

# pH/ORP CONTROLLER

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## OPERATION MANUAL

MTWPH5000/

MTWPH5200

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## 一、 Safety information

Before installing this controller please read the following instructions.

1. Before power on, please check wires connect correctly .
2. To avoid install controller in the environment of high temperature,high humidity and corrosion.
3. The electrode cable has to use the specific coaxial cable.
4. To avoid the surge interference from power , please make sure the power cable connects to the ground or separate the power cable with motor/VFD equipments and use a surge absorber.
5. The relays contact rating is 5A. If the equipment current is over than 5A please don't use the controller's relay. You should use excess relay.

## 二、 Specifications

Function	pH	ORP
Measure Range	-2.00 to +16.00 pH	-2000mV to +2000mV
Resolution	0.01pH	1mV
Accuracy	±0.01	±1mV
ATC	Pt-100 / pt-1000	
Temperature Range	-10.0 to +120.0°C	
Temp. resolution	0.1°C	
Temp. accuracy	±0.2°C	
Ambient temperature	0.0 to +50°C	
Stored temperature	-20 to +70°C	
Input resistance	>1012Ω	
Display	Large LCD	
Output 1	4 to 20mA for pH/ORP, load < 600Ω	
Output 2	4 to 20mA for Temperature, load < 600Ω	
RS485	Modbus RTU protocol	
Relay contact rating	5A/250VAC、 5A/30VDC	
Clean relay ON:	1 to 1000 S、 OFF: 1 to 1000 hour	
Protection grade	IP65	
Power	90 to 260VAC	
Installing	Wall /Piping/Panel mounting	
Dimension	144mm X 144mm X 115mm (H/W/D)	
Cutout size	138mm X 138mm	
Weight	0.8Kg	

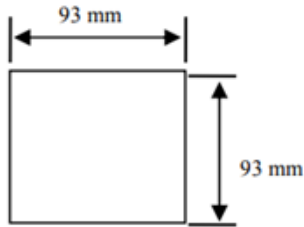
### 三、 Assembly

#### 3.1 Meter installation

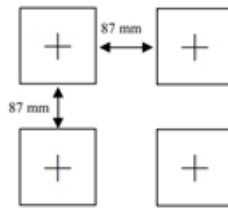
There are three kinds of installing method.

Panel mounting, Pipe mounting and Wall mounting

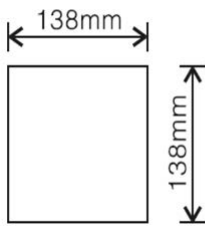
#### 3.2 Panel mounting



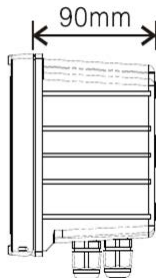
96 x 96 hole dimensions



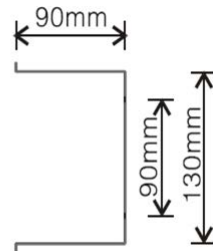
96 x 96 square hole spacing of the distribution box



