Conductivity controller

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U-SUP-EC8.0-EN2

Preface

Thank you for purchasing conductivity 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-SUP-EC8.0-EN2

Safety Precautions

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

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.   - Don't 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.

⚠

- Don't 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 us 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.

No.	Name	Quantity	Note
1	Conductivity controller	1	
2	Manual	1	
3	Certificate	1	

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.

Contents

Chapter 1 Product introduction

The product package contains 1 controller, 1 manual.

Controllers are used in industrial measuring of the temperature, conductivity, Resistivity, salinity and total dissolved solids, such as waste water treatment, environmental monitoring, pure water, sea farming, food production process, etc.

The instrument can be panel, wall or pipe mounted.

The instrument provides two current outputs. The maximum load is 500Ω.

The instrument provides 3 relays. It can pass though a maximum of 5A/250VAC or 5A/30VDC.

Chapter 2 Parameter

| Functions	EC	Resistivity	Salinity	TDS
Measuring range	0.00uS-2000 mS	0.00-20.00 MΩ-CM	0.00-78.00 g/Kg	0-133000 ppm
Resolution	0.01/0.1/1	0.01	0.01	1
Accuracy	±1%F.S.	±1%F.S.	±1%F.S.	±1%F.S.
Temp. compensation	Pt1000/NTC30K			
Temp. range	-10.0 to +130.0℃			
Temp. compensation range	-10.0 to +130.0℃			
Temp. resolution	0.1℃			
Temp. accuracy	±0.2℃			
Cell constant	0.001 to 20.000			
Ambient temp. range	0 to +70℃			
Storage temp.	-20 to +70℃			
Display	Back light, dot matrix			
EC current output1	Isolated, 4 to 20mA output , max. load 500Ω			
Temp. current output 2	Isolated, 4 to 20mA output , max. load 500Ω			
Current output accuracy	±0.05 mA			
RS485	Modbus RTU protocol			
Baud rate	9600/19200/38400			
Maximum relay contacts capacity	5A/250VAC,5A/30VDC			
Cleaning setting	ON: 1 to 1000 seconds, OFF: 0.1 to 1000.0 hours			
Multifunction relay	clean/period alarm/error alarm			
Relay delay	0-120 seconds			
Data logging capacity	500,000			
Language selection	English/traditional Chinese/simplified Chinese			
Waterproof grade	IP65			
Power supply	90~260 VAC, power consumption < 7 W			
Installation	panel/wall/pipe installation			
Weight	0.85Kg			

Chapter 3 Instrument installation

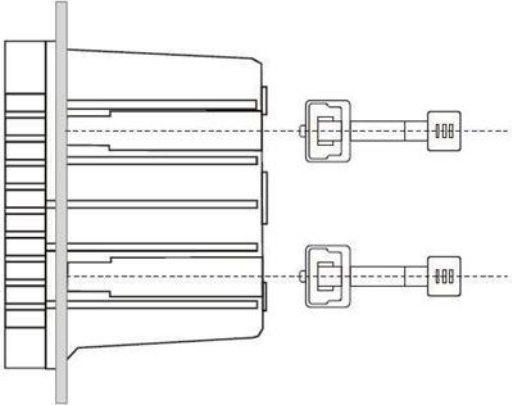The instrument can be panel, wall or pipe mounted installation.

Panel Installation: Make a 138x138 mm square cutout and insert the instrument. Screw in the fixed block with the screws and fixed bar.
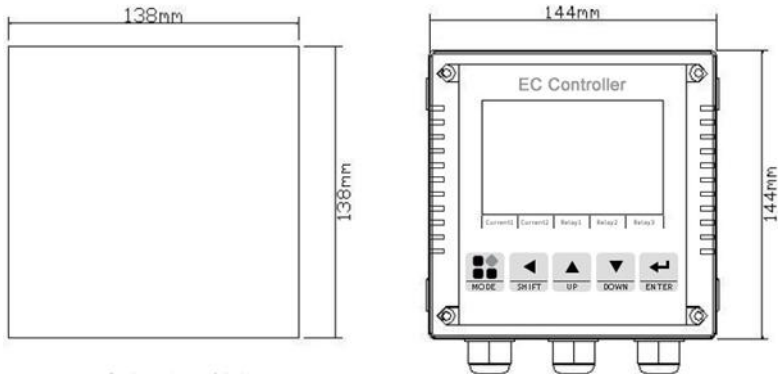
Cutout dimension
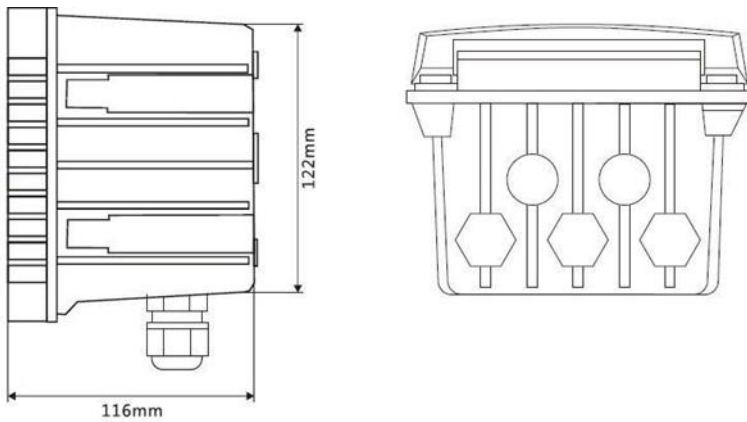
Overall dimension

