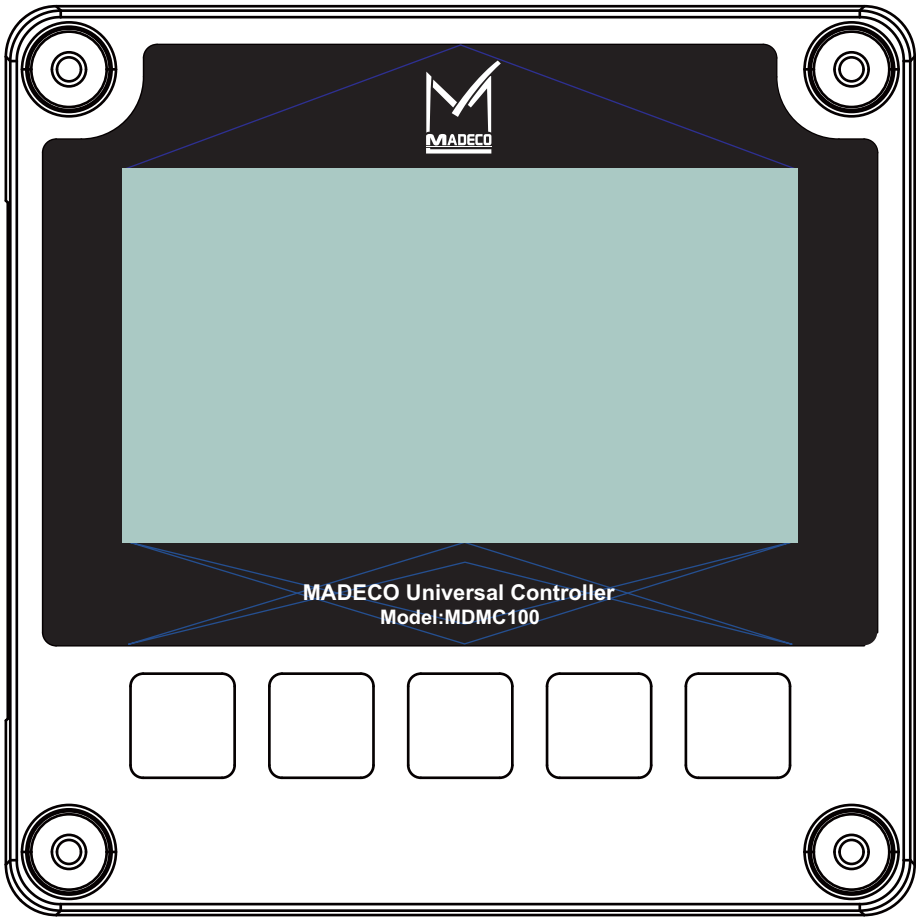
MADECO General controller
Model: MDMC100
User Manual



Directory

A、Installation / structure description

1.1 system constituent

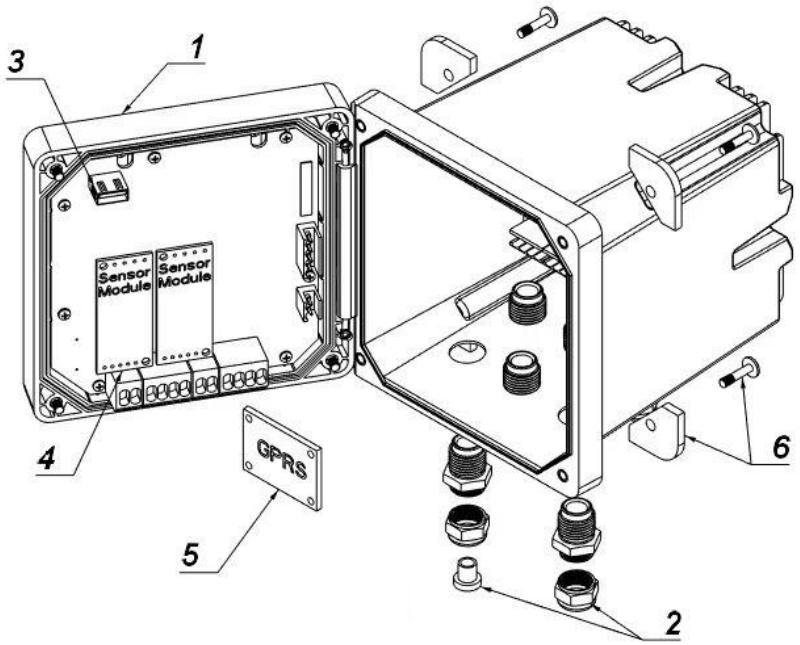


Figure 1. System component diagram

①Controller	③USB installation (Optional as per controller version)	⑤ Network module (optional)
②Pull-resistant device and digital connection of pipe fittings	④Sensor module (Optional as per controller version)	⑥Install accessories

Sensors and the sensor modules

The controller can accommodate up to two sensor modules or two digital sensors (depending on the controller configuration) and a communication module. It can be combined with a digital sensor and a sensor module. All the sensors can be connected to the sensor module. For sensor wiring information, see the specific sensor manual and user instructions for the specific module.