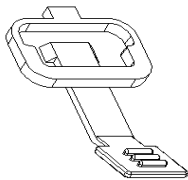
Hole dimensions,



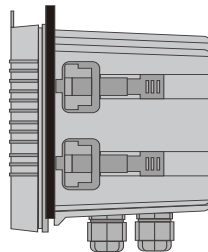
side drawings



fixers

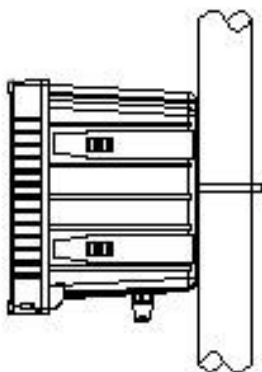


holder

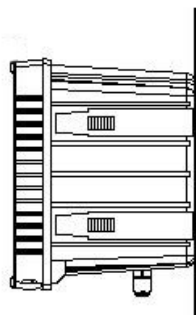


Holder for panel mounting

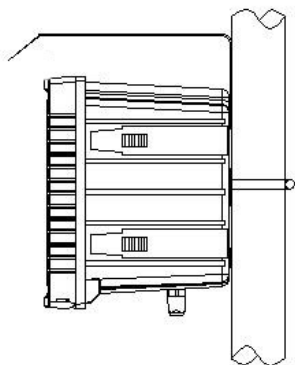
### 3.3 Pipe mounting and Wall mounting



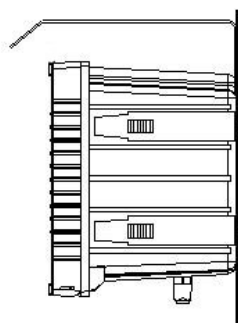
Pipe mounting



Wall mounting



Pipe mounting and shade



Wall mounting and shade

### 3.4 wire stripping



Black conductive rubber

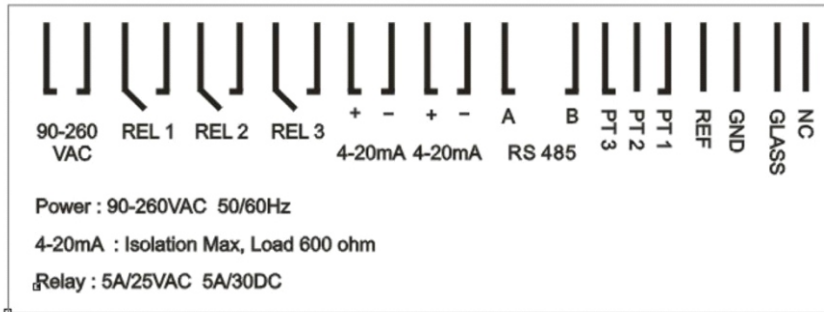


removed conductive rubber

- ① The black conductive rubber has to be stripped
- ② No any connections between electrode to meter unless specific connect box, the core wire connects to GLASS connector, the shade wire connects to Ref connector.

## 四、Connector

### 4.1 Wirings



### 4.2 Connector information

90-260AC : Power input, 50 or 60Hz

REL1 : Relay 1 connector ( 5A/250VAC、 5A/30DC)

REL2 : Relay 2 connector ( 5A/250VAC、 5A/30DC)

REL2 : Clean relay connector ( 5A/250VAC、 5A/30DC)