Installation figure

Chapter 4 Wiring
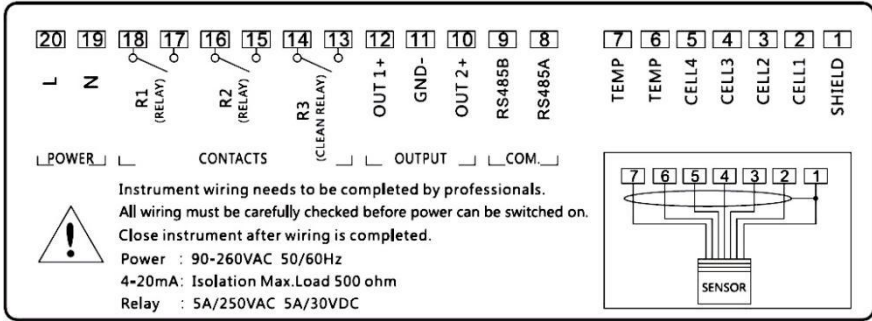
Wiring label

Chapter 5 Electrode connection figure
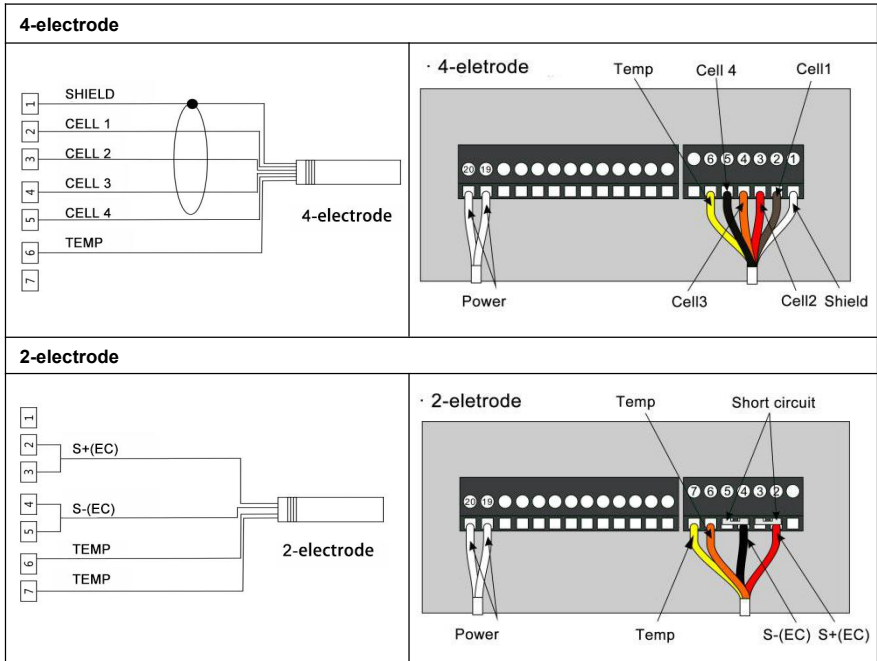
Chapter 6 Relay contact protection

Electrical spark at the relay contact may affect the life of the relay, especially in an inductive and capacitive load. In order to inhibit the spark and arc, user should use an RC circuit to extend the life of the relay.
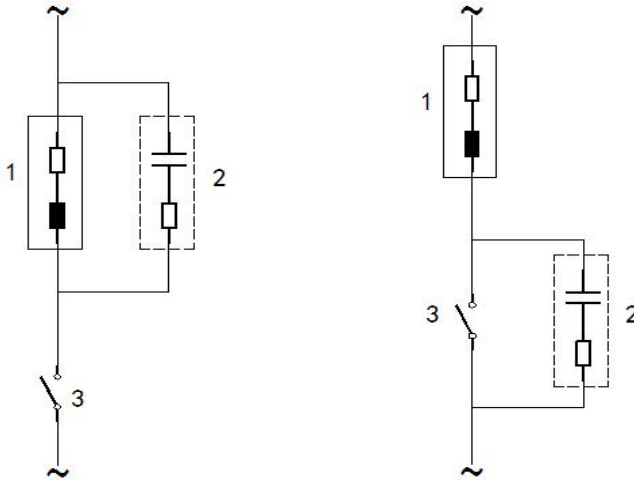
AC protection, use for inductive load

