enter' to continue;
- Press 'Cancel' to delete all;
- Press "Backspace" or "Bsp" to clear an input character.



Figure 4

2.1.5 Physical overview

Turn on the meter and show initial state, login



2.2 Measuring Method

2.2.1 Instruction

The meter defines all measurements with measure method; each measuring method contains a complete set of measuring process.

Each measure method contains multiple parameters, including prompt parameters, electrode calibration parameters, measuring control parameters, sample parameters, measuring result and etc.

Each measure method contains measuring parameter, reading mode, electrode, calibration result, data stable condition, temperature control, sample, equipment(stirrer),result selection,output selection, graph, etc.

100sets of measurement method can store in the meter. User can delete date which has been stored or store last date into U disk when data has stored over 100.

View, delete the Measurement method in the U disk.

Copy the measurement method in the U disk into the meter.

The meter creates files in root directory of U disk which is used in the first time: C:\

LEADSER\METHOD

\RESULT

- Measurement method store in C:\LEADSER\METHOD.
- Measurement result and measurement curve store in C:\LEADSER\

RESULT.

• Filename is 8.3 coding of DOS system. 8pcs Capital is filename and extension is 3pcs Capital. Extension is .MOD that is measurement method file, for example: M1.MOD is the number 1 file of Measurement method; M1.MOD is the number 2 file of Measurement method.

2.2.2 Parameter

- The name of measuring method : Allowed to modify, maximum 20 characters.

Attention: The name of default methods is not allowed to change.

- Description: the brief description of the chosen method, allowed to modify, maximum 20 characters.

- Parameters: Last measurement parameter type. such as measuring pH, measuring pX, etc. Each parameter correspond to a measuring channel, reading method, balance condition, used electrode, electrode type, calibration result and sample.

Attention: The default measurement method is not allowed to change.

- Last measuring channel: measurement parameter is corresponding to measurement channel, such as CH1~CH4.

- Reading mode: three reading modes:Continuous Mode, Timed Reading and smart reading Mode.

Attention: The default measurement method is not allowed to change.

1) Continuous Mode: This is the most often used measuring mode. When measurement begins, the meter continuously displays the results of measurements and calculations. You can view a calibrated parameter, calibrate the electrode, and save or print the results during measurement. To stop measurement by user.

2) Smart reading mode: Users shall set the balance condition before measurement begins, the meter measures, calculates, and displays the results until reach the requirement. Balance condition includes balance time and balance value. The condition is satisfied when all measured data meet the requirements of balance value in set balance time. The instrument provides four balance conditions, expressed as "Fast, Medium, Strict, and Custom". The instrument allows users to customize balance condition; the balance condition varies with measure parameter.

3) Timed Reading: two type timed reading, one is only to set time and the other is to set time interval and set times.

A Timed Reading 1:

In this mode, the meter is measuring until the time you set.

- For example, if performing a reading every 300 seconds, select this mode and the meter is working until to 300 seconds.

Attention: the measurement data can not be saved automatically.

B Timed Reading 2: Set time and set measuring interval

In this mode, the meter continuously measures the parameter for a specified period of time. When the set time period ends, the meter saves the measurement and begins the next one. The minimum time is 1second.

- For example, if performing a reading every 300 seconds, select this mode and the meter continuously measures 300seconds. After 300 seconds, the meter saves the last result and starts the process again.

- Electrode name, it is better to electrode management. It is recommended to follow electrode suggestions. To create an electrode name for each electrode. All corresponding data will be stored under this name, and user can navigate to ' Electrode ID management' screen to view.

- Calibration result: it means last calibrated data, also it is the measurement parameters that the electrode is using;

- Calibration operator: it means last operator;

- Calibration time: it means last calibration time.

- Balance condition: the meter provides four balance conditions, expressed as "Fast, Medium, Strict, and Custom". The instrument allows users to customize balance condition; the balance condition varies with measure parameter.

- Balance time: the minimum waiting time for reading becomes stable, the meter continuously measures, calculates, and displays the results until reach the requirement. It takes more time if the balance condition is strict.

- Balance value: it is a parameter of balance condition. The value is more bigger more easy to reach balance, And vice versa. It is a different value corresponding to different

measurement parameter.

Attention: User allows to modify the custom balance time and value.

- Temperature unit, (°C) or (°F)
- Temperature compensation method : Auto and Manual.

In the state of manual temperature compensation: if the meter is not connected to the ATC probe , temperature value of the meter as current is put by user and the meter adopt this temperature value to calculate the PH value;

In the state of auto temperature compensation:if the meter is connected with ATC probe,temperature value of the meter as current is get from ATC probe.

- Manual temperature value: manual temperature compensation or adopt it when it does not work in the state of auto temperature compensation
- Sample ID and Sample name: maximum 10 characters.
- Auto or manual store: if user sets to save data, the meter will save data automatically after finish measurement; otherwise, user needs to save data by themself.

Attention: the meter save data automatically under Timed Reading 2.

- Output: included in Output equipment, output terminal signal, communication Baud rate,the characters of per line of printer,output title or not ,name of the output title and detail of output.

The meter supports GLP norm. User can edit the detail of output. There are three output ways:

A Following GLP norm;

B Following standard; C Following customer.

User can set the output way when user selects customer ways. Such as the following picture: user can select title of report, time of report, information of user, information of the meter, information of measurement method, measurement information,information of electrode, information of calibration, information of sample,etc.

To print all corresponding information when following GLP norm; To print in shortly when following standard ways.

