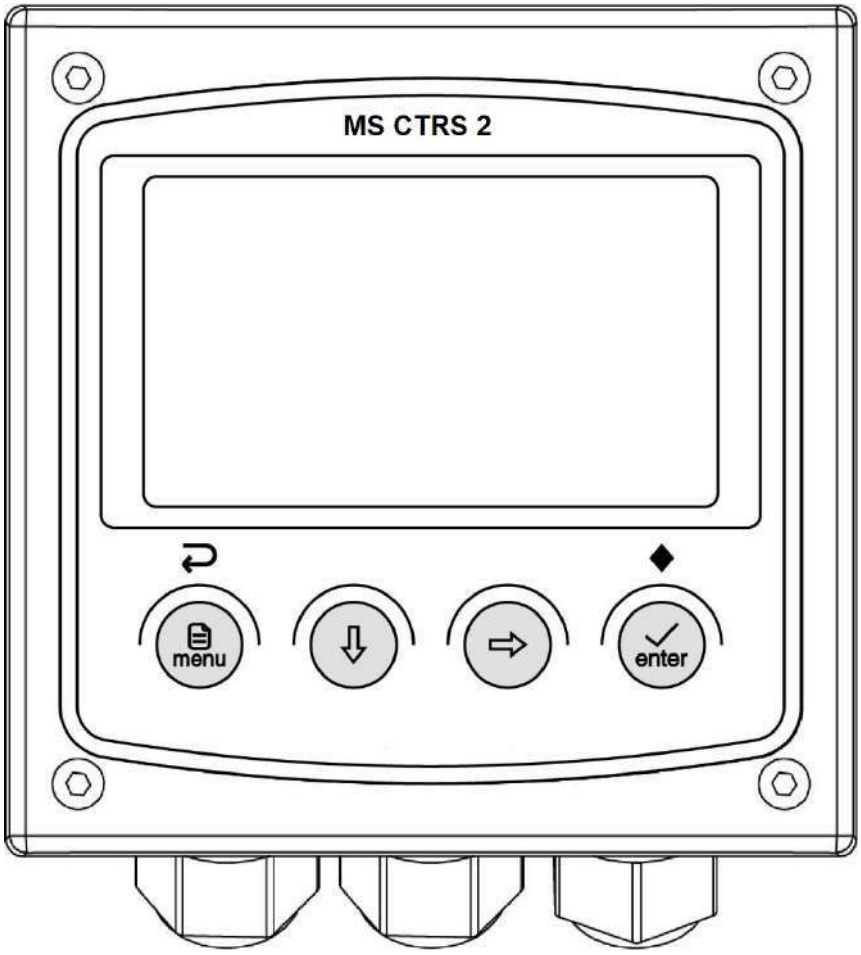
MicroSet
INSTRUMENTATION & CONTROLS

Conductivity Indicating Controller Cum Transmittter

MS CTRS 2

Instruction Manual



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Chapter 1 Overview

The online conductivity meter adopts a 2-electrode measurement method, which can be applied to various conductivity monitoring and control occasions.

1.1 Technical Parameters

Display Range	Conductivity: 0~20mS/cm Min. resolution: 0.001uS/cm
	Resistivity: 0~18MΩ·cm Min. resolution: 0.001MΩ·cm
	TDS: 0~10000ppm Min. resolution: 0.001ppm
	Salinity: 0~15ppt Min. resolution: 0.001ppt
	Temp.:-10~150℃ Fixed resolution: 0.1℃
Accuracy	Conductivity: ±1%FS, temp.: ±0.5℃
Temp. Compensation	PT100 automatic or manual
Relay Control	Two SPST relays, contact capacity: 3A 250V AC
	Control Type: main value/temp./wash/resistivity/TDS/salinity
Current Output	Two active 4~20mA or 0~20mA, max. Load 1000Ω
	Corresponding channel: main value/temp./resistivity/TDS/salinity
Comm. Interface(1)	NA
Calibration Method	Conductivity:Deviation & factor/1~5 point linear calibration
Display Screen	3.2 inch graphic LCD display
Configuration information	Power failure protection, parameters are retained indefinitely
Operating Environment	0~+60℃, relative humidity 0~95%, no condensation
Storage Environment	-20~+70℃, relative humidity 0~55%, no condensation
Power Supply	100~240VAC or 18~36VDC, 3W Max
Installation Method	Panel mounting
Instrument Dimension	100*100*120(unit: mm)
Protection Grade	IP66
Instrument Weight	About 500g

