User's Manual Supmea

pH/ORP Controller

Supmea

Headquarters

5th floor,Building 4,Singapore Hangzhou Science Technology Park,
No. 6 street,Hangzhou Economic Development Area,
Hangzhou 310018,China

Singapore / Philippines

info@supmea.com

www.supmea.com

Supmea Automation Co.,Ltd.

Preface

Thank you for purchasing pH/ORP controller. Please read this manual carefully before operating and using it correctly to avoid unnecessary losses caused by false operation.

Note

●Modification of this manual’s contents will not be notified as a result of some factors, such as function upgrading.

●We try our best to guarantee that the manual content is accurate, if you find something wrong or incorrect, please contact us.

●This product is forbidden to use in explosion-proof occasions.

Version

U-pH1-MYEN3

Safety Precautions

In order to use this product safely, be sure to follow the safety precautions described here.

About this manual

●Please submit this manual to the operator for reading.

●Please read the operation manual carefully before applying the instrument. On the precondition of full understanding,

●This manual only describes the functions of the product. The company does not guarantee that the product will be suitable for a particular use by the user.

Precautions for protection, safety and modification of this product

To ensure safe use of this product and the systems it controls, Please read carefully the operation manual and understand the correct application methods before putting into operation, to avoid unnecessary losses due to operation mistakes. If the

instrument is operated in other ways not described in the manual, the protections that the instrument give may be destroyed, and the failures and accidents incurred due to violation of precautions shall not be borne by our company.

When installing lightning protection devices for this product and its control system, or designing and installing separate safety protection circuits for this product and its control system, it needs to be implemented by other devices.

If you need to replace parts of the product, please use the model specifications specified by the company.

This product is not intended for use in systems that are directly related to personal safety.Such as nuclear power equipment, equipment using radioactivity, railway systems, aviation equipment, marine equipment, aviation equipment and medical equipment.If applied, it is the responsibility of the user to use additional equipment or systems to ensure personal safety.

Do not modify this product.

The following safety signs are used in this manual:

Hazard , if not taken with appropriate precautions, will result in serious personal injury, product damage or major property damage.

Warning:Pay special attention to the important information linked to product or particular part in the operation manual.

●Confirm if the supply voltage is in consistent with the rated voltage before operation.

●Do not use the instrument in a flammable and combustible or steam area.

●To prevent from electric shock, operation mistake, a good grounding protection must be made.

●Thunder prevention engineering facilities must be well

managed: the shared grounding network shall be grounded at is-electric level, shielded, wires shall be located rationally, SPD surge protector shall be applied properly.

●Some inner parts may carry high voltage. Do not open the square panel in the front except our company personnel or maintenance personnel acknowledged by our company, to avoid electric shock.

●Cut off electric powers before making any checks, to avoid electric shock.

●Check the condition of the terminal screws regularly. If it is loose, please tighten it before use.

●It is not allowed to disassemble, process, modify or repair the product without authorization, otherwise it may cause abnormal operation, electric shock or fire accident.

●Wipe the product with a dry cotton cloth. Do not use alcohol, benzine or other organic solvents. Prevent all kinds of liquid from splashing on the product. If the product falls into the water, please cut off the power immediately, otherwise there will be leakage, electric shock or even a fire accident.

●Please check the grounding protection status regularly. Do not operate if you think that the protection measures such as grounding protection and fuses are not perfect.

●Ventilation holes on the product housing must be kept clear to avoid malfunctions due to high temperatures, abnormal operation, shortened life and fire.

●Please strictly follow the instructions in this manual, otherwise the product's protective device may be damaged.

●Do not use the instrument if it is found damaged or deformed at opening of package.

●Prevent dust, wire end, iron fines or other objects from entering the instrument during installation, otherwise, it will cause abnormal movement or failure.

●During operation, to modify configuration, signal output, startup, stop, operation safety shall be fully considered. Operation mistakes may lead to failure and even destruction of the instrument and controlled equipment.

●Each part of the instrument has a certain lifetime, which must be maintained and repaired on a regular basis for long-time use.

●The product shall be scrapped as industrial wastes, to prevent environment pollution.

●When not using this product, be sure to turn off the power switch.

●If you find smoke from the product, smell odor, abnormal noise, etc., please turn off the power switch immediately and contact the company in time.

Disclaimer

●The company does not make any guarantees for the terms outside the scope of this product warranty.

●This company is not responsible for damage to the instrument or loss of parts or unpredictable damage caused directly or indirectly by improper operation of the user.