- Graph parameter: shows graph parameters during measurement process. It means recording frequency of measurement curve, its minimum interval is 1s.

2.2.3 Creating Customer Measurement

The meter supports users to create their own special measuring method for special applications. User can modify original parameters under the default measuring method and save as a new method.



2.3 Turn-on/off the Meter

One end of power adaptor is inserted into the meter and the other end of power adaptor is connected with the meter, turn on the power, the meter shows and let user to login.

The meter will highlight the desired parameter and grey the rest, users can press highlight one to perform the corresponding operation. After measurement, users can press navigation key more than 4 seconds to shut down the meter. It is direct to turn- on the meter when you press the navigation next time.

The meter supports navigation operation when you turn the navigation key right or left. The flesh key will show in the screen. Press the function your need. The reminding window will disappear automatically when user do not turn the navigation key right or left in 5 second.

2.4 Initial Interface

The meter has password management and supports up to 8 users. The first user is Admini who has the right to create and delete users. The meter goes into the initial state after the system self-check. The system display will automatically back to initial state after measurement.

Figure 8

Attention 1: For the first time user, it is better to create a account with password, alternatively, user can just press 'Enter' button to login. The meter will turn-off if user fail to login in 1min.

Attention 2: Keep your password set by yourself carefully. The meter can not work if you lost your password.



Figure 9

The initial state includes three section as shown in figure 9:

- the first one is the display of Measuring signal monitoring,;
- the second one is system page;
- the third one is customer method.

The model is on the up- left of the screen and time is on the up-right of the screen; the direction is under the meter. User can press or slip by right or left to choose your need.

• The first one is the display of Measuring signal monitoring, shows the current measuring data in the middle of the meter. The meter shows reading method, type of temperature compensation and the measurement parameters above the screen; the last calibration data shows below of the screen.



- The second is system page, display the functions of the meter, such as repeating last measurement, measurement method management, sample list measurement, electrode ID management, view stored data, view pH standard buffer group, system setup, etc. Enter into function unit by click corresponding of item.



Figure 10

The customer page: to create a shortcut page in here that has some frequently used measurement method.



2.5 Operation

2.5.1 Shortcut

The meter allows user to create shortcut for measuring method. The shortcut icon will display on the initial state.



Click 'Shortcut' and enter the method name to the initial state. Maximum 10 shortcuts of measuring method. User can rename the shortcut (names must be English letters, maximum length is 20 characters). Similarly, the parameter are allowed to delete.

2.5.2 System setup

System setup display is shown in figure 12. Use this screen to set the system time, buzzer, automatic backlight, User ID management, Correct touch screen, language select, set Baud rate, firmware update, etc.

To select "System Setup" in the initial state.



Figure 12

- System time: It is used to record the time of operation, method setup, electrode calibration, etc. If the deviation is large, adjust the system time according to the local time. Time format: Year/Month/Day Hour: minute: second;
- Buzzer setting: User are free to turn on/off the buzzing. The buzzer tweets when pressing a valid key or there is a special situation happens.
- Automatic back-lit design: An automatic back-lit design that can be used in a dark environment. There are 5 options such as:
 - 'Off' means the back-light is working until user stop it.
 - 1 minute, 5 minutes, 10 minutes, 20 minutes, etc. The back-light will stop automatically after 1 minute, 5 minutes, 10 minutes and 20 minutes if user do not press any key.

The meter is able to automatically reduce the brightness of the backlight once reached the preset time. (In power saving mode, press any place of the screen, it will be back to show at the set backlight value) ; the instruments also allows users to set the brightness of the backlight;
- User ID Management: This function includes change user ID, set password, create user, delete user and log off. It supports up to 8 users. The first user is Admini and cannot be modified. Only Admini has the right to create and delete users. The meter will reset if you logout the current ID.
- Touch screen: With correct screen and test screen. Long press the function button to enhance the accuracy. When you find that the touch screen position is not right, you can calibrate the touch buttons. There's a test module for screen calibration. The meter supports 5 point to calibrate the screen, user need click 5 position by clicking above 5 times continues



and then finish calibration work.

After entering test module, users can press position of the screen according to their habits to view the accuracy of click, including click strength, location size and effect of clicking by touch pen or finger. After calibration, save calibration data.

- Set Baud rate: set Baud rate of the printer or PC communication equipment.
- Firmware Update: The instrument supports firmware upgrade function. There are two ways to upgrade: (Press "About" to view version information and company information, etc.)
 - upgrade with specific software through PC ; ▼ upgrade with U disk.

2.6 Electrode ID Management

The meter supports electrode ID management. There is one defaulted electrode in the meter. It supports up to five for each kind of electrode. Each electrode includes the following property: electrode name, comment, operator, login time, shelf life, shelf life prompting, electrode type, previous calibration record.

- Electrode Name: the electrode ID. It is the unique identification to recognize one electrode. Once created and defined, please don't change it casually, otherwise users are likely to lost calibration data. It supports modification, up to 20 characters.

Attention: the name of the electrode and the manual of the electrode shipped by the meter can not be modified the parameters

- Comment: allows users to briefly explain the electrode, supports modification, up to 20 characters.
- Operator: This parameter can not be modified. Once it is established, the instrument will mark the current user as the electrode registrar.
- Login time: the time that establishes the electrode. This parameter can not be modified.
- Shelf life: it means the effective using time of electrode. Different service life to different electrodes.
- Reminding method of service life: the meter supports reminding service life for convenience view and checking when user is measuring
- Electrode Type: basic type of electrode, such as pH measuring electrode, etc.
- Calibration Record: each electrode supports up to 20 sets of calibration records. Users can delete certain calibration record. When the storage exceeds maximum, the instrument will automatically delete the earliest record.