Chapter 2 Mechanical Installation

2.1 Dimension

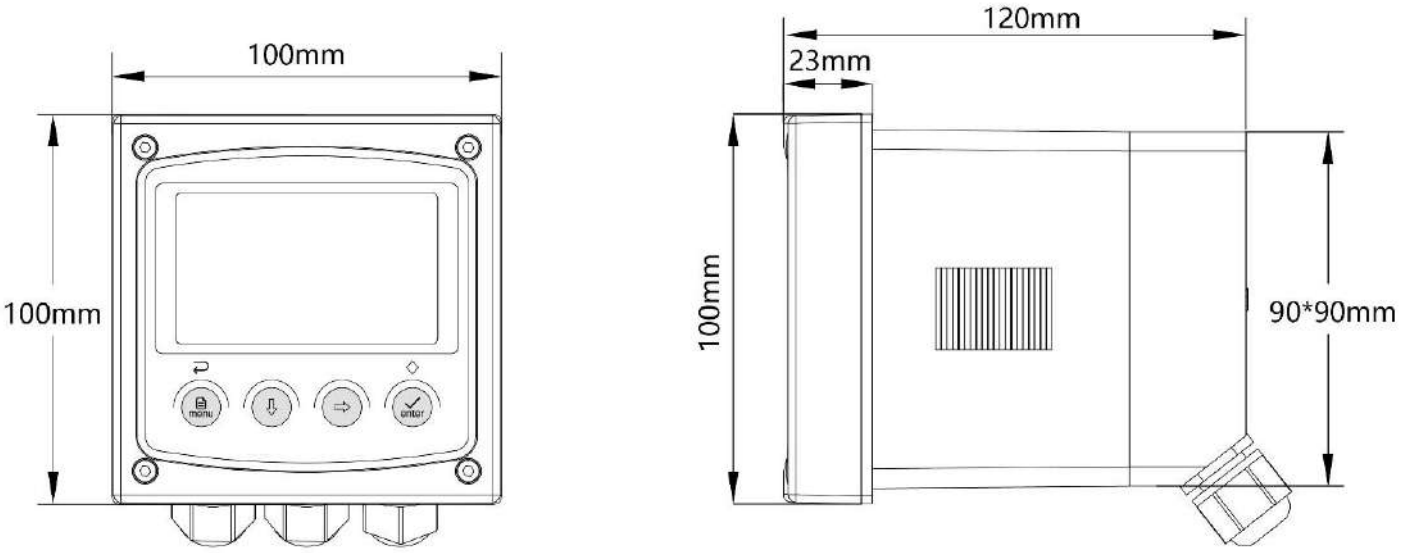


Figure 2-1 Instrument dimension

2.2 Installation

When the controller is selected for panel mounting, the user passes the fixing clips through the back of the instrument until it is tightened, and the mounting dimensions and diagram are shown below:

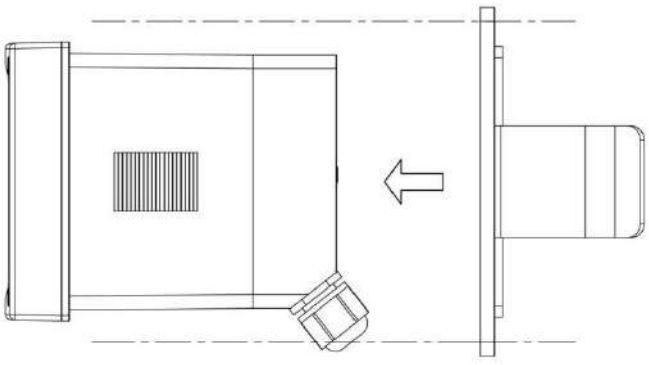


Figure 2-2 Panel mounting

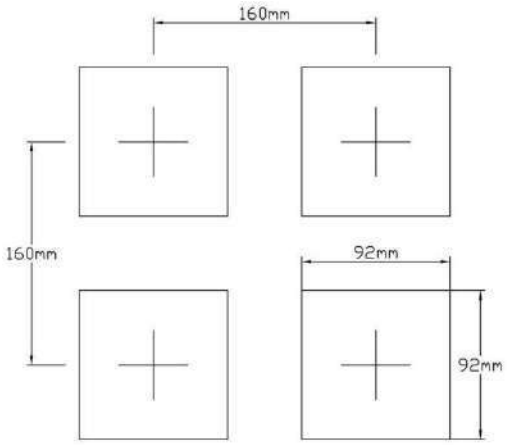


Figure 2-3 The minimum opening spacing

Chapter 3 Electrical Installation

3.1 Power Connection

After unscrewing the screws on the back of the meter, remove the cover and see the terminal blocks. According to the power supply type of the instrument, access 100~240VAC or 18~36VDC.

Note: Before connecting AC power, be sure to cut off the power supply

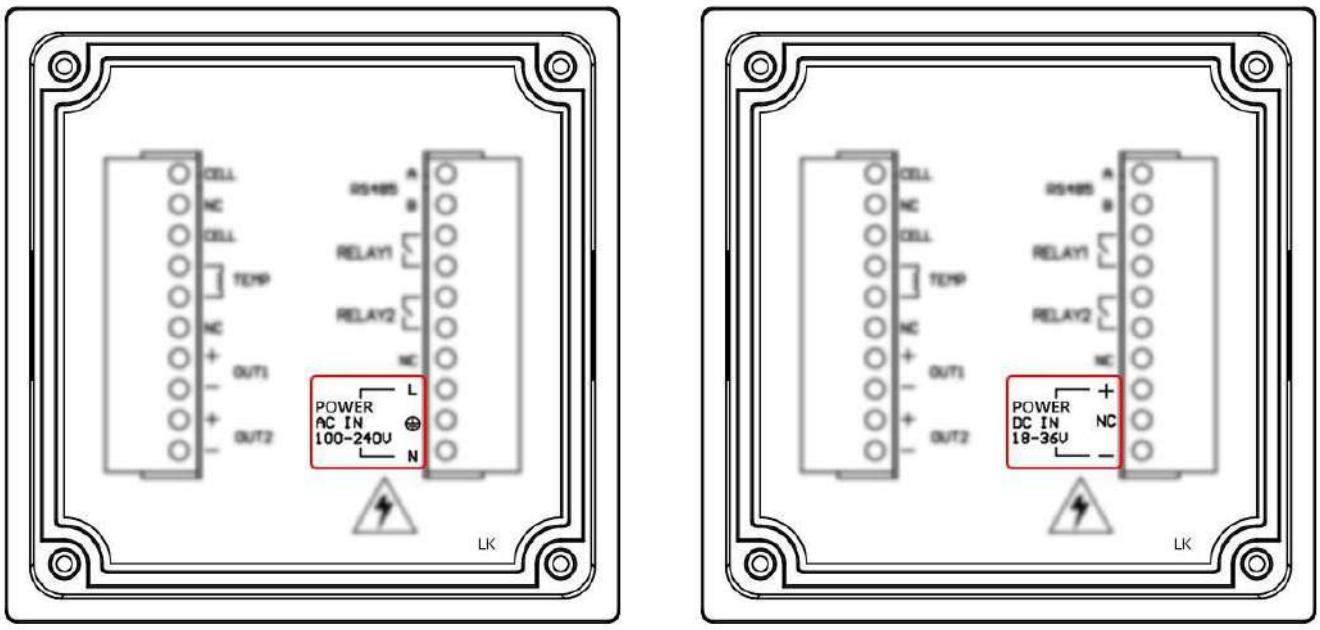


Figure 3-1 Two types of power terminals

Two kinds of power terminals are defined in the Table:

POWER AC IN 100-240V	L	AC power LIVE wire	POWER DC IN 18-36V	+	DC power positive
	⏚	AC power ground wire		NC	Floating terminal
	N	AC power NEUTRAL wire		-	DC power negative

3.2 Terminal Definition

The electrode cable is connected to the CELL, CELL, TEMP terminals, and the rest are connected according to actual needs.