1. load
2. RC eliminate spark, using in 220VAC, R=100 ohm1W,C=0.1uF630V
3. Relay contact
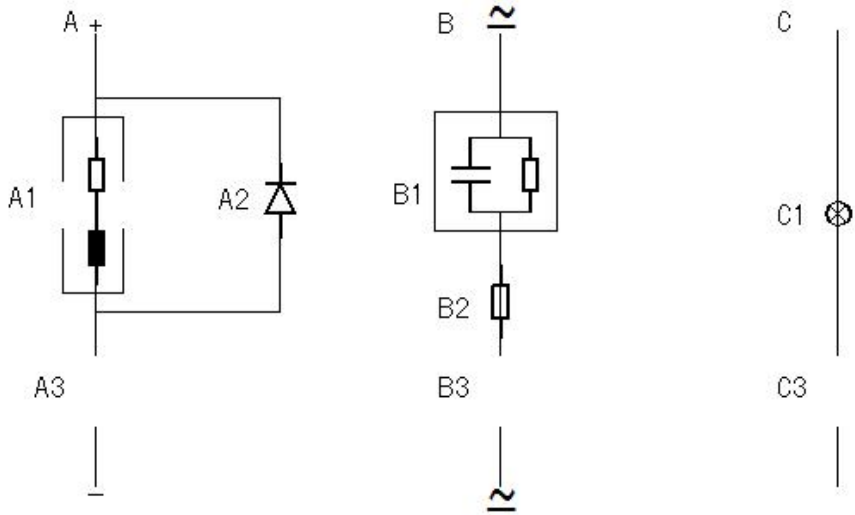
DC protection ,

A1: inductive load   A2: 1N4007

A3: relay contact

AC/DC protection ,

B1: capacitive load

B2: 0.8 Ohm/1W（DC24V）

B3: relay contact

Resistive load ,

C1:lamp bulb

C3:relay contact

Chapter 7 Display
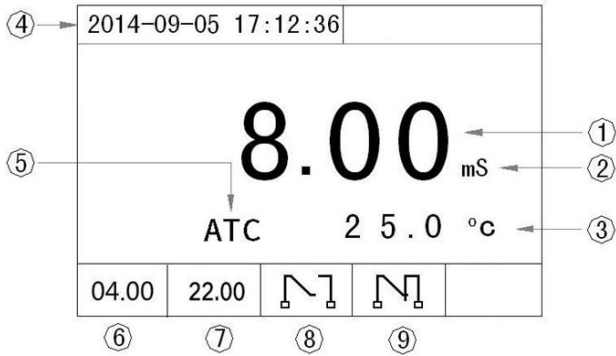
1. Main display

2. Unit

3. Temperature and unit

4. Date and time

5. Temp. compensation: auto(ATC) or manual(MTC)

6. First current output

7. Second current output

8. Relay 1

9. Relay 2

Note:

If the EC readings are over the range, it will display 99.99/999.9/9999

If the temperature readings are under or over the range, it will display -99.9/999.9.

Chapter 8 Key function

Key name	Meas. status	Setting status	Cal. status	Record status
MODE	Enter password	Exit	Exit	Exit
SHIFT	None	Move digit	Move digit	Move digit
UP	Enter record	Inc	Inc	Inc
DOWN	None	Dec	Dec	Dec
ENTER	ON/OFF back light	Enter	Enter	Enter

Chapter 9 HOLD Type

HOLD Type is a safe mode. It is for Calibration, Setting, Record and Clean. In this mode all the relays are open(inactive), current output follows the setting by user(last current or fixed current).

The instrument will enter HOLD Type when user presses into Calibration, Setting, Record or the instrument works in clean mode.

It will in HOLD Type around 10 seconds when it goes back to measurement mode form the above mentioned 4 modes then left HOLD Type.

The instrument will go into the HOLD Type when turn on the power. Current output in HOLD Type:

User has two choices: fixed current output or last current output.

- Fixed current:

  User can set the output current from 4.00 to 20.00mA when instrument goes into HOLD Type.

- Last current:

  User can set the output current keep at the last current when instrument goes into HOLD Type.

- Relays in HOLD Type: All relays are opened.(inactive)

Chapter 10 Setting

Press MODE key to enter the password menu and then press UP/DOWN/SHIFT key to input password 2008 then press ENTER will enter to setting mode or press MODE key to exit. If no key is pressed and over 10 minutes then it will go back to measurement mode.

```
              PASSWORD

              0 0 0 0
```
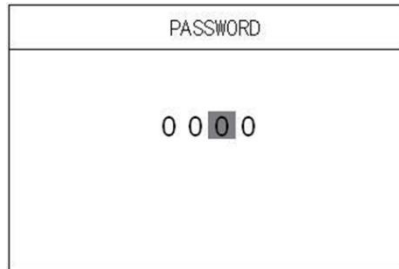
10.1 Main display

Press UP/DOWN key to choose functions, press ENTER key enter the function.
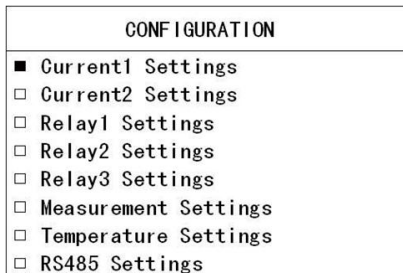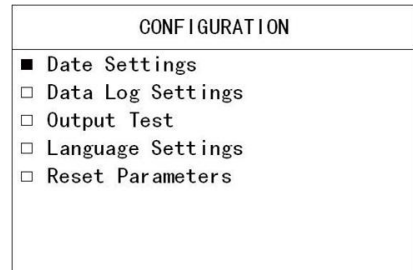
```
        CONFIGURATION                        CONFIGURATION
  ■ Current1 Settings                  ■ Date Settings
  □ Current2 Settings                  □ Data Log Settings
  □ Relay1 Settings                    □ Output Test
  □ Relay2 Settings                    □ Language Settings
  □ Relay3 Settings                    □ Reset Parameters
  □ Measurement Settings
  □ Temperature Settings
  □ RS485 Settings
```
| Page1 | Page2 |