In the initial state:

- Select the menu item " EC ID Manage" to enter;
- After select relevant electrode, press "View" to check the specific content of a certain electrode, including relevant calibration records and related parameters, etc. For each electrode, the instrument supports up to 20 sets of electrode calibration records. Users can view, deleted, or as a calibration data of measuring method (enter by measuring method). Here, the instrument also supports the re-calibration of electrode.



Figure 13



Figure 14

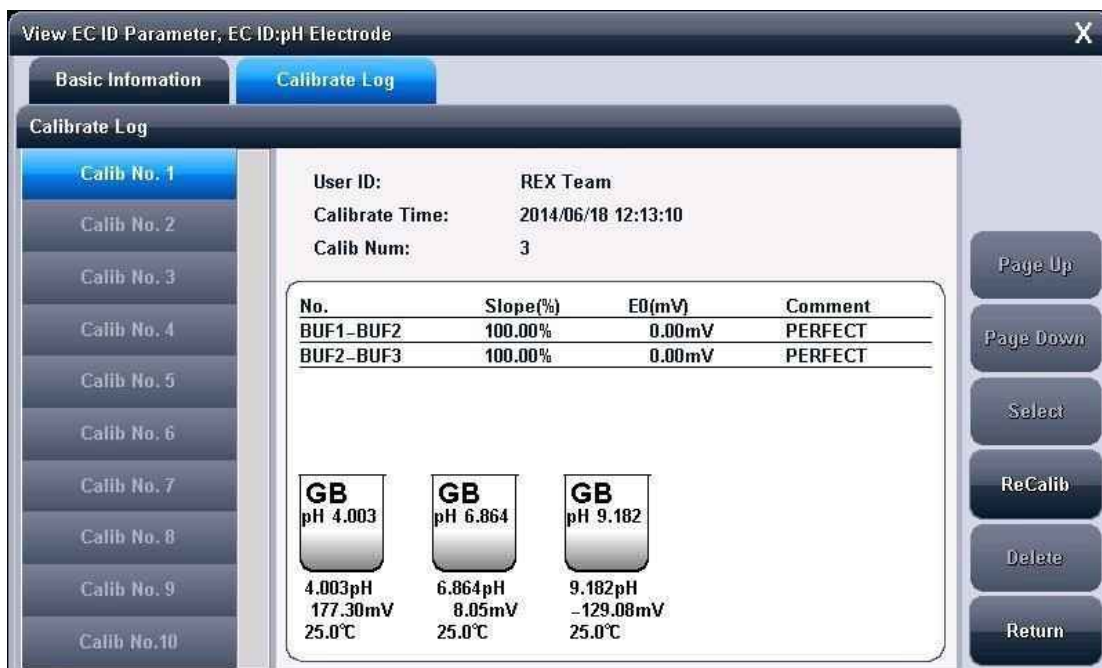


Figure 15

2.7 Electrode Calibration

To get higher accuracy measurement, electrodes has to be calibrated before measuring. There are three ways to calibrate electrode as following :

- Calibrate in the Electrode ID Management when viewing electrode calibration data;
- Calibrate in the Measurement Method Management when viewing electrode calibration data;
- Calibrate in the state of checking the electrode and calibrating result when starting measurement.

The meter can edit the last calibrated results for next time use. As shown in figure 16, there is a popup window displayed to ask whether you want to save the last results or not before calibration.

If a three-point calibration was used in the last calibration, user can choose to keep calibration for this time as an added calibration parameter. Please follow the navigation steps to finish a calibration.



Figure 16

2.7.1 Calibrate pH Electrode

For accurate measurement, perform a calibration with standard solution if the probe hasn't been used for a long time. The meter support six-point calibration to avoid an incorrect adjustment.

- To perform a two-point calibration, prepare two types of standard buffer solutions. Two-point calibration means to calibrate the position value with two type of standard buffer solution.
- To perform a one-point calibration, prepare one type of standard buffer solutions. One-point calibration means to calibrate the position value with one type of standard buffer solution.
- The default theory slope of pH combination electrode is set to 100%. For high accuracy, use two-point calibration or multi-points calibration.