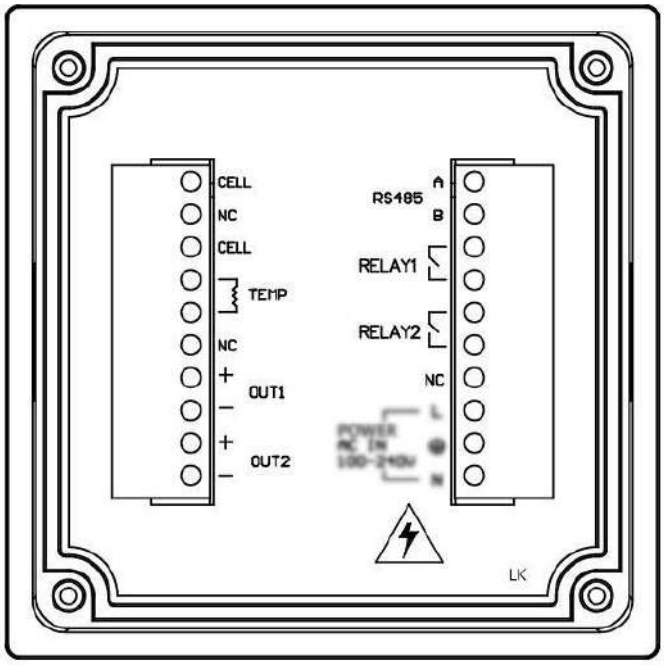


Figure 3-2 terminal blocks

The terminal locations and names are shown in the table below:

CELL		Conductivity probe input terminal	RS485(1)	A	RS485 signal D+(A)
NC		Floating terminal		B	RS485 signal D-(B)
CELL		Conductivity probe input terminal	RELAY1		Relay 1 contact
TEMP		Temp. probe input terminal			Relay 1 contact
		Temp. probe input terminal	RELAY2		Relay 2 contact
OUT1	+	Current 1 Output positive			Relay 2 contact
	-	Current 1 Output negative	NC		Floating terminal
OUT2	+	Current 2 Output positive			
	-	Current 2 Output negative			

Note: (1) Only AEC1-T2 model are equipped with RS485 function, the terminal of the unconfigured instrument is marked with "NC"