Relays, outputs, and signals

The controller is equipped with four configurable relay switches and two analog outputs.

Controller shell

The controller shell has IP65 protection grade and corrosion prevention function, and can withstand corrosive environmental components such as salt foam and hydrogen sulfide. For outdoor use, protective measures against environmental damage are strongly recommended.

Network module

Optional device, with wireless transmission function module, optional after the Internet of things card matching use.

USB installation

Optional device, after optional, you can download the historical data stored by the controller through the U disk.

Controller installation options

Controllers can be mounted to the panels, walls, risers, or transverse tubes. Neoprene-containing sealing ring, which can be used for vibration reduction. The washers can be used as a template for panel mounting before the internal washer assembly is separated.

Preface Overview

The controller displays sensor measurements and other data, can transmit analog and digital signals, and can interact with and control other devices through outputs and relays.

Users can configure and calibrate outputs, relays, sensors, and sensor modules through the user interface on the front of the controller.

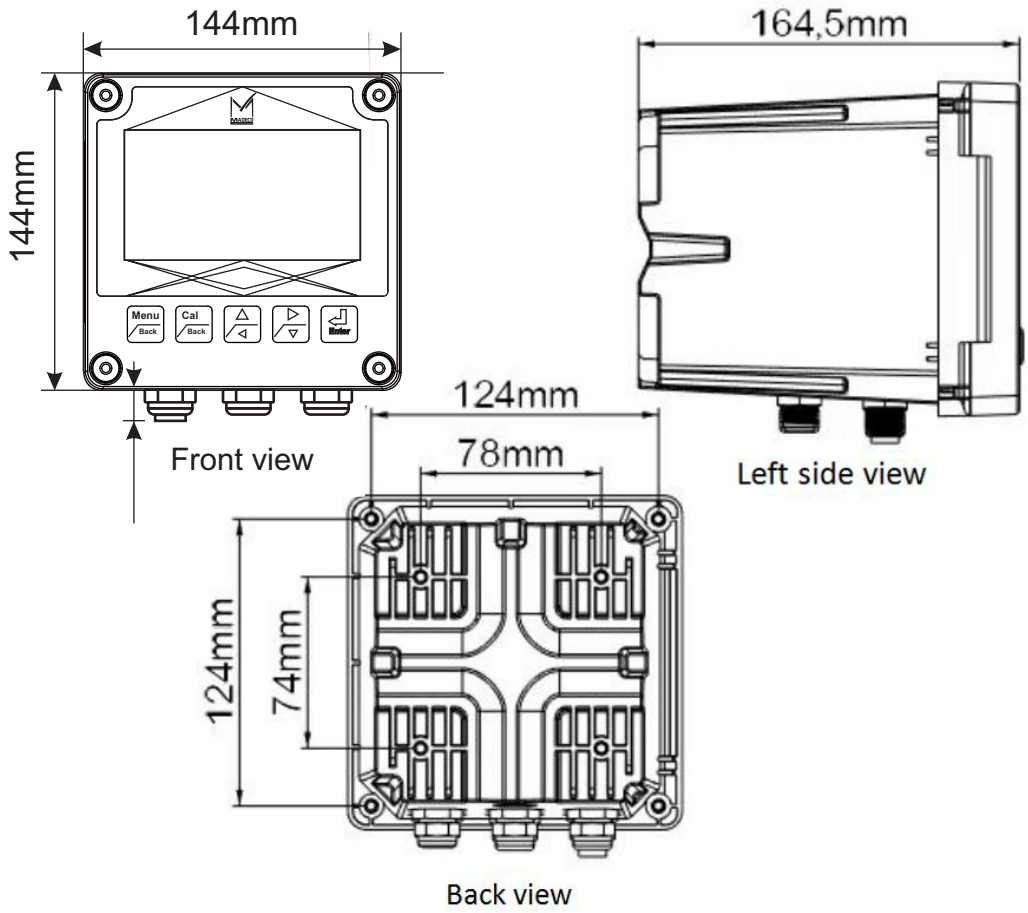
TECHNICAL INDEX