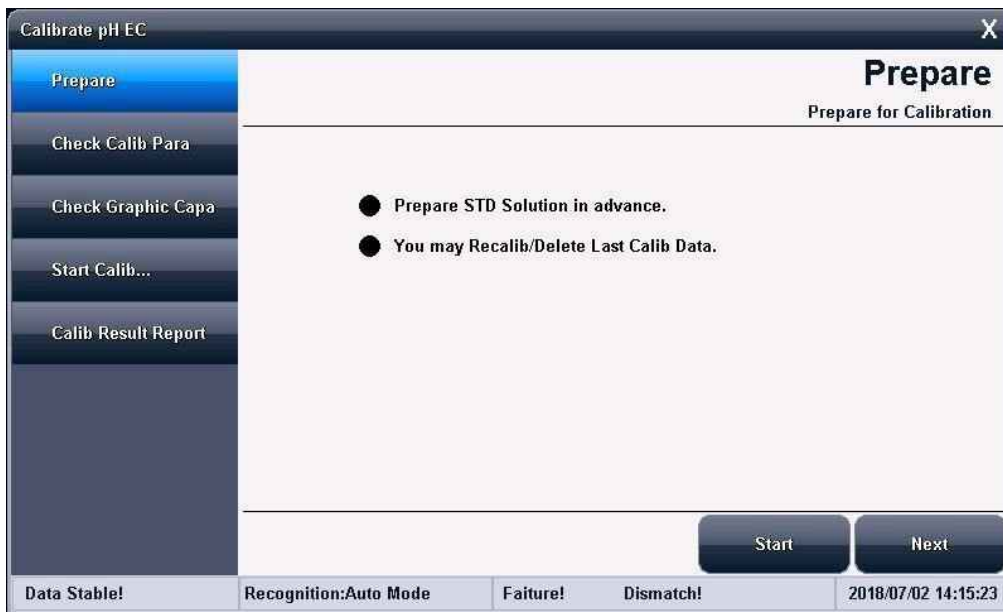


Figure 17

2.7.1.1 Preparation before Calibration

To preparation 1-6 PH buffer,DI water,etc. Click “Next” to continue after preparation finished.

Attention 1:

User can configure a standard buffer solution or purchase one .

Attention 2:

Configuration

of PH buffer:

refer to the instruction for more details

if you want to configure a standard buffer solution.

Attention 3: P

urchased from professions.

2.7.1.2 Check the calibrated parameter

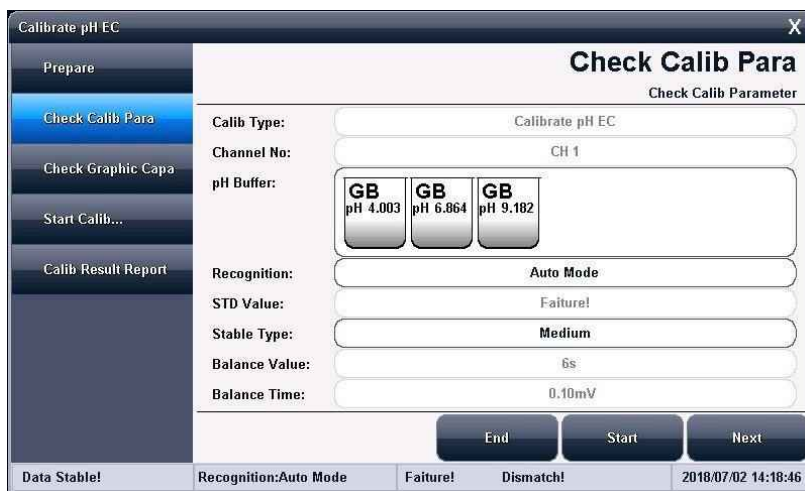


Figure 18



The meter can automatically identify GB,DIN,NIST and custom standard group. Please refer to 'pH standard solution group' chapter for more information. If you are not using routine standard buffer solution, you can manually entry the standard value.

2.7.1.3 Check Graphic Attribute

It means the character during calibrating.

2.7.1.4 Start Calibration

- Prepare 1 to 6 standard buffer solution as required;
- Check buffer group and check setting buffer solution is right or not;
- Insert the pH combination electrode and ATC probe into relative electrode socket;
- Rinse the probe with distilled water;
- Soak it into pH standard buffer solution;
- The calibration can only continue with standard value. If you are using the automatic identifying meter, the window will display the standard value. If the automatic identification failed, the possible causes as followed:

- buffer group setting error.
- Broken pH electrode or ATC probe
- User can input the standard value manually as well.
- Press 'Calibrate' button when the reading is stable, the meter save the calibration results. Then switch to Calibration Result Report and show calibration result.
- Press 'Continue' button to start a new calibration;
- Press 'End' button to finish calibration;

Attention : The meter supports calibrate the standard solution repeatedly. If the difference value between the current and last calibration is less than 0.1pH , the meter will overlap the calibration value. For example, if the last calibration group is 4.00 3pH, 6.86 5pH,9.182pH,and this time user also calibrate the pH value is 6.865pH,the meter will overlap the previous data6.865pH if the current calibration has the same calibration value.If necessary, user can reset the calibration parameter.

- Rinse the electrode off and soak it in another standard buffer solution. Repeat the calibration procedure.
- Press "X" button to exit the calibration.





Figure 19

2.7.1.5 Calibration Result Report

The window will display the calibration results with current calibration points and detailed solution parameter after calibration.

- To check the calibration results in calibration report page while calibration. The meter allows user to delete the last calibration result if wanted.
- Press "End" key to finish calibration.



Figure 20

2.8 Perform a Measurement

2.8.1 Preparation before Measurement

Users should know about the properties of measuring material (samples) under test; conventional test methods; know basic operation and application of the instrument; know the usage and maintenance of general electrode.

2.8.2 Several ways to start measurement

The meter supports a variety of ways to start and complete a measurement, including:

- Start with “Repeat Last Measurement” ;
- Start with “Direct Measurement”; ➤ Start with “Measurement Method ”; ➤ Start with “Shortcut ”.

2.8.3 Start with “Repeat Last Measurement”

If users have performed a measurement, press “Repeat Last Measurement” button to start a measurement repeatedly, and all measuring parameters unchanged. User can view,store,print and statistics,etc after finished measurement.

2.8.4 Start with “Direct Measurement”

The meter shows measurement data in the initial state, user clicks it to start measurement. It is a measurement method, use set and modify all parameter before measurement. To click measurement window or “Start measurement” to enter method management in the state of initial. User operates the steps according to the meter guide.