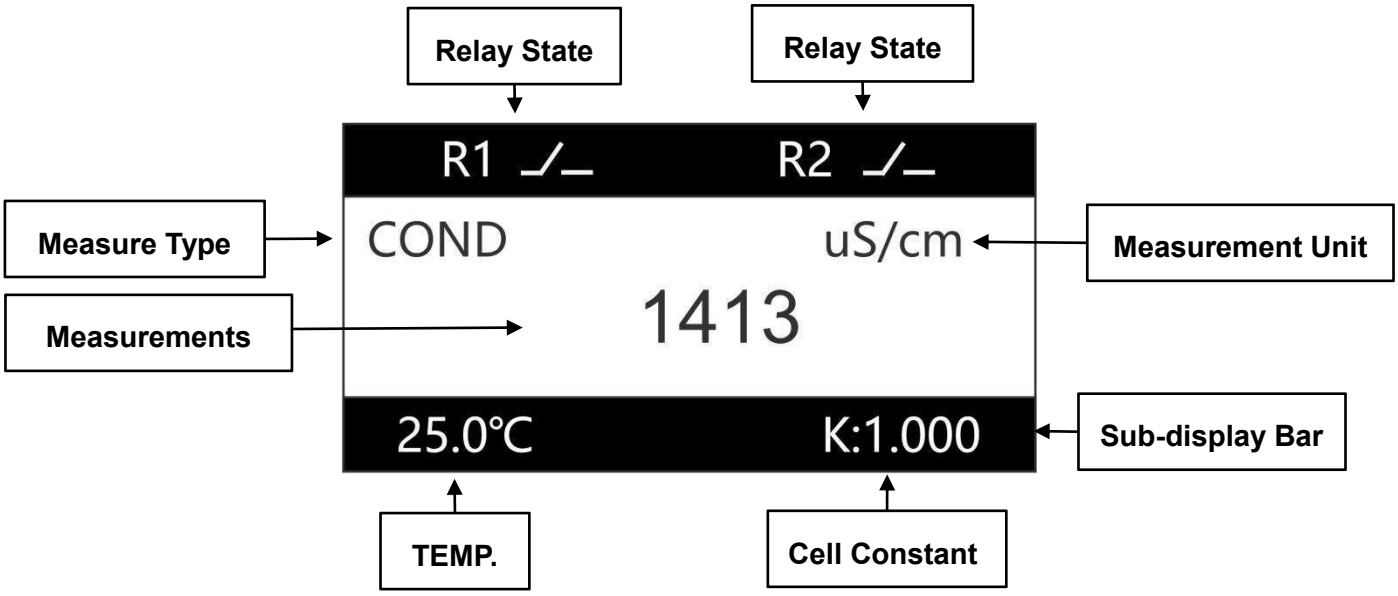
Chapter 4 User Interface

4.1 Panel Button

Button	Function
	In the main menu, long press to return to the measurement mode In the sub menu, return to the previous menu When setting the value, abandon the modification and return to the previous menu During calibration, cancel the calibration process In measurement mode, enter the main menu
	In measure mode, switch between two secondary display modes In the menu, move the cursor down When setting the value, subtract 1 from the value, or to change the sign bit
	In measurement mode, switch between four measurement value display modes (conductivity, resistivity, TDS, salinity) In the menu, move the cursor up When setting the value, move the cursor right
	In measurement mode, display the measurement status interface In the menu, enter the sub menu or the item selected by the cursor When setting the parameter (value or option), save the setting and return to the previous menu

4.2 Display Screen

The meter normally displays the measurement interface after power-on. The specific information is as follows:



- **Relay state:** indicate the current relay state: on or off
- **Measurements/Type/Unit:** indicate the current measurement type, value and unit, If a triangle symbol with " ! " appears on the measurement interface, it means the measurementis out of the range. In the measurement mode, press the button  to switch conductivity(COND), resistivity(RES), TDS, salinity(SAL).
- **Sub-display bar:** press  under the measurement interface to switch the sub-display bar information: " Temp.&cell constant " and " two currents values "
- **Temperature:** display the current Temp. value, the temp. value is not displayed when the temp. probe is not connected.
- **Cell constant:** display the current K constant of probe .

Chapter 5 Menu Description

In the measurement interface, long press the 

button to enter the menu. This chapter describes the main features.

5.1 Probe Setting

- K constant set

  After the meter is connected to the electrode, the actual cell constant needs to be input first.
- Probe Calibration
  - EC offset/EC factor

  Correct the conductivity measurement value by setting the offset and factor.

  After setting, EC measurement value = original EC measurement value* EC factor + EC offset.
  - 1~5 point linear calibration

  Perform 1~5 point calibration according to the actual water sample value. For multi-point calibration, it is recommended to uniformly select calibration points within the actual measurement range. During calibration, it is necessary to calibrate from the first point in the order of conductivity from low to high. The operation method is as follows:

  (1) First prepare 1 to 5 water samples with known conductivity values, sort them from low to high conductivity values, and record them as water samples 1 to 5.

  (2) Clean the electrode with deionized water, dry it with filter paper, put in the water sample 1 with the lowest conductivity value, wait for the measured value to stabilize, enter the "1st point CAL" in the menu, and set the calibration value to the conductivity value of sample 1, press “enter” key to start the calibration, and wait for the calibration to end.

  (3) If multi-point calibration is required, after completing the "1st point CAL", take the electrode out of water sample 1, clean it with deionized water, dry it with filter paper, put it into water sample 2, and wait for the value is stable, enter the "2nd point CAL" in the menu, set the calibration value as the conductivity value of water sample 2, press “enter” key to start the calibration, and wait for the calibration to end.

  (4) The methods from "3rd point CAL" to "5th point CAL" are the same.