Package contents

After opening the box, please confirm the package contents before starting the operation.If you find that the model and quantity are incorrect or there is physical damage in appearance, please contact us.

Serial number	Name	Quantity	Remarks
1	pH/ORP controller	1	
2	Manual	1	
3	Certificate	1	

Contents

Chapter I Introduction

The online pH/ORP controller is independently researched and developed, which is delivered to the monitoring room with transmission trough RS485 or analog output so as to record and store.

pH/ORP controller is one of the intelligent on-line chemical analyzers, which is widely used in the continuous monitoring on pH value or OPR value and temperature of thermal power, chemical engineering and fertilizer, metallurgy, environment protection, pharmacy, biochemistry, food and tap water as well as other solution.The transmission monitoring and recording of continuous monitoring data is realized Through the connection between the Analog output and recorder, and the monitoring and recording is realized by easily linking to the computer with MODBUS-RTU protocol through connecting RS485 interface.

Characteristics

- Easy operation
- NEMA enclosure for field mounting and panel mounting
- Automatically Temperature Compensation
- Directly switchable to pH or ORP
- Large LCD display with background lighting
- pH or ORP sensors can be connected thanks to the sensor supply integrated in the output
- Using the setup program: user-friendly programming
- 4~20mA analog output
- RS485 communication

Table 1 Technical Parameters

Screen size	2.8 inch
Overall dimension	96*96*112mm
Cutout dimension	92*92mm
Weight	0.5Kg
Measured variables	pH/ORP
Measurement range	pH:0.00~14.00pH ORP:-1000~+1000mV -2000~+2000mV
Accuracy	pH:±0.02pH;ORP:±1mV
Input resistance	$\geq 10^{12}\Omega$
Temperature compensation	NTC10K:0~60℃ Accuracy:±0.5℃ 60~100℃,Accuracy:±2℃ Temperature compensation:0~100℃ manual/automatic
Analog output	4-20 mA, maximum loop is 750Ω,±0.2%FS
Communication protocol	MODBUS-RTU RS485
Alarm relay	Pickup/Breakaway AC250V/3A
Relative humidity	10~85%RH（No condensation）
Operating temperature	0~60℃
Power supply	AC:220V±10%,50Hz/60Hz;DC:24V
Storage conditions	Temperature:-15~65℃ Relative humidity:5~95%RH（No condensation） Altitude:<2000m

Chapter II Installation

Proceed as follows to completely install the measuring point

●The instrument is panel mounted.

●It shall be installed inside the building so as to avoid wind and rain as well as direct sunlight.

●Please install it at the place with good ventilation in order to prevent the internal temperature of the instrument from rising.

●Don't lean to left or right when the instrument is installed, horizontal installation shall be realized as possible

The following places shall be avoided during the installation

●The place where the environment temperature exceeds 60℃ during the work.

●The place where the environment humidity exceeds 85% during the work.

●The vicinity of the electromagnetic occurring sources.

●The sites with strong mechanical vibration.

●The site where the temperature is changed a lot and the

moisture condensation is easily formed.

●Places with lots of lampblack, steam, moisture, dust and corrosive gas.

2.1 Dimension

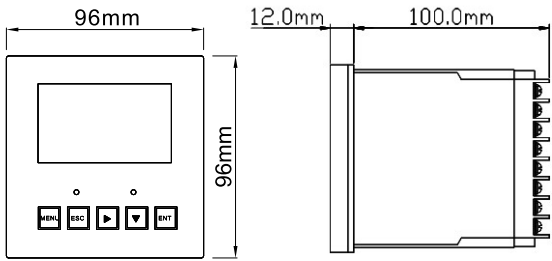


Figure 1 Dimension of product

2.2 Instrument installation

●A 92mm*92mm installation hole is opened at the instrument cabinet or installation panel.

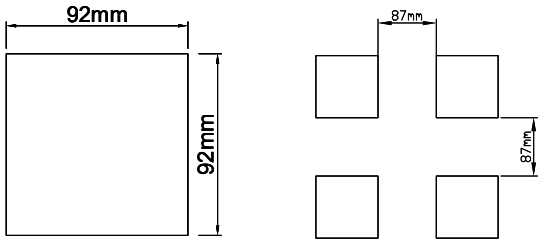


Figure 2 Dimension of installation

The instrument is inserted into the installation hole and the screw is fixed, refer to the following drawing.