2.8.5 Start with “Measurement Method”

For all users, this is the most commonly used method. Users can click ‘Method Manage’ to enter method management.

General steps as follows:

- Select a proper measuring method;
- Press “View” button to view or set relevant parameters, return after finished. Detail settings and parameter definitions please refer to ‘Parameter of Measure Method’ section.
- Press ‘Start’ to start measurement. Each measure method is controlled by reading mode. Details please refer to relevant measure section.
- To view,store and print after measurement finished.



Figure 21

2.8.6 pH Measurement

To select “pH Measure Method” in the method of measurement; To click “Start Measurement” to enter into pH measurement.

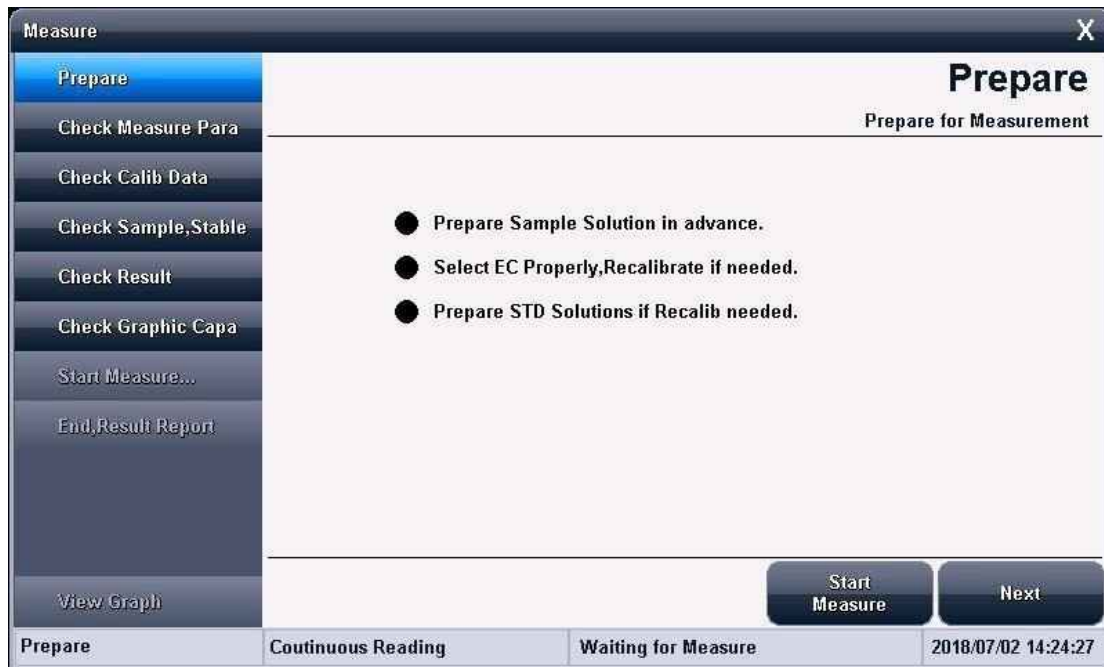


Figure 22

- Preparation before measurement;
- Check measurement parameter;
- Check electrode & calibrated result;
- Check sample;
- Check measurement condition;
- Check result;
- Check graphical,
- Start measurement & report after measured
- Press 'Next', follow the navigation bar to finish measurement.

2.8.6.1 Preparation before Measurement

The meter remind user need to prepare sample or do calibration, etc.

2.8.6.2 Check the measuring parameter

Set Reading Method in this navigation page. Different parameter for different reading method.

Measure

- ✓ Prepare
- Check Measure Para
- Check Calib Data
- Check Sample,Stable
- Check Result
- Check Graphic Capa
- Start Measure...
- End,Result Report
- View Graph

Check Measure Para
Check Measurement Parameter

Measure Para: pH

Reading Mode: Continuous Reading

Start Measure Next

Check Measure Para Continuous Reading Waiting for Measure 2018/07/02 14:26:44

Figure 23

2.8.6.3 Check electrode & calibration result

- Set electrode type, electrode name and electrode calibration result that those parameter are used to be electrode parameter in this measurement;
- Click twice the area of electrode calibration result to do calibration or modify the parameters if wanted.

The detailed operation steps, please refer to electrode calibrating, EC ID management section.

Measure

- ✓ Prepare
- ✓ Check Measure Para
- Check Calib Data
- Check Sample,Stable
- Check Result
- Check Graphic Capa
- Start Measure...
- End,Result Report
- View Graph

Check Calib Data
Check EC ID, Calibrated Data

Measure Para: pH

EC Name: pH Electrode

Calib Result:

No.	Slope(%)	E0(mV)	Comment
BUF1-BUF2	100.00%	0.00mV	PERFECT
BUF2-BUF3	100.00%	0.00mV	PERFECT

Calib Operator: REX Team

Calib Time: 2014/06/18 12:13:10

pH Group Type: GB Group

Start Measure Next

Check Calib Data Continuous Reading Waiting for Measure 2018/07/02 14:27:25

Figure 24

2.8.6.4 Check sample & measurement condition

Set balance condition, temperature display type, temperature compensation method, sample ID, etc in this page.