pH4-20mA : pH/ORP output

Temp4-20mA : Temperature output

RS485 : RS485, Modbus RTU protocol

Pt100 : Pt100 or Pt1000 temperature probe

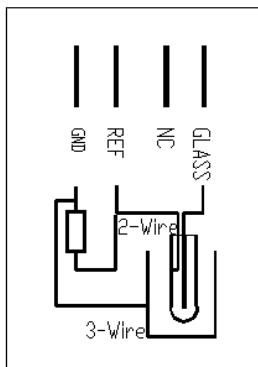
GND : no earth pin then short with REF

Or correct to earth pin

REF : Reference electrode

GLASS : Glass electrode

### 4.3 3-wire electrode



#### 2-wire electrode:

GND short with REF

REF connects to reference electrode

GLASS connects to glass electrode

#### 3-wire electrode:

GND connects to earth pin





REF connects to reference electrode

GLASS connects to glass electrode

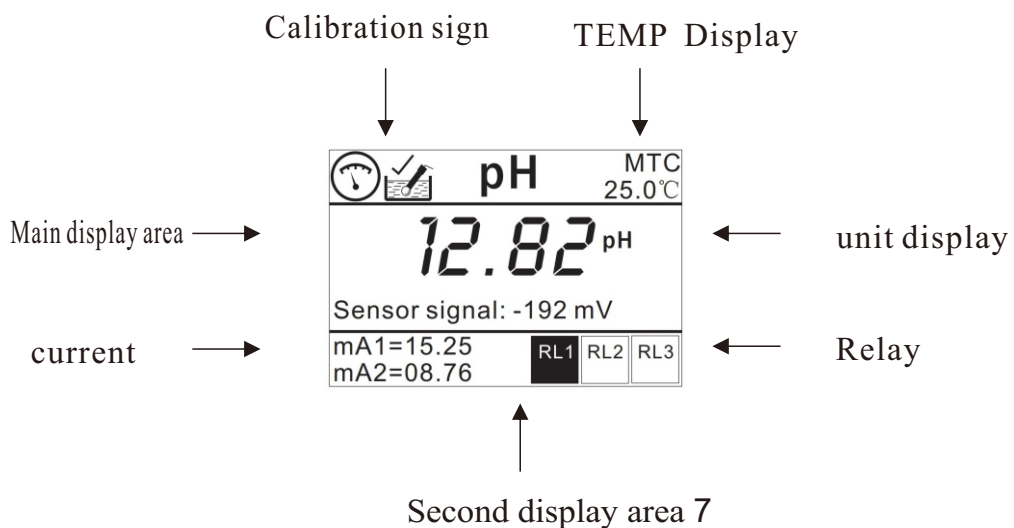
## 五、 Panel introduction

### 5.1 Panel drawing

### 5.2 Keypad

-  MENU, Enter in Setting Mode
-  UP/DOWN, Choose buffer
-  BACK, Exit
-  ENTER, Save and go to next mode

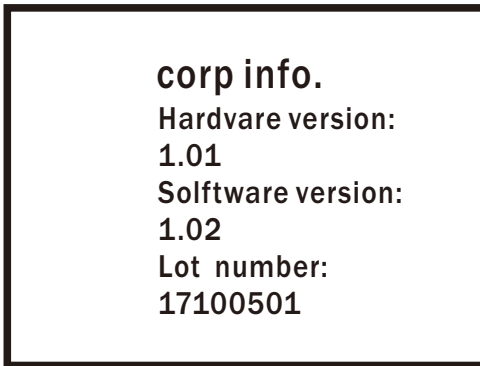
### 5.3 LED introduction



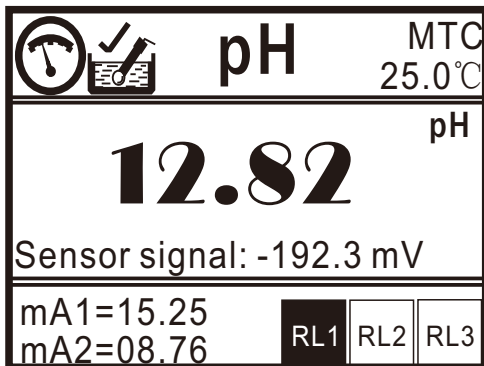
## 六、 Parameters setting

### 6.1 Calibration

Boot screen



Measurement mode



MTC, Means temperature set by manual  
 If it auto set, there will display ATC  
 Relay is on the sign will changed to black

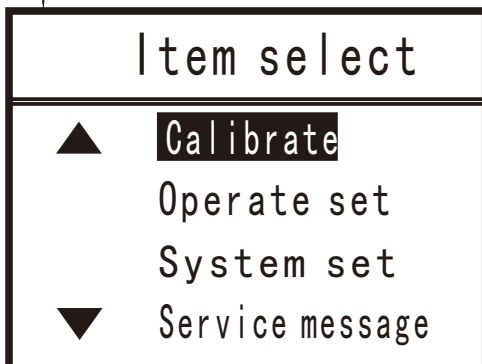


After calibration,  
 the sign have a tick.




Measuring sign

Press **x** to enter in item select screen



## pH Calibration

Select calibration at item select screen, then press  to enter Calibrate mode

<b>Calibrate</b>	
▲ <b>pH</b>	
	Temperature adjust
	Offset adjust
▼	

Press ▲ or ▼ to select pH calibration , press  go to next menu.

<b>Calibrate</b>	
▲ pH First point	
<b>6.86pH</b> 7.00pH	
▼	
7.15pH	-9.0 mV

← Select 6.86pH or 7.00pH

← Display pH data and sensor signal

After finished the Calibration, the LED will keep 3 seconds then go to next mode.

<b>Calibrate</b>	
▲ pH First point	
	7.00pH
▼ Zero	-3.6mV
	7.15pH -9.0 mV

Calibration have not passed, if no any action within 10 minutes, system will go back to measuring mode

Calibrate	
Firsr point error	
7.00pH	
Over range/Unstable	
9.15pH	-168.0 mV

First point result passed then go to sencond point

Calibrate	
pH second point	
<b>1.68pH</b>	4.01pH
9.18pH	10.01pH
12.45pH	
7.15pH	-9.0 mV

← select 1.68, 4.01, 9.18, 10.01, 12.45

← Display value and sensor signal

Calibration result is passed, the screen will keep 3 seconds then go to next mode

Calibration have not passed, if no any action within 10 minutes, system will go back to measuring mode.