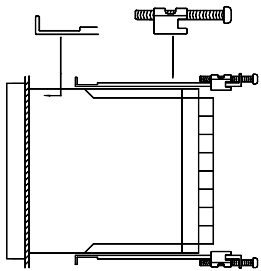


Figure 3 Installation

2.3 Electrode installation

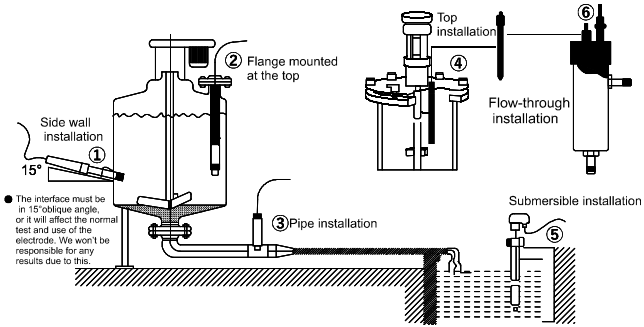


Figure 4 Sketch map of the common installation method

2.4 Wiring

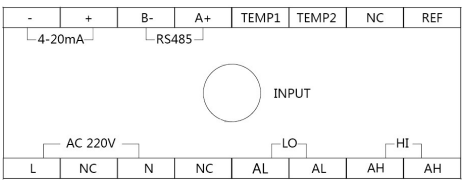


Figure 5

Definition of the port

- ●INPUT: measuring terminal of the electrode
- ●REF: reference terminal of the electrode
- ●NC: undefined

- TEMP2: temperature compensation terminal 2
- TEMP1: temperature compensation terminal 1
- RS485(A+):RS485 communication interface A+
- RS485(B-):RS485 communication interface B-
- 4~20mA(+):4~20mA output end+
- 4~20mA(-):4~20mA output end -
- AC220V(L) or (DC24V-): AC220V live wire or （DC24V Negative terminal）
- AC220V(N) or (DC24V+):AC220V neutral wire or （DC24V positive terminal）
- LO(AL): low alarm
- HI(AH): high alarm

Chapter III Navigation keys

●Button display

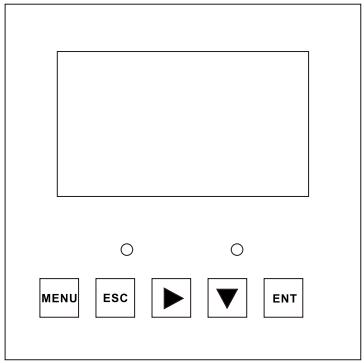


Figure 6

●Definition of buttons

Table 2

Sign	Name of the key	Function description
	MENU	Enter the menu under “monitoring interface” Exit the menu under “monitoring interface”
	EXIT	Check relevant alarm status under the “monitoring interface” The relevant up and bottom layer of interface under the “menu interface” returns to the up layer “Calibration interface” presents the calibration item is skipped
	RIGHT	The digit of recurrent selection parameter
	DOWN	Relevant menu is selected under the “menu interface” Relevant numerical value is modified under the setup status
	ENTER	Enter the sub-menu or confirm modification under the “menu interface”

Monitoring page

- pH monitoring page

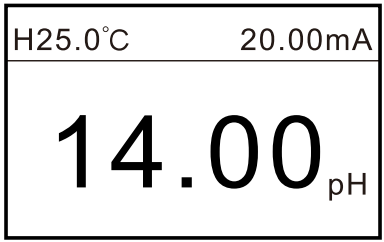


Figure 7

- ORP monitoring page

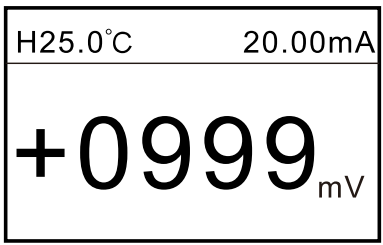


Figure 8

Password verification page

●pH alarm page

HighPick-up : 12.00pH

HighBreakaway:11.00pH

LowPick-up : 02.00pH

LowBreakaway :03.00pH

●ORP alarm page

HighPick-up : +0900mV

HighBreakaway:+0800mV

LowPick-up : -0900mV

LowBreakaway :-0800mV

Password validation

----User Password----

Password:0000

Page of main menu

Please contact us if the password is forgotten.