Measure		Check Sample, Stable	
		Check Sample, Condition	
✓ Prepare	Channel No:	CH 1	
✓ Check Measure Para	Measure Para:	pH	
✓ Check Calib Data	Stable Mode:	Medium	
Check Sample, Stable	Balance Time:	6s	
Check Result	Balance Value:	0.10mV	
Check Graphic Capa	Temp in C/F:	*, *°C	
Start Measure...	Temp Comp Mode:	ATC	
End, Result Report	Manual Temp:	25.0°C	
	Temp Channel No:	CH 1	
	Sample ID:	Sample 1	
View Graph		Start Measure	Next
Check Sample, Stable	Continuous Reading	Waiting for Measure	2018/07/02 14:28:02

Figure 25

2.8.6.5 Check Result & the other

◦ Set measurement result selection, such as data stored, data output print, output equipment, port, communication Baud rate, output information, etc in this page.

Please refer to Measurement Method section.

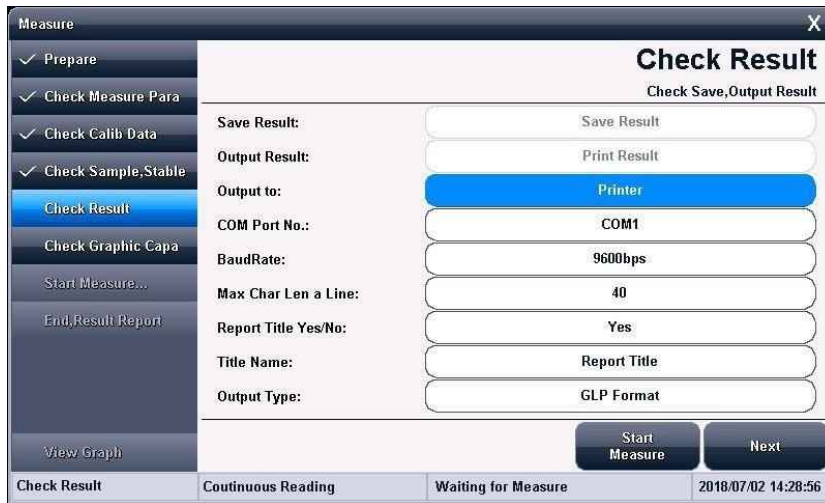


Figure 26

2.8.6.6 Check Graphical Attribute

- Set relative graphical attribute during measuring, such as data recording interval, etc



Figure 27

2.8.6.7 Start Measuring

- Click “Next” to start measurement after finished above steps.



Figure 28

The measuring curve shows in the middle of screen, the measuring results show in the upper area of the screen. Three windows show down area of the screen such as pH value, mV value and temperature value. Every windows shows statistics value of maximum, minimum and average value. There are 200 sets of data can be stored in the meter. The meter controls reading in the 200s if the interval time is 1s. ➤ Click “||” button to stop recording data.

The meter collects measurement value automatically, calculate, display result and record curve according to the set measurement parameter.

The meter can judge whether the reading is stable or not and remind measuring course at same time. The stable signal shows down of every measurement window.

The meter monitors the balance condition in the state of smart reading mode. Measurement ends automatically when meet balance condition.

The meter monitors the time condition in the state of timed reading mode. Measurement ends automatically and store measurement data automatically when meet timed condition.

The meter monitors the measurement course in the state of continuous reading mode. Measurement ends when user stop it.

The meter supports to repeat calibrating electrode under measurement conditions, store data by manual and print measurement data by manual.

- Press ‘End’ button to finish measurement anytime during measurement.

2.8.6.8 Result Report after Measurement

The meter will provide a brief reports including measuring time, stored the number of result, print output result report, etc after finish measurement or end measurement.

Figure29



- To select “remeasure“, “save“, “output“ again or click “X” to exit;
- To view data changing after measure or click “View Graph”. The meter lock measurement data but displays curve of measurement result.

2.9 Data center

The meter supports:

- View lasted measurement data
- View calibration data of pH electrode
- View pH buffer group
- View the measuring results & statistics result

2.9.1 View Lasted Measurement Unit

The meter displays lasted measurement data in the state of initial. The parameter of measurement is continuous reading mode.

- To click the screen or “Start Measure” to view or modify

or calibrate method parameter.

2.9.2 View Electrode Calibration Data

Refer to Electrode ID management.

2.9.3 pH Standard Solution Group Generally, pH electrode shall be re-calibrated with pH buffer solution of new concentration, especially when it hasn't been used for a long time or environment temperature changed. It is recommended to turn on the auto-recognition to minimize the mistakes.

The meter provides auto-recognition of several buffer groups prepared according to either the NIST standard, the DIN standard, MERK standard, JIS standard or the GB standard.

The meter shows the buffers available in the group;

Selecting a buffer for use or calibration: Icons with √ indicate that a selected buffer. Icons without √ indicate an available buffer. The selected buffer group is GB standard in the figure, the calibration point is GB 4.003、6.864、9.182.

Each group supports different buffer solutions:

1) GB buffer group includes

1.680pH,3.559pH,4.003pH,6.864pH,7.409pH,9.182pH,12.460pH, etc;

2) DIN buffer group includes

1.680pH,2.000pH,3.557pH,3.775pH,4.008pH,6.865pH,7.416pH,9.184pH,10.014pH,12.454pH, etc

3) NIST buffer group includes

1.680pH,4.008pH,6.864pH,7.416pH,10.014pH,12.469pH, etc

4) MERK buffer group includes

2.000pH,4.000pH,7.000pH,9.000pH,12.000pH, etc

JIS buffer group includes

1.680pH,4.008pH,6.864pH,7.413pH,9.180pH,10.010pH, etc.