Calibrate	
pH second point	
4.01pH	
Slop1	95.3%
7.15pH	-9.0 mV

Calibrate	
Second point error	
4.01pH	
Over range/Unstable	
9.15pH	-168.0 mV

Calibrate	
▲ pH Third point	
<b>1.68pH</b>	4.01pH
9.18pH	10.01pH
▼ 12.45pH	
7.15pH	-9.0 mV

← Select 1.68, 4.01, 9.18, 10.01, 12.45

← Display value and sensor signal

Calibration result is passed, the screen will keep 3 seconds then go to next screen.

Calibration have not passed,if no any action within 10 minutes, system will go back to measuring mode.

Calibrate	
pH Second point	
4.01pH	
Slope2	95.3%
7.15pH	-9.0 mV

Calibrate	
Second point error	
4.01pH	
Over range/Unstable	
9.15pH	-168.0 mV




## Notice:

Calibration function can judge terminal point and stability. If the data changed with 0.01pH in 10 seconds Consider it as terminal point and stability. If the data can not keep stable within 5 minutes, the screen will display unstable.




## Temperature calibration

Select Calibrate at Item select Screen then press  to enter

Calibrate	
▲	pH
	<b>TEMP</b>
	Offset adjust
▼	

Press  or  to select TEMP calibrate then press  to enter

Calibrate	
TEMP	
Sensore value:	26.3°C
Accurate value:	<b>25.8°C</b>
TEMP offset:	0.5°C

In this screen, you can adjust accurate value with  or  and press  to save data.

TEMP offset range:-10°C to10°C

Calibrate	
Tempreture	
Error	
Check sensor	
Check wiring	

### Notice:

Temperature calibration action can perform only when have auto temperature adjustment. If there isn't temperature sensor, it will display error information.

## ORP Calibration



Select Calibrate at Item select Screen then press  to enter

<b>Calibrate</b>	
▲	<b>ORP</b>
	TEMP
	Offset adjust
▼	



Press ▲ or ▼ to select ORP then press 

<b>Calibrate</b>	
▲	<b>ORP first point</b>
	Standard value: <b>86</b> mV
	Sensor value: <b>102</b> mV
▼	

ORP calibrate: User can set standard value with ▲ or ▼ then press  perform calibration. It will auto judge terminal point or press  by manual. After calibration the screen will show first point data.

ORP has two-point calibration at most, the display after calibration can refer to pH calibration process.

The error information is also refer to pH calibration.


## pH offset adjust

Select Calibrate at Item select Screen then press  to enter

Calibrate	
▲	pH
	TEMP
▼	<b>Offset adjust</b>

Press ▲ or ▼ to select offset adjust then press  to enter

Calibrate	
▲	pH offset adjust
	Sensor value: 8.36pH
▼	Accurate value: <b>7.95pH</b>
	pH offset: 0.41pH

In this screen, you can adjust accurate value with ▲ or ▼ and press  to save data.

pH offset range:  $\pm 2.00$  pH.

### Notice:

After calibration pH offset will be reset to zero.

ORP offset adjust procedure please refer to pH offset adjust screen.

## 6.2.1 pH Operate set


Press  enter in Item select screen

Item select	
▲	Calibrate
	<b>Operate set</b>
	System set
▼	Service


Select operate set then press 


Operate set	
	Password
	<b>0</b> 0 0 0

Enter in password then press 

 Operate set	
▲	<b>Control mode</b>
	Relay 1
	Relay 2
▼	Relay 3
	mA1
	mA2

Select control mode then press 

 OPR01	
▲	<Control mode>
	<b>Normal</b>
	Pulse length
▼	Pulse frequency


Select relay1 then press 

Normal mode

 OPR02	
▲	<Relay 1>
	<b>On</b> 10.00pH
▼	Off 09.50pH

Limit, High or Low


Pulse length mode

 OPR02	
▲	<Relay 1>
	<b>High</b> Low
	Limit <b>1</b> 0.00pH
▼	Proportion 100%
	Pulse length 20S

← Limit, High or Low

← Proportion range: 10% to 200%

← Range 5-50s

	OPR02
▲ <Relay 1>	
High Low	
Limit value	10.00pH
▼ Proportion	100%
Pulse frequency	010

← Limit, High or Low

← Proportion range:10%to200%

← Pulse frequency range:6-120


Select Relay2, press ↵ enter in Normal mode

Normal mode

	OPR03
▲ <Relay 2>	
On 10.00pH	
▼	09.50pH

Normal mode only have On/Off.