  Note: Choose to calibrate the 1st point during one-point calibration, select to calibrate the 1st and 2nd points during two-point calibration, select to calibrate the 1st to 3rd points during three-point calibration, and select to calibrate the 1st to 4th point during four-point calibration.
- Temperature Compensation Coefficient

  Since the meter displays the conductivity value at 25°C, it is necessary to set the conductivity temp. compensation coefficient of the water sample. The meter will convert the conductivity value at the current temp. to the value at 25°C through the built-in formula and then display it. .
- TDS Coefficient

  Set the TDS coefficient, TDS value = conductivity value (uS/cm) * TDS coefficient.

5.2 Alarm Setting

- **Control function**

  When “Main value Control”/“Temp. Control”/“Resistivity Control”/“TDS control”/“Salinity control” is selected in the “ Function Set ” menu, the relay is a control output relay.

  When “ On Value ” > “ Off Value ” are set in the menu, the relay is a high alarm control.
  When “ On Value ” < “ Off Value ” are set in the menu, the relay is low alarm control.

- **Wash relay**

  When “ wash relay ” is selected in the “ Function Set ” menu, the relay is in the wash output state, and the relay will on and off in the set cycle for wash control.
  When “ Hold ” is selected for “ wash State ”, when cleaning, the measurement display value remains unchanged before the relay is operated.
  When “ constant ” is selected for “ wash State ”, the measurement value is the real-time value of continuous measurement.