Note:

1. When the input data is not in correct range then it will display ERROR on the top of LCD

2. After input data user needs to press ENTER to save the data.

3. Press MODE to exit.

4. No key is pressed in 10 minutes then it will go back to measurement mode.

10.2 Current 1 settings

```
           CURRENT 1 SETTINGS

4.00 mA      =    0 0 0 0 uS
20.00 mA     =    1 0 0 0 uS
Offset       =  + 0 . 0 0 mA
Filter Time  =      0 0 0 SEC
HOLD Type    = □ Fixed
                  0 4 . 0 0 mA
               □ Last
```

1. Set the corresponding 4.00mA to EC/ Resistivity/Salinity/TDS.

2. Set the corresponding 20.00mA to EC/ Resistivity/Salinity/TDS, the difference between 4.00mA and 20.00 mA at least for EC is 1.00/10.0/100(uS/mS), for Resistivity is 1.00MΩ,for Salinity is 1.00g/kg,for TDS is 100 ppm.

3. Set the offset current ,the range is± 1.00mA.

4. The filter time range is 0-120 seconds, the low pass filter of software will active when the current from one point to another point if user sets the filter time.

5. Set the current 1 output mode(fixed / last) when instrument enter into HOLD Type.

10.3 Current 2 settings

```
           CURRENT 2 SETTINGS

4.00 mA      =+ 0 0 0 . 0 ℃
20.00 mA     =+ 1 0 0 . 0 ℃
Offset       =  + 0 . 0 0 mA
Filter Time  =      0 0 0 SEC
HOLD Type    = □ Fixed
                  0 4 . 0 0 mA
               □ Last
```

1. Set the corresponding 4.00mA to temperature.

2. Set the corresponding 20.00mA to temperature, the difference at least between 4.00mA and 20.00mA is 10.0℃.

3. Set the offset current of temperature, the range is±1.00mA.

4. The filter time range is 0-120s, the low pass filter of software will active when the current from one point to another point if user sets the filter time.

5. Set the current 2 output mode(fixed / last) when instrument enter into HOLD Type.

10.4 Relay 1 settings

```
            RELAY 1 SETTINGS

    ON/OFF          = ■ ON
                      □ OFF
    Close S.P.      =    1 0 0 0 uS
    Open  S.P.      =    0 4 0 0 uS
    Delay Time      =      0 0 0 SEC
```

1. Press UP/DOWN key to ON/OFF (enable/ disable) relay1.

2. Close set point: active point for EC/ Resistivity/Salinity/TDS.

3. Open set point: inactive point for EC/ Resistivity/Salinity/TDS.

4. Delay time: the range is 0-120s. Relay needs to delay first then active if the measuring data is reach to close set point.

5. For example: If user wants turn on the pump at EC 1000uS and turn off it at EC 400uS, then the close S.P. needs to set to 1000uS, Open S.P. sets to 400uS.

10.5 Relay 2 settings

```
            RELAY 2 SETTINGS

    ON/OFF          = ■ ON
                      □ OFF
    Close S.P.      =    0 4 0 0 uS
    Open  S.P.      =    1 0 0 0 uS
    Delay Time      =      0 0 0 SEC
```

1. Press UP/DOWN key to ON/OFF (enable/ disable) relay2.

2.   Close set point: active point for EC/ Resistivity/Salinity/TDS.

3.   Open set point: inactive point for EC/ Resistivity/Salinity/TDS.

4.   Delay time: the range is 0-120 seconds. Relay needs to delay first then active if the measuring data is reach to close set point.

5.   For example: If user wants turn on the pump at EC400uS and turn off it at EC 1000uS, then the close S.P. needs to set to 400uS, Open S.P. sets to 1000uS.

10.6 Relay 3 settings

```
           RELAY 3 SETTINGS
ON/OFF        = ■ ON
              = □ OFF
Period Time   = 0 0 0 1 . 0 HOUR
Clean Time    =     0 0 1 0 SEC
Delay Time    =       0 0 0 SEC
Function      = □ Rinsing
                □ Interval Alarm
                □ Error Alarm
```

1.   Press UP/DOWN key to ON/OFF (enable/disable) relay3.

2.   Period time: The period for Rinsing or interval function.

3.   Clean time: When period is timeout then relay active.

4.   Delay time: the range is 0-120s. Relay needs to delay first then active if the period is timeout.

5.   Function: Press UP/DOWN key to choose Rinsing/Interval/Error.

Notice:

1.   Rinsing: when period timeout then clean-relay will active, when clean time is timeout the repeat count for the period.

2.   Interval alarm: When period timeout then clean-relay active until user resets the interval then the clean-relay inactive and repeat count for the period.