Pulse length mode


	OPR03
▲ <Relay 2>	
High Low	
Limit value	10.00pH
▼ Proportion	100%
Pulse length	20S

← Limit, High or Low

← Proportion range:10%to200%

← Range 5-50s

Pulse frequency mode


	OPR03
▲ <Relay 2>	
High Low	
Proportion	10.00pH
▼ Proportion	100%
Pulse frequency	010

← Limit, High or Low

← Proportion range:10%to200%

← Pulse frequency range:6-120

select Relay3 then press ↵

	OPR04
▲	<Relay 3>
	<b>Alarm</b> Clean
	Interval time: 120H
▼	duration time: 20S

← Select Alarm , relay1 and relay2 work

← Range: 1-1200 hours

← Range: 5-60 seconds


## Notice:

When perform clean. Please lock display value and current output. Turn off Relay1 and relay2 to keep system no error happened .After complete clean 1-2 minutes ,recover system.


The same operation is needed when select relay 3 and perform clean by manual.

Select mA1 then press ↵

pH output setting


	OPR05
▲	<mA 1>
	<b>pH</b> TEMP
	Range:
▼	4mA = 00.00pH
	20mA = 14.00pH

Temperature output setting


	OPR05
▲	<mA 1>
	pH <b>TEMP</b>
	Range:
▼	4mA = +000.0 °C
	20mA = +000.0 °C

Select mA2 then press ↵

pH output setting

	OPR06
▲	<mA 2>
	<b>pH</b> TEMP
	Range:
▼	4mA = 00.00pH
	20mA = 14.00pH

Temperature output setting

	OPR06
▲	<mA 2>
	pH <b>TEMP</b>
	Range:
▼	4mA = +000.0 °C
	20mA = +000.0 °C

## 6.2.2 ORP Operate set


Press  enter in Item select screen

Item select	
▲	Calibrate
	<b>Operate set</b>
	System set
▼	Service message


Select operate set then press 


Operate set	
	Password
	<b>0</b> 0 0 0

Enter in password then press 


 Operate set	
▲	<b>Control mode</b>
	Relay 1
	Relay 2
▼	Relay 3
	mA1
	mA2

Select control mode then press 

 OPR01	
▲	<Control mode>
	<b>Normal</b>
	Pulse length
▼	Pulse frequency


Select relay1 then press 

Normal mode

 OPR02	
▲	<Relay 1>
	<b>On</b> +1000mV
▼	Off +0950mV

Normal mode only have On/Off.

Pulse length mode


 OPR02	
▲	<Relay 1>
	<b>High</b> Low
	Limit +1000mV
▼	Proportion 100%
	Pulse length 20S

← Limit, High or Low

← Proportion range:10%to200%

← Range 5-50s


Pulse length mode

	OPR02
▲ <Relay 1>	
High	Low
Limit value	+1000mV
▼ Proportion	100%
Pulse frequency	010

- ← Limit, High or Low
- ← Proportion range: 10% - 200%
- ← Pulse frequency range: 6-120


Select Relay2, press  enter to Normal mode

Normal mode

	OPR03
▲ <Relay 1>	
On	1000mV
▼ Off	+ 50mV


Normal mode only have On/Off

Pulse length mode

	OPR03
▲ <Relay 1>	
High	Low
Limit value	+1000mV
▼ Proportion	100%
Pulse length	20S

- ← Limit, High or Low
- ← Proportion range: 10%to200%
- ← Range 5-50s

Pulse frequency mode

	OPR03
▲ <Relay 1>	
High	Low
Limit value	+1000mV
▼ Proportion	100%
Pulse frequency	010

- ← Limit, High or Low
- ← Proportion range: 10%to200%
- ← Pulse frequency range: 6-120