Main Menu

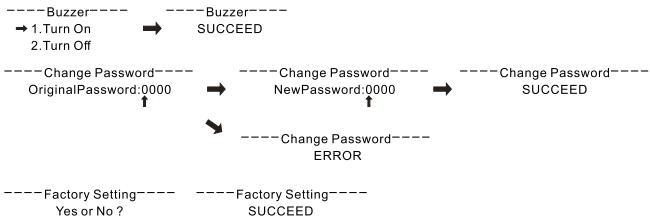
```
----Main Menu----
  1.System Setting
  2.Signal Setting
  3.Online Calibration
  4.Remote Setting
  5.Alarm Setting
  6.Information Inquiry
```

Chapter IV System menu

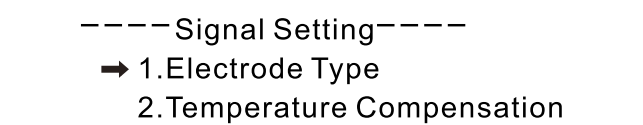
4.1System setting

```
----System Setting----
  1.Buzzer
  2.Change Password
  3.Factory Setting
```

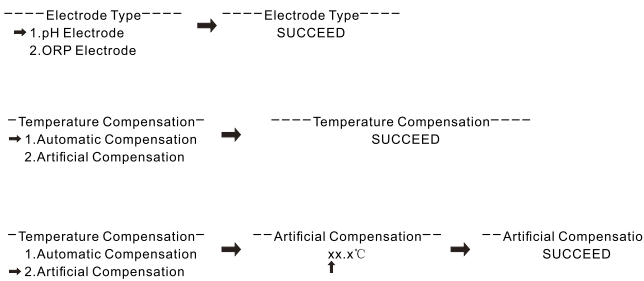
Operational guidance：



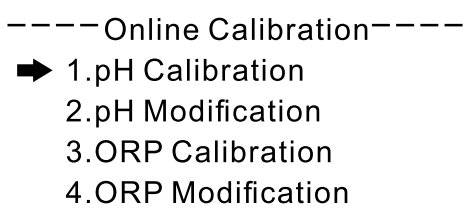
4.2Signal setting



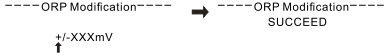
Operational guidance：



4.3Online calibration



Operational guidance：



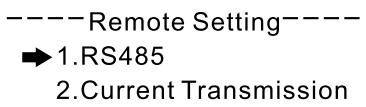
pH calibration

after entering the pH calibration page, firstly immerse pH electrode into 4.00 / 4.01 standard buffer solution, standing for a moment, after the reading is stable, press the ENT, then immerse the pH electrode into the 6.86/ 7.00 pH standard solution, standing for a moment, after the reading is stable, press the ENT, finally put the pH electrode into 9.18/10.01 pH standard solution, standing for a moment, after the reading is stable, press the ENT, after the reading is successfully calibrated, the calibration process of pH is completed.

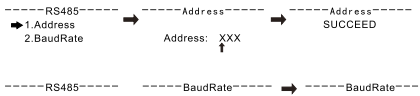
pH modification: the measured pH is modified between two pH value.

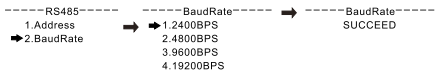
ORP calibration: after entering the calibrated page, firstly immerse the ORP electrode into the 86mV standard buffer solution,standing for a moment, after the reading is stable, press the ENT, then immerse the ORP electrode into the 256mV standard buffer solution, standing for a moment, after the reading is stable, press the ENT, after the reading is successfully calibrated, the calibration process of ORP is done.

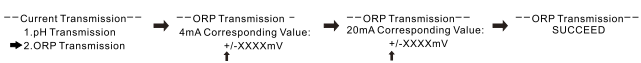
4.4Remote setting



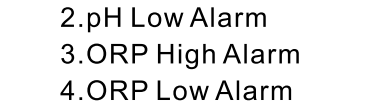
Operational guidance：



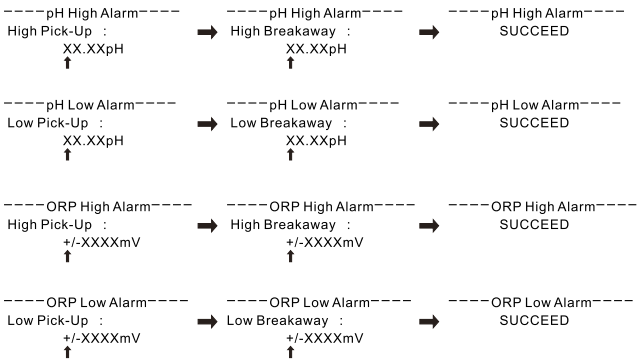




4.5Alarm setting



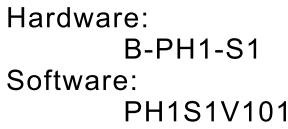
Operational guidance：



4.6Information inquiry

Version information: inquire the current version of hardware, with strong trace-ability.