3.   Error alarm: The clean-relay active when there is a error produce. No delay time function in this mode.

10.7 Measurement settings

```
MEASUREMENT SETTINGS
Mode       =■ Conductivity
            □ MΩ-CM
            □ Salinity
            □ TDS
```

```
MEASUREMENT SETTINGS
Range      =□ 20.00 uS
            □ 200.0 uS
            ■ 2000  uS
            □ 20.00 mS
            □ 200.0 mS
            □ 2000  mS
Offset     = +000 uS
Filter     =     01
```

Conductivity measurement setting

```
MEASUREMENT  SETTINGS
Offset     =+0.00 g/Kg
Filter     =    01
```

Resistance measurement setting

```
MEASUREMENT  SETTINGS
Comp. Mode =■ Linearity
            □ Pure
Offset     =+0.00 MΩ
Filter     =    01
```

Salinity measurement setting

```
MEASUREMENT  SETTINGS
TDS Coeff  =  0.500
Offset     =  +000 ppm
Filter     =    01
```

1. Choose the mode for measuring, press UP/DOWN key to choose, press ENTER to next.

2. The Range selection for EC only.

3. Offset , range for EC is ±1.00uS/ ±10.0uS/ ±100uS/ ±1.00mS/ ±10.0mS/ ±100mS,for Resistivity is ±1.00MΩ,for Salinity is ±1.00g/Kg, for TDS is ±100ppm

4. Filter: Range 0-10.

5. Note : If the reading is not stable then user can set the filter to average the readings.

10.8 Temperature settings

Automatic/manual temperature compensation selection, press UP/DOWN key to choose.

```
TEMPERATURE  SETTINGS              TEMPERATURE  SETTSINGS

Automatic    = ■ Auto              Display      = ■ YES
               □ Manual                           □ NO
Probe        = □ Pt 1000
               □ NTC 30K
Offset       =    + 0 . 0 ℃
Manual Meas. = + 0 2 5 . 0 ℃
Manual Cal.  =    2 5 . 0 ℃
```

1. Temperature compensation setting, press UP/DOWN key to choose.

2. Temperature probe, press UP/DOWN key to choose.

3. Temperature offset ,the range is±5.00℃.

4. Temperature for measuring when user set the temperature to manual.

5. Temperature for calibration mode when user sets the temperature to manual.

6. Temperature display: display the temperature on measurement mode or not

Note:

1. When user chooses AUTO and doesn't connect temperature probe then the display will not correct.

2. When select the probe needs to make sure the probe type is correct.

3. Manual measurement: the instrument will use this temperature for compensation in measurement mode when user chooses Manual.

4. Manual calibration: the instrument will use this temperature for compensation in calibration mode when user chooses Manual.

10.9 RS485 settings

```
      RS485  SETTSINGS

ID Address    = 0 0 1
Baud Rate     = □ 9600
              = □ 19200
              = □ 38400
```

ID address:1-255.

Baud rate ,press UP/DOWN key to choose.

10.10 Date settings

```
      DATE SETTINGS

Year      = 2 0 1 5
Month     = 0 8
Day       = 1 5
Hour      = 1 3
Minute    = 3 6
Second    = 0 4
```

Press UP/DOWN key to set the date. When power off the date will be kept for around 2 days

10.11 Data log settings

```
   DATE  LOG  SETTINGS

ON/OFF        = ■ ON
                □ OFF
Display Type  = □ Record
                □ XY Chart
Reset Record  = □ Yes
                □ No
Save Period   = 0 6 0 SEC
```

Press UP/DOWN key to ON/OFF (enable/disable) this function.

Display type, press UP/DOWN key to choose

Erase all the records.

Saving period from 5~120s.

Notice:

1. When user chooses ON, then it will save measuring data follow the save period time.

2. Display type: Record, display the detail of record(5 records in one page), XY chart, display a chart.(150 records in one page)

3. When reset the records, it will spend around 10s.

10.12 Output test

OUTPUT TEST	
Current1	= 0 4 . 0 0 mA
Current2	= 0 4 . 0 0 mA
Relay1	= □ CLOSE
	□ OPEN
Relay2	= □ CLOSE
	□ OPEN
Relay3	= □ CLOSE
	□ OPEN

Current 1 output: 4.00-20.00mA, press UP/DOWN to set.

Current 2 output: 4.00-20.00mA, press UP/DOWN to set.

Relay 1 output, press UP/DOWN to choose.

Relay 2 output, press UP/DOWN to choose.

Relay 3 output, press UP/DOWN to choose

Notice: This function for testing the output only

10.13 Language settings

LANGUAGE SETTSINGS	
Language	= ■ English
	□ 繁體中文
	□ 简体中文

Press UP/DOWN key to choose the language.

10.14 Reset parameters

```
        RESET PARAMETERS

Reset Type    = ■ Current
                □ Relay1
                □ Relay2
                □ Relay3
                □ All
```

Press UP/DOWN key to choose the language.

Notice: The reset will not affect the calibrated parameters.

10.15 Record query

```
   INPUT RECORD START NUMBER



          01030 0
```

Press UP key at the measurement mode to enter record query mode.