## 6.3 System set

Press  enter in item select

Item select	
▲	Calibrte
	Operate set
	<b>System set</b>
▼	Service

select system set then press 

System set	
password	
<b>0</b>	0 0 0

Enter in password then press  and select measure mode

System set	
▲	<b>Measure mode</b>
	TEMP mode
	RS-485
	LED contract
	digial filter
	Language
	passpord
	4mA adjust
	20mAadjust
▼	System reset

Measure mode select

SYS01	
<Measure mode>	
<b>pH</b>	Sensor
	<b>Glass</b>
	Antimony
ORP	

TEMP mode select

SYS02	
<TEMP mode>	
▲	Pt100 Pt1000
	22K <b>Manual</b>
▼	Manual:
	<b>+025.0°C</b>

Communication protocol

SYS03	
<RS 485>	
▲	<b>Com add</b> 001
	Baudrate 9600
▼	Stopbits 1bit
	Parity 8bs,no

Id NO. Max is 128,

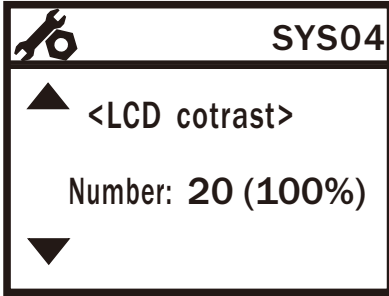
Baudrate range:2400to19200

Stopbits can be set

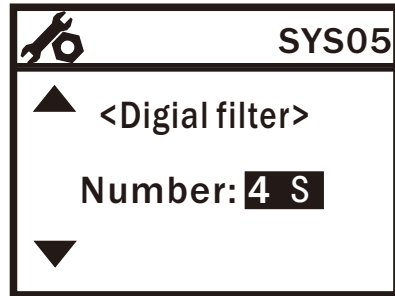
parity can be set



LED contrast



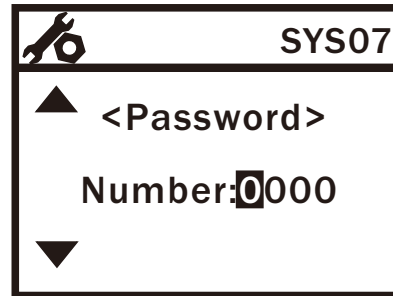
Digital filter



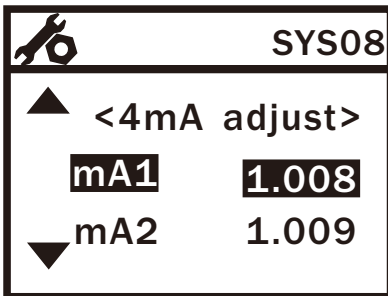
Language



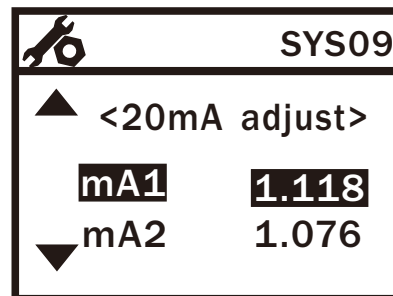
Password



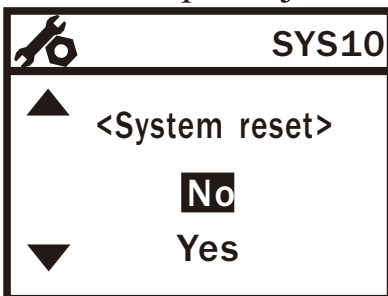
current output adjust



current output adjust




current output adjust



Notice:

If you haven't action within 10 s  
System setting mode will return to  
measuring mode

## 6.4 View operate

Press  to enter in View operate setting

View operate	
▲	<b>Calibrate</b>
	Control mode
	Relay 1
	Relay 2
	Relay 3
	mA1
▼	mA2



Cal info screen

View operate	
▲	<Cal info>
	Sensor offset:
	-5.8mV
	slope1: 95.3%
▼	slope2: 92.8%

Control mode screen

View operate	
▲	<control mode>
▼	Pulse length

Relay screen

View operate	
▲	<Relay1>
	<b>High</b> Low
	Limit value <b>+1000mV</b>
	Proportion 100%
▼	Pulse length 20S