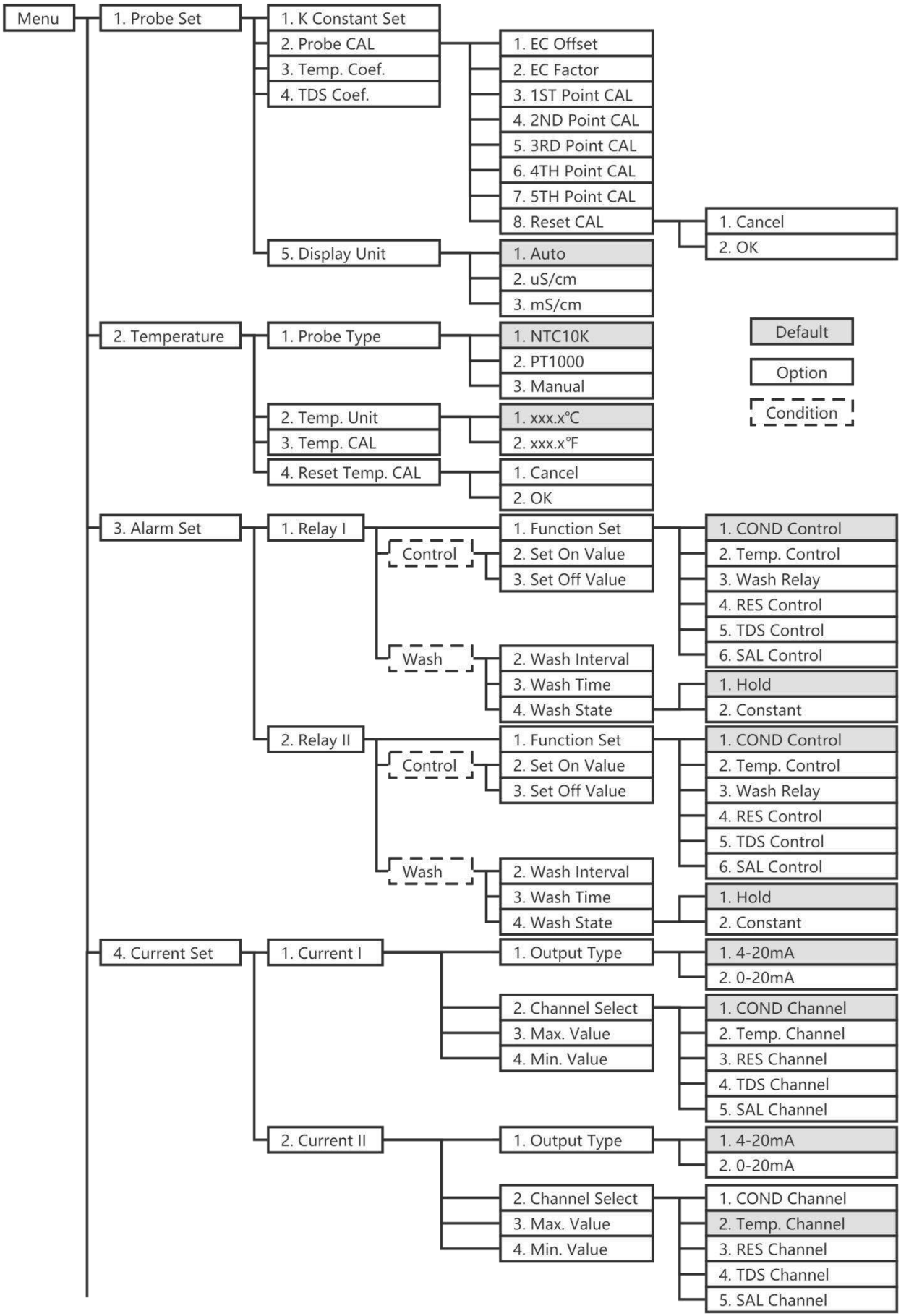
5.3 Current Setting

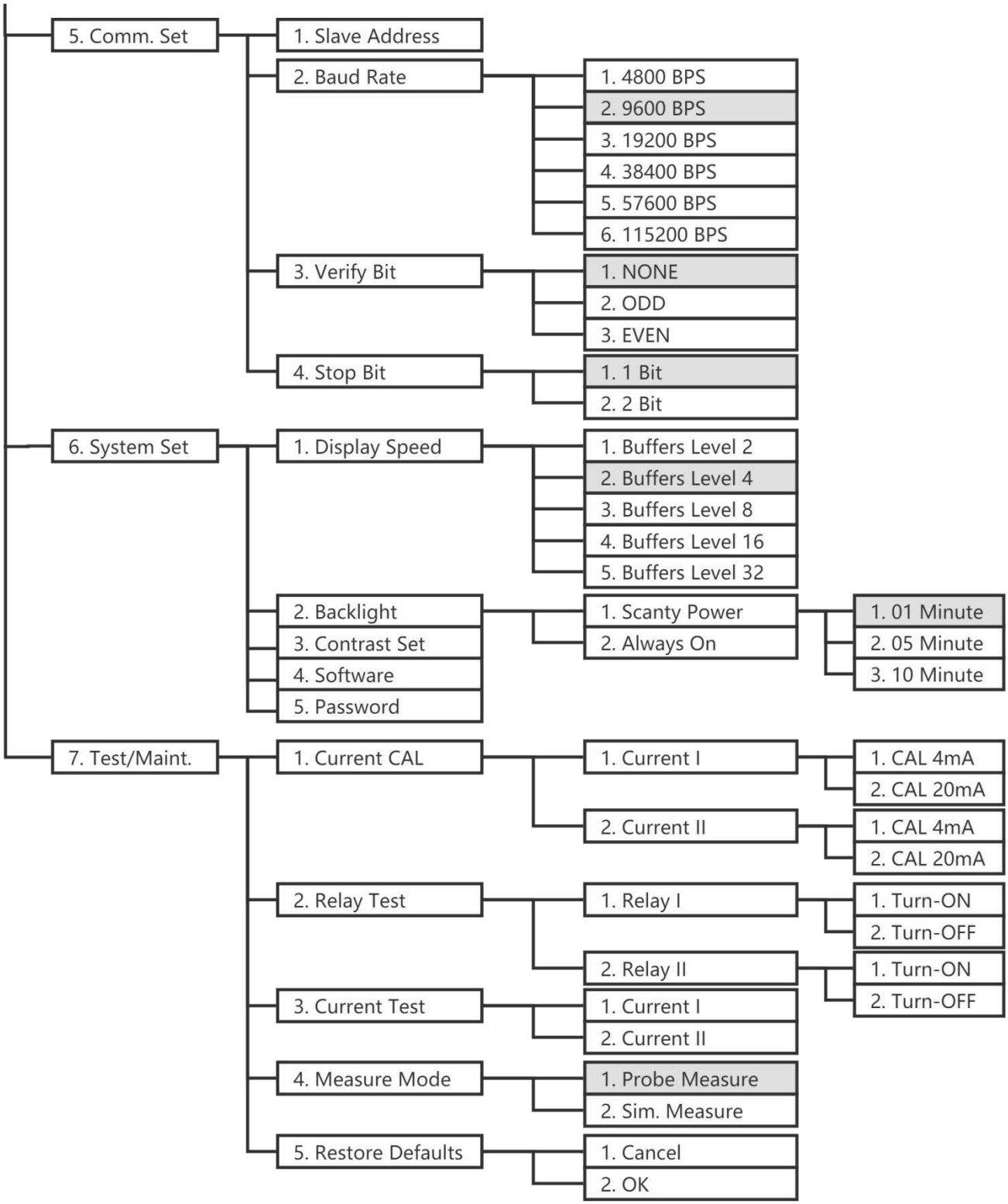
Use a current signal to output the measured value.
Set the measured value for the current in “ Channel Select ”.
The measured values corresponding to the current output “ 20mA ” and “ 0mA/4mA ” are set in “ Max. Value ” and “ Min. value ”, respectively.