Press UP/DOWN and SHIFT key to input record number then press ENTER key enter or press MODE key to exit.

```
        RECORD 020300

15-08-14      0200     uS
21:20:49      025.0    °C
15-08-14      0201     uS
21:20:59      025.0    °C
15-08-14      0201     uS
21:21:09      025.0    °C
15-08-14      0201     uS
21:21:19      025.0    °C
15-08-14      0201     uS
21:21:29      025.0    °C
```

Display EC record at record，5 transactions each time

```
        RECORD 020300

2000


1000


0000    15-07-14    21:20:49
```
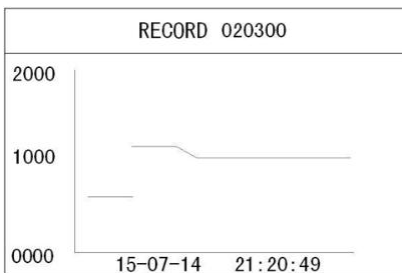
Display EC record at XY chart，150 transactions each time

10.16 EC Calibration

Press MODE key to enter the password menu and then press UP/DOWN/SHIFT key to input password 1008 then press ENTER will enter to calibration mode or press MODE key to exit. If no key is be pressed and over 10 minutes then it will go back to measurement mode.

```
        PASSWORD


         0 0 0 0
```

10.17 Menu

```
        CALIBRATION

   ■ Parameters Setting
   □ Calibration
   □ Reset Parameters
```
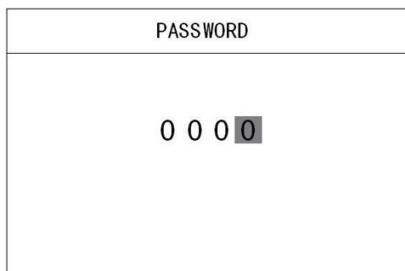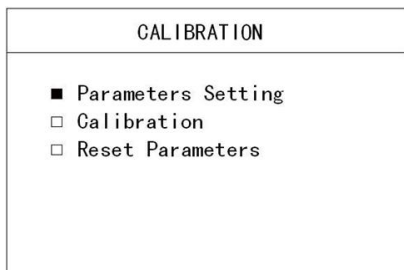
Press UP/DOWN key to select the functions and then press ENTER key to enter.

parameters setting: Input the parameters.

Calibration: Calibrate the EC.

Reset parameters: reset all of the calibrated parameters to default.

Notice:

If the cell constant is over than ±30%, user should replace the new electrode.

10.18 Reset parameters

RESET PARAMETERS RESET	This will reset all of the calibrated parameters to defaul

10.18 Parameters Setting

PARAMETERS SETTING Temp. Coef. = 0 2.0 0 % Ref. Temp. = 2 5.0 ℃	Temperature Coefficient of solution: the range is form 0.01 to 40.00% Reference Temperature: the range is from 15.0 to 35.0 ℃ Note:In general, the conductance is compensated back to 25.0℃, if the user wants to compensate back to other temperatures, the reference temperature can be changed

10.19 Calibration

CALIBRATION Last Cell = 0 1.0 0 0 0 EC Reading = 1 0 4 3 uS Temerature = + 0 2 5.0 ℃ Input Cell = 0 1.2 0 0 0 Input Cell Constant	Put the electrode to the standard solution. It will display the EC reading. When the EC reading is stable then press UP/DOWN key to modify the cell constant to make the EC reading correspond to the standard solution. If the EC Reading is over the EC range or the temperature is over 0.0-60.0℃ then it will display error message on the button of LCD.

Chapter 11 Default

EC 20.00mA	corresponding	2000	uS	difference : 100uS range: 100 - 2000
EC 4.00mA	corresponding	0	uS	range: 0 - 1900
RES 20.00mA	corresponding	10.00	MΩ	difference : 1.00 M Ω range: 1.00 - 20.00
RES 4.00mA	corresponding	0.00	MΩ	range: 0.00 - 19.00
SAL 20.00mA	corresponding	10.00	g/Kg	difference : 1.00 g/Kg range: 1.00 - 78.00
SAL 4.00mA	corresponding	0.00	g/Kg	range: 0.00 - 77.00
TDS 20.00mA	corresponding	1000	ppm	difference : 100ppm range: 100 - 133000
TDS 4.00mA	corresponding	0	ppm	range: 0 - 132900
Temp. 20.00mA corresponding		100.0	℃	difference : 10.0℃ range: 0.0 - 130
Temp. 4.00mA corresponding		0.0	℃	range: -10.0 - 120.0
Current 1 output offset		0.00	mA	range: +/- 1.00
Current 2 output offset		0.00	mA	range: +/- 1.00
Current 1 filter		0	second	range: 0 - 120 second
Current 2 filter		0	second	range: 0 - 120 second
Current 1 fixed output		4.00	mA	range: 4.00 - 20.00
Current 2 fixed output		4.00	mA	range: 4.00 - 20.00
Current 1 HOLD type		last		range: fixed/last
Current 2 HOLD type		last		range: fixed/last
Relay 1 EC close S.P.		2000	uS	difference : 1uS range: 0 - 2000