Current output screen

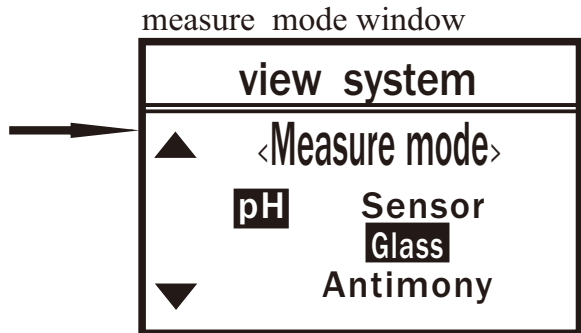
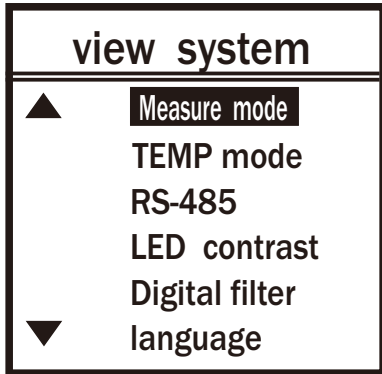
View operate	
▲	<mA 1>
	<b>pH</b> TEMP
	Range:
	4mA = 00.00pH
▼	20mA = 14.00pH

### Notice:

This section only  
can view operating  
setting data.

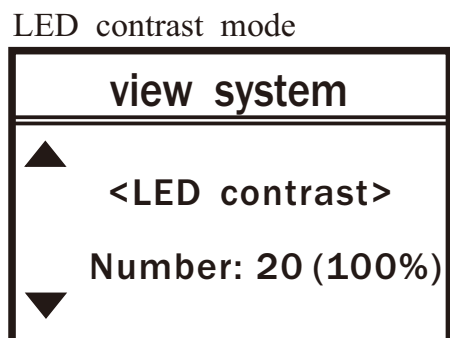
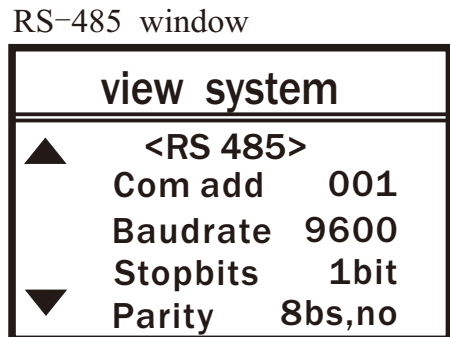
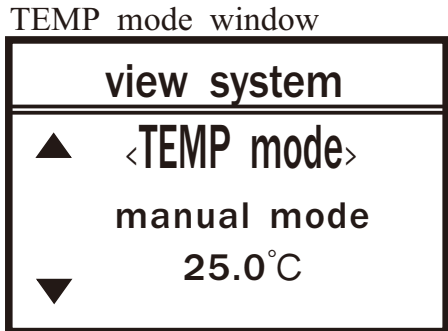
## 6.5 View system

Press ▲ (at measuring mode) switch to view system mode



### Notice:

This section only  
can view setting data.



### Digital filter

System set	
▲	<Digital filter>
	Number: <b>4 S</b>
▼	

### Language window

System set	
▲	<Language>
	English
▼	

## 6.6 Manual control

Press enter key for 3s(at measuring mode)switch to manual control mode

Manual Control				
▲	<b>Relay 1</b>			
	Relay 2			
	Relay 3			
▼	mA 1			
	mA 2			
	10.26 pH			
	<table border="1"><tr><td>RL1</td><td>RL2</td><td>RL3</td></tr></table>	RL1	RL2	RL3
RL1	RL2	RL3		



Here show measuring data

Press ▲ or ▼ choose the relay then press ↵

Manual Control				
▲	<b>Relay 1</b> <b>on</b> off			
	Relay 2			
	Relay 3			
▼	mA 1			
	mA 2			
	10.26 pH			
	<table border="1"><tr><td>RL1</td><td>RL2</td><td>RL3</td></tr></table>	RL1	RL2	RL3
RL1	RL2	RL3		