Figure 31

Generally, the pH value (25.0°C) will be set as standard buffer solution, for example, GB 6.864pH buffer solution, the pH value is 6.864pH at 25.0°C ; MERK standard solution is what the pH value is at 20.0°C.

Attention: It is still GB pH buffer group when user sets pH buffer group in "View pH buffer group" of the initial of measurement. User can not set pH buffer group and select pH buffer group to Measurement Method. User has to view in the Measurement Method when pH buffer group set in the Measurement Method,

2.9.3.1 To select a buffer in a group

For each Buffer Group setup, you may select up to six buffers that is the six point calibration. Since the pH range of a buffer may overlap with the pH range of another buffer in the same buffer group, the meter prevents selecting two or more buffers with overlapping pH ranges.

Generally, select corresponding buffer group when user is calibrating pH electrode according to using pH buffer; otherwise user can not get correction data. For example, calibrate pH electrode when user chooses GB 4.003pH, 6.864pH, 9.182pH. The buffer group must be GB standard.



Figure 32

2.9.3.1 View the data in a certern pH buffer group

The meter supports to view all data of a pH buffer corresponding to pH buffer group



Figure 33

2.9.3.3 Create custom standard solution

For regular pH buffer solutions (meets the NIST standard, the DIN standard, or the GB standard), use the Auto-Recognition method. The

meter supports up to 3 custom buffer solutions for special requirements. User can modify pH buffer one by one and also user can copy pH buffer in the meter as own pH buffer. After created, user can choose pH buffer you need.



Figure 34



Figure 35

2.9.4 View saved data

The meter supports to save measurement

data automatically after finish measurement.

- Click 'View stored data' to enter in the initial state;

2.9.4.1 View setting

The meter supports various viewing methods. User can view results by stored date, operator, saved number, electrode ID, methods, Sample ID, etc.

- Select you need viewed data;
- Click 'Start view' to view

The meter display curve after viewed result

The image displays two screenshots of the 'View Stored Result' interface. Both screenshots show a window with a title bar 'View Stored Result' and a close button 'X'. The window contains a tabbed interface with tabs for 'View Option', 'View Result', 'Brief Report', 'Statistic', and 'Output'. The 'View Option' tab is active in both.

Top Screenshot:

- View What:** pH
- View Type:** By Stored Date
- Start Date(YY-MM-DD):** 18 / 7 / 2
- End Date(YY-MM-DD):** 18 / 7 / 2
- Data Stored Num:** 0
- Buttons: Delete, Start View, Return

Bottom Screenshot:

- View What:** pH
- View Type:** By Locate No
- Start No:** 1
- End No:** 0
- Data Stored Num:** 0
- Buttons: Delete, Start View, Return

2.9.4.2 View results

The meter will display the results in diagram with the current viewed results, range, method, the matched results, the beginning number the current curve displaying, the end number of the curve displaying, etc. For clear displaying, the meter is able to display up to 100 sets of data at once, users can click "Page Up", "Page Down" to see the rest of the data; The indicatrix is able to adjust by clicking "< <", "> >" button to get the corresponding results.



Figure 37

2.9.4.3 Result report

This meter can give the measuring result such as calibration information, calibration result and basic information in detail. The selected method, operator, storage time, electrode, samples and reading mode will be included in the report.

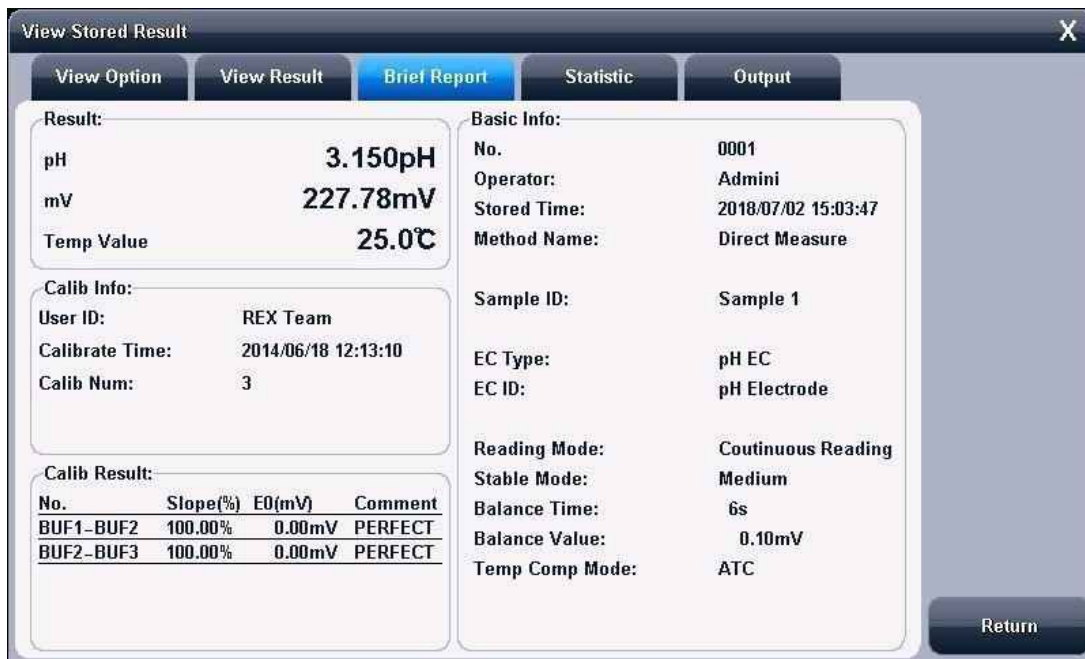


Figure 38

2.9.4.4 Statistics result

The meter supports to count data that user view.