Relay 1 EC open S.P.	10	uS	range: 0 - 1900
Relay 1 RES close S.P.	10.00	MΩ	difference : $0.01\mathrm{M\Omega}$ range: 0.00 - 20.00
Relay 1 RES open S.P.	0.1	MΩ	range: 0.00 - 19.00
Relay 1 SAL close S.P.	10.00	g/Kg	difference: 0.01$\mathrm{g/Kg}$ range: 0.00 - 78.00
Relay 1 SAL open S.P.	0.1	g/Kg	range: 0.00 - 77.00
Relay 1 TDS close S.P.	1000	ppm	difference:1ppm range: 0 - 133000
Relay 1 TDS open S.P.	10	ppm	range: 0 - 132900
Relay 1 delay time	0	second	range: 0 - 120
Relay 2 EC close S.P.	1000	uS	difference :1uS range: 0 - 2000
Relay 2 EC open S.P.	10	uS	range: 0 – 1900
Relay 2 RES close S.P.	10.00	MΩ	difference :0.01$\mathrm{M\Omega}$ range: 0.00 - 20.00
Relay 2 RES open S.P.	0.1	MΩ	range: 0.00 - 19.00
Relay 2 SAL close S.P.	10.00	g/Kg	difference :0.01g/Kg range: 0.00 - 78.00
Relay 2 SAL open S.P.	0.1	g/Kg	range: 0.00 - 77.00
Relay 2 TDS close S.P.	1000	ppm	difference :1ppm range: 0 - 133000
Relay 2 TDS open S.P.	10	ppm	range: 0 – 132900
Relay 2 delay time	0	second	range: 0 - 120
Relay 3 period time	1.0	hour	range: 0 - 1000.0
Relay 3 clean time	10	second	range: 0 - 1000
Relay 3 delay time	0		range: 0 - 120

Relay 3 function	error alarm		range: clean/period alarm/ error alarm
Saving period	60	second	range: 5 - 120
ID address	1		range: 1 - 255
Baud rate	9600		range: 9600,19200,38400
EC Offset	0	uS	range: +/-100
Resistivity Offset	0.00	MΩ	range: +/-1.00
Salinity Offset	0.00	g/Kg	range: +/-1.00
TDS Offset	0	ppm	range: +/-100
Mode	EC		EC,RES,SAL,TDS
Measuring range	0-2000uS		0-20.00uS/0-200.0Us 0-2000uS/0-20.00mS 0-200.0mS/0-2000mS
Temp. Offset	0.0	℃	range: +/- 5.0
Manual Temp. for measurement	25.0	℃	range: -10.0 - 130.0
Manual Temp. for calibration	25.0	℃	range: 0.0 - 60.0
Language	English		English/traditional Chinese/simple Chinese
Filter	1		range: 0 - 10
Temp. compensation	ATC		TC/MTC
temp. probe	NTC30K		Pt1000, NTC30K
Record type	Record		record/XY chart

Chapter 12 Password

Press MODE key

1008:Calibration mode

2008:Setting mode

If no key is be pressed and over 10 minutes then it will go back to measurement mode.

Chapter 13 Error code

Error 01	memory error
Error 02	reading is over maximum
Error 03	reading is under minimum
Error 04	temperature is over maximum
Error 05	temperature is under minimum
Error 06	current 1 output is over 20.5 mA,the maximum is 22.00mA
Error 07	current 1 output is under 3.8 mA, the minimum is 3.5mA
Error 08	current 2 output is over 20.5 mA,the maximum is 22.00mA
Error 09	current 2 output is under 3.8 mA, the minimum is 3.5mA
Error 10	record error
Error 11	ADC damage
Error 99	default parameters lost

Chapter 14 RS485 communication

The instrument use the standard Modbus-RTU protocol, all of the data are word type(2 bytes), the range is -32767～32767 ,16 system.

PC command:

	ID address	command	Start address	Data number	CRC16
length	1 byte	1byte	2 byte	2 byte	2 byte
Ex.	0x01	0x03	0x0001	0x0001	0xD5CA

Instrument response:

	ID address	command	Data number	data	CRC16
length	1 byte	1 byte	1byte	N byte	2 byte
Ex.	0x01	0x03	0x02	0x02 0xBC	0xB895

If response is 01,the command is wrong.

If response is 02,the address is not correct.

If response is 03,data number is not correct.

Communication rate: 9600 (fixed)

Data: 8

Parity: None

Stop bit: 1

command 03: read the settings

command 04: read the readings 04:definition

04:definition

Address

(00) 0x00   EC/RES/SAL/TDS measuring1   reading: floating unit is uS

(01) 0x01   EC/RES/SAL/TDS measuring2   reading:

measuring1 and measuring2 combine to a floating

(02) 0x02   EC/RES/SAL/TDS current   reading:X 0.01

(03) 0x03   Temperature   reading:X 0.1

(04) 0x04   Temperature current   reading:X 0.01

(05) 0x05   Error code   reading:X 1

(06) 0x06   Measure mode   reading:0= EC, 1=RES, 2=SAL,3=TDS

(07) 0x07

(08) 0x08

(09) 0x09   Model type   fix to 3

03:definition

Address

(00) 0x00   EC 20.00mA corresponding (current 1)
reading:X0.01/0.1/1

(01) 0x01   EC 4.00mA corresponding (current 1)
reading:X0.01/0.1/1

(02) 0x02   RES 20.00mA corresponding (current 1)   reading:X0.01

(03) 0x03   RES 4.00mA corresponding (current 1)   reading:X0.01

(04) 0x04   SAL 20.00mA corresponding (current 1)   reading:X0.01

(05) 0x05   SAL 4.00mA corresponding (current 1)   reading:X0.01

(06) 0x06   TDS1 20.00mA corresponding (current 1)   reading:X1

(07) 0x07   TDS2 20.00mA corresponding (current 1)   reading:X1

(08) 0x08   TDS1 4.00mA corresponding (current 1)   reading:X1

(09) 0x09   TDS2 4.00mA corresponding (current)   reading:X1

(10) 0x0A   Temp. 20.00mA corresponding (current 2)   reading:X 0.1

(11) 0x0B   Temp. 4.00mA corresponding (current 2)   reading:X 0.1

(12)	0x0C	Current 1 offset	reading:X0.01	
(13)	0x0D	Current 2 offset	reading:X0.01	
(14)	0x0E	Current 1 filter	reading:X1	
(15)	0x0F	Current 2 filter	reading:X1	
(16)	0x10	Current 1 fixed current	reading:X0.01	
(17)	0x11	Current 2 fixed current	reading:X0.01	
(18)	0x12	Current 1 HOLD type	reading:X1	0=fixed,1=last
(19)	0x13	Current 2 HOLD type	reading:X1	0=fixed,1=last
(20)	0x14	Relay 1 EC close S.P.	reading:X0.01/0.1/1	
(21)	0x15	Relay 1 EC open S.P.	reading:X0.01/0.1/1	
(22)	0x16	Relay 1 RES close S.P.	reading:X0.01	
(23)	0x17	Relay 1 RES open S.P.	reading:X0.01	
(24)	0x18	Relay 1 SAL close S.P.	reading:X0.01	
(25)	0x19	Relay 1 SAL open S.P.	reading:X0.01	
(26)	0x1A	Relay 1 TDS1 close S.P.	reading:X1	
(27)	0x1B	Relay 1 TDS2 close S.P.	reading:X1	
(28)	0x1C	Relay 1 TDS1 open S.P.	reading:X1	
(29)	0x1D	Relay 1 TDS2 open S.P.	reading:X1	
(30)	0x1E	Relay 1 delay time	reading:X1	
(31)	0x1F	Relay 2 EC close S.P.	reading:X0.01/0.1/1	
(32)	0x20	Relay 2 EC open S.P.	reading:X0.01/0.1/1	
(33)	0x21	Relay 2 RES close S.P.	reading:X0.01	
(34)	0x22	Relay 2 RES open S.P.	reading:X0.01	
(35)	0x23	Relay 2 SAL close S.P.	reading:X0.01	
(36)	0x24	Relay 2 SAL open S.P.	reading:X0.01	
(37)	0x25	Relay 2 TDS1 close S.P.	reading:X1	
(38)	0x26	Relay 2 TDS2 close S.P.	reading:X1	

(39) 0x27   Relay 2 TDS1 open S.P.   reading:X1

(40) 0x28   Relay 2 TDS2 open S.P.   reading:X1

(41) 0x29   Relay 2 delay time   reading:X1

(42) 0x2A   Relay 3 clean period   reading:X0.1

(43) 0x2B   Relay 3 clean time   reading:X1

(44) 0x2C   Relay 3 delay time   reading:X1

(45) 0x2D   Relay 3 function   reading:X1

                              0:clean,1:period alarm,2:Error alarm

(46) 0x2E   Record saving time   reading:X1

(47) 0x2F   EC Offset   reading:X0.01/0.1/1

(48) 0x30   RES Offset   reading:X0.01

(49) 0x31   SAL Offset   reading:X0.01

(50) 0x32   TDS Offset   reading:X1

(51) 0x33   Temp. offset   reading:X0.1

(52) 0x34   Language   reading:X1

                              0=English ,1=traditional,2=Simple

(53) 0x35   Filter   reading:X1

(54) 0x36   Temperature coefficient   reading:X0.01 0.01%-40.00%

(55) 0x37   Reference temperature   reading:X0.1   15.0-35.0℃

(56) 0x38   Mode   reading:

                              0=EC,1=RES,2=SAL,3=TDS

(57) 0x39   Temp. probe   reading:

                              0=Pt1000,1=NTC 30K

Chapter 15 Warranty & After-sales Service

We promise to the customer that the hardware accessories provided during the supply of the instrument have no defects in material and manufacturing process.

From the date of the purchase, if the user's notice of such defects is received during the warranty period, the company will unconditionally maintain or replace the defective products without charge, and all non customized products are guaranteed to be returned and replaced within 7 days.

Disclaimers:

● During the warranty period, product faults caused by the following reasons are not in the scope of Three Guarantees service

● Product faults caused by improper use by customers.

● Product faults caused by disassembling, repairing and refitting the product.

After-sales service commitment:

● We promise to deal with the customer's technical questions within 2 hours.

● For the instruments returned to the factory for maintenance, we promise to issue the test results within 3 working days and the maintenance results within 7 working days after receiving them.