5.4 Comm. Setting

Use RS485 interface to output the measured value.
The instrument adopts Modbus standard communication.Refer to the appendix for the description of relevant registers.

Menu Structure Diagram




5. Comm. Set
1. Slave Address
2. Baud Rate
1. 4800 BPS
2. 9600 BPS
3. 19200 BPS
4. 38400 BPS
5. 57600 BPS
6. 115200 BPS
3. Verify Bit
1. NONE
2. ODD
3. EVEN
4. Stop Bit
1. 1 Bit
2. 2 Bit
6. System Set
1. Display Speed
1. Buffers Level 2
2. Buffers Level 4
3. Buffers Level 8
4. Buffers Level 16
5. Buffers Level 32
2. Backlight
1. Scanty Power
1. 01 Minute
2. 05 Minute
3. 10 Minute
2. Always On
3. Contrast Set
4. Software
5. Password
7. Test/Maint.
1. Current CAL
1. Current I
1. CAL 4mA
2. CAL 20mA
2. Current II
1. CAL 4mA
2. CAL 20mA
2. Relay Test
1. Relay I
1. Turn-ON
2. Turn-OFF
2. Relay II
1. Turn-ON
2. Turn-OFF
3. Current Test
1. Current I
2. Current II
4. Measure Mode
1. Probe Measure
2. Sim. Measure
5. Restore Defaults
1. Cancel
2. OK

TEST / CALIBRATION CERTIFICATE

Calibration Date: __ __ / __ __ / 2 0 __ __

ITEM DETAILS

Name : Conductivity Indicating Controller Cum Transmitter

Make : MicroSet

Model : MS CTRS 2

Serial No : __ __ __ __ __

Input : Conductivity Sensor Model : MS CD __ __ SN :__ __ __ __ __

READING

Standard Solution	Observed Reading Before Calibration	Observed Reading After Calibration	Observed Reading After Calibration mA

Relay 1 Working OK ☐

Relay 2 Working OK ☐

Calibrated By,

Sign *Seal*

Initials

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WARRANTY CERTIFICATE

MicroSet warrants each instrument to be free from defects in material & workmanship. This obligation to servicing or part returned to the company for that purpose & making good any parts thereof which shall be within warranty period, returned to the company under a written intimation & which to the company's satisfaction to be found defective. The company reserves the right to decide the workplace for the repair work. The freight for defective material will have to be borne by the buyer, & the transit risk for such material will rest with the buyer. The warranty is applicable only if the instrument is used within its specification.

THIS WARRANTY IS VALID UP TO 12 months from date of Tax Invoice (Sensors Carry No Warranty since Consumables)

ITEM DETAILS

Name	:	Conductivity Indicating Controller Cum Transmitter
Make	:	MicroSet
Model	:	MS CTRS 2
Serial No	:	__ __ __ __ __

Seal

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