Operational guidance：



Chapter V Communication

The instrument is provided with standard RS485 series communication interface, in accordance with international universal standard MODBUS-RTU communication protocol,supporting No.03 register reading and holding command.

Register address

Communication data and register address is as below:

Address	Data type	Function code	Description	Access authority
0x0000	unsigned short	0x03	pH value（Default two decimal places）	Read only
0x0001	short	0x03	Temperature value（Default one decimal places）	Read only
0x0002	short	0x03	ORP value（Integer）	Read only

Example of conductivity reading

Computer sends:00 03 00 00 00 01 85 DB

pH/ORP send：00 03 02 02 AE 05 58

Return command annotation:

00 communication address

03 function code

02 length of the pH value

02 Hexadecimal high byte of pH value

AE Hexadecimal low byte of pH value

05 58 Calibrated value of CR

Chapter VI Product maintenance

1.The storage of pH glass electrode, short-term: it's stored at the buffered solution of pH=4; long-term: it's stored at the buffered solution of pH=7.

2. Due to contamination possibly lengthen the response time of the measurement , By cleaning of the tip of glass electrode bulbs of the pH sensor. CCl4 or soap solution can be used to wipe the dirt, then it can be continued to use after being soaked in the distilled water for a whole night. It can be soaked for 10~20 minutes by 5% HF solution when the contamination is serious, then immediately use water to wash clean, finally It's used after being soaked in the 0.1mol/L HCl solution for a whole night.

3.Treatment of glass electrode aging: the aging of glass electrode is related to the progressive change of the substratum structure. The response of the old electrode is slow, the membrane resistance is high, and the slope is low. The external substratum is etched by HF, which can usually improve the electrode performance. If the internal and external substratum can be regularly cleaned by this method, the service life of the

electrode is almost unlimited.

4.The best storage solution for the storage Ag-AgCl electrode of the reference electrode is saturation KCl solution, the high concentration KCl solution can prevent the AgCl from being deposited at the solution border and keep the solution border at the working condition. This method can also be used for the storage of combined electrode.

5.The problems of regenerated reference electrode are mostly caused by the blocking of solution border, which can be solved by the following methods:

(1)Solution border is soaked: the mixed liquid of 10% saturation KCl solution and 90% distilled water is heated to 60~70℃, the electrode is soaked for about 5cm, it's soaked for 20 minutes to 1 hour. This method can eliminate the crystal at the electrode terminal.

(2)Soaked by ammonia: the stronger NH3.H20 can be used to eliminate when the solution border is blocked by AgCl. The specific method is to wash clean the electrode, then it's soaked for 10~20 minutes in NH3.H20 after the solution is evacuated,

but the NH3.H20 can't enter the internal part of the electrode. The electrode is picked out and washed clean by distilled water, which can be continued to use by adding internal solution.

(3)Vacuum method: use soft tube to cover the solution border of the reference electrode, use pump to suck the internal solution until penetrate the solution border, and then the mechanical blocking materials are removed.

(4)Solution border is boiled: the solution border of Ag-AgCl reference electrode is soaked in boiled water for 10~20 seconds. Notice that the electrode shall be cooled to room temperature before the next boiling.

(5)The mechanical method of abrasive paper can be adopted to eliminate the blocking when the above mentioned methods are invalid, this method possibly blocks the ground sand grains into the solution border and cause permanent blocking.

Chapter VII Troubleshooting

1.No display at the controller？

Solution: check if the power supply is correctly connected.

2.Fluctuation of the displayed value?

Solution: check if there are frequency converters and other interference equipment at the surrounding environment, notice to keep away from these interference equipment or adopt grounding measures.

3.The pH instrument can't be calibrated？

Solution: the standard solution preparation is not correct or the electrode is damaged.

4.The test of standard solution pH4.00, pH7.00 and pH10.00 calibration is not correct?

Solution: if the standard solution is contaminated, exchange the standard solution for calibration again.

5.The response of the figure is slow?

Solution: the electrode physical bulb is covered by dirt, the response will become slow, please clean according to the

corresponding methods based on the types of the pollutants, it's normal phenomenon if it's slow in winter.

6.The screen displays ----?

Solution: When the screen displays ----, the measured value is out of range.