- Click 'Statistics Result'.

The meter will show statistics result, such as maximum value, minimal value, average value, standard deviation, relative standard deviation and relative statistics information.





2.9.4.5 Output setting

The meter allows user to output information such as the device name, file name and etc by printer, PC meter, U disk. The instrument supports GLP functions, allows users to establish output requirements. Usually there are three kinds of output method: GLP format, standard format and custom format.

If users select a custom format, the instrument allows users to customize output settings. Users can customize report title, report time, user information, instrument information, measurement method information, measurement information, electrode information, calibration information, sample information, etc.

2.9.4.6 Output

User can output stored measurement data, statistics result, record(it has been used), etc after finish view, statistic.

The data can be output to printer , PC and U disk.

View Option	View Result	Brief Report	Statistic	Output
Output to:	Printer			
COM Port No.:	COM1			
BaudRate:	9600bps			
Max Char Len a Line:	40			
Report Title Yes/No:	Yes			
Title Name:	Report Title			
Output Start No.	1			
Output End No.	2			
Output Type:	GLP Format			

Return

Figure 40





Figure 41

03. Maintenance

Keep away from acidity, alkaline, salt solution and also damp-proof to ensure insulation and high input impedance performance of the meter. When the meter is not used, insert Q9 short circuit plug into the socket of measuring electrode to prevent it from dust and steam. Store the electrode in dry place.

Electrode cleaning: Electrode cleaning includes inorganic cleaning, organic cleaning, grease cleaning, protein precipitation cleaning and glass sensitive membrane regeneration. The type of cleaning needed depends on the contaminants and the electrode. After one or more cleaning procedures, rinse the outside of the electrode with distilled water. Siphon the filling solution away and add fresh solution. Repeat 2 or 3 times. Store the pH electrode in the storage solution.

Electrode storage: pH measuring electrode: When the electrode is not in use, store it in reference filling solution. For refillable electrodes, close the filling hole. When the electrode is not used for a long time, put the electrode back in the box and store it a dry place at ambient temperature.



04. Appendix

How to select the printer:

- Support to use RS232
- Contain over 40 characters in a line

How to connect the printer

• Connect the printer and the meter with printing line after turn-off the meter;

• Set printer as the output device, and then set communication port, Baud rate;

• Set Baud rate of printer as 9600bps, the other format is 8digit data bits, no calibration and 1 stop bit;

- To output data in the corresponding of function unit;

How to connect the PC

• The PC must has serial port or has device which USB to serial Port; ➤ The PC has communication software which receive and send data; ➤ The detailed operation steps as following:

1) Installing USB driver first if the port in the PC is USB switching to serial port; 2) check if it is installed correctly:

First, connect the PC with the meter

Second, check "My PC/Properties/Device Manager/COM or LPT

Third, check Virtual RS232COM port (Included device information), it is installed correctly if is is no yellow exclamation mark; otherwise it is fail to install, the meter can not communicate.

- Adjust software in PC;
- Connect the meter with PC;
- Set the output device as PC, and then set communication port, Baud rate;

• Set communication port and Baud rate on PC, the other format is 8digital data bit, no calibration and 1 stop bit;

- To output data in the corresponding of function unit;

How to use U disk

• Inset the U disk into the meter. The meter can identify the U disk automatically and then remind the user;

• If the meter can not identify the U disk automatically, the data can not be read into U disk. User try to use communication line connected with the meter;

- To output data in the corresponding of function unit;
- Store data under C:\LEADSERI\RESULT



05. Troubleshooting

Phenomenon	Cause	Troubleshooting
No display after start-up	<ol style="list-style-type: none"> 1.The power adaptor is damaged or mismatched. 2.The instrument is damaged. 3.The Light-back is turn off. 	<ol style="list-style-type: none"> 1.The meter is connected with power adaptor and turn on again. 2. Replace or repair by rule. 3.Turn off Auto Light-back; Click screen or turn on Light-back.

Can't link with measurement unit	<ol style="list-style-type: none"> 1.Electrode plug has bad contact. 2.Measurement channel broken. 	<ol style="list-style-type: none"> 1. 2.Change measurement channel.
MV measurement is not correct	<ol style="list-style-type: none"> 1.Electrode performance is bad. 2.Electrode plug has bad contact. 	<ol style="list-style-type: none"> 1.Replace a good electrode. 2.Connect short circuit, the meter should display about 0.0mV, otherwise there may be problems in pH measuring unit.
pH measurement is not correct	<ol style="list-style-type: none"> 1.Same as the above 2.Same as the above 3.The electrode has not been calibrated or has been wrongly calibrated. 	<ol style="list-style-type: none"> 1.Same as the above 2.Same as the above 3.Re-calibrate electrode or replace standard solution.

**Packing List MET21-06 Benchtop PH meter**

Number	Description	Quantity
1	MET21-06 PH meter	1
2	PH combination electrode	1
3	ATC probe	1
4	PH buffer(PH4.00,PH7.00,PH10.01)	5bags for each
5	Power adaptor	1
6	Stylus	1
7	Protective Cover	1
8	Electrode Holder	1
9	Mini USB communication line	1
10	Power line	1
11	Software	1
12	Operation Manual	1



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