Product technical specifications are subject to change without prior notice

Name	Interpretation
Component Description	Microprocessor controlled and menu driven controllers can calibrate sensors and display measured values.
Operate temperature	-20 ~ 60 ºC（-4 ~ 140 ºF）
Storage temperature	-20 ~ 70 ºC（-4 ~ 158 ºF）
Sensor load	Sensor load <28 W
Housing material	ABS material with IP65 protection level can be slightly corrosion-resistant.
Power requirements	100-240 VAC ±10%，50/60 Hz
Altitude requirements	—
Output	Two analog outputs (0-20 mA or 4-20 mA). Each analog output can be set to 0-20 mA or 4-20 mA.and parameters representing measurements such as pH, temperature, flow rate, or calculated values can be specified.
Relay	Four sets of independent relays can be used for high and low limit alarm, timer, PWM control, etc
Measurement	144*144*164.5mm
Weight	1.3KG
Communication protocol	Modbus RS485
Guarantee	one year

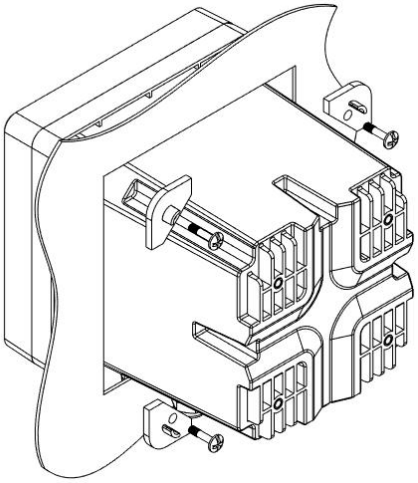
1.2 Controller dimension and installation method

1.2.1 Controller size

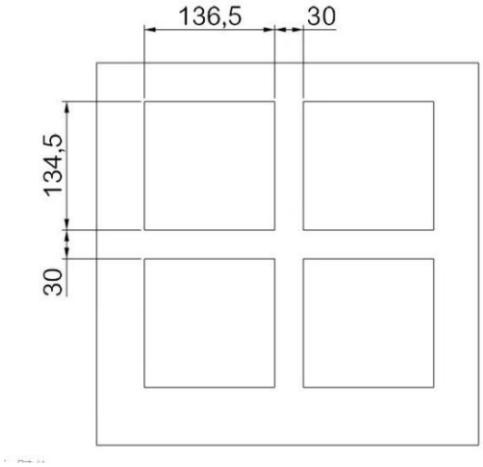


1.2.2 Controller installation mode

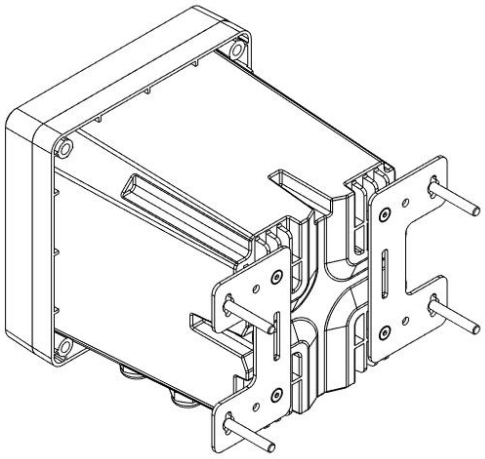
The controller is installed in three ways:



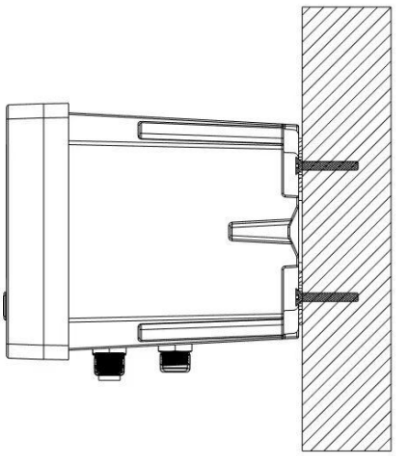
Panel installation diagram



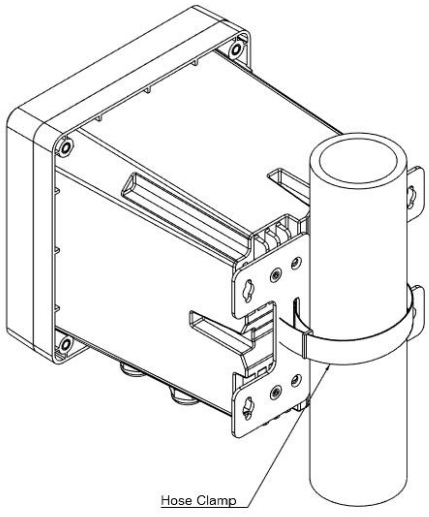
Distance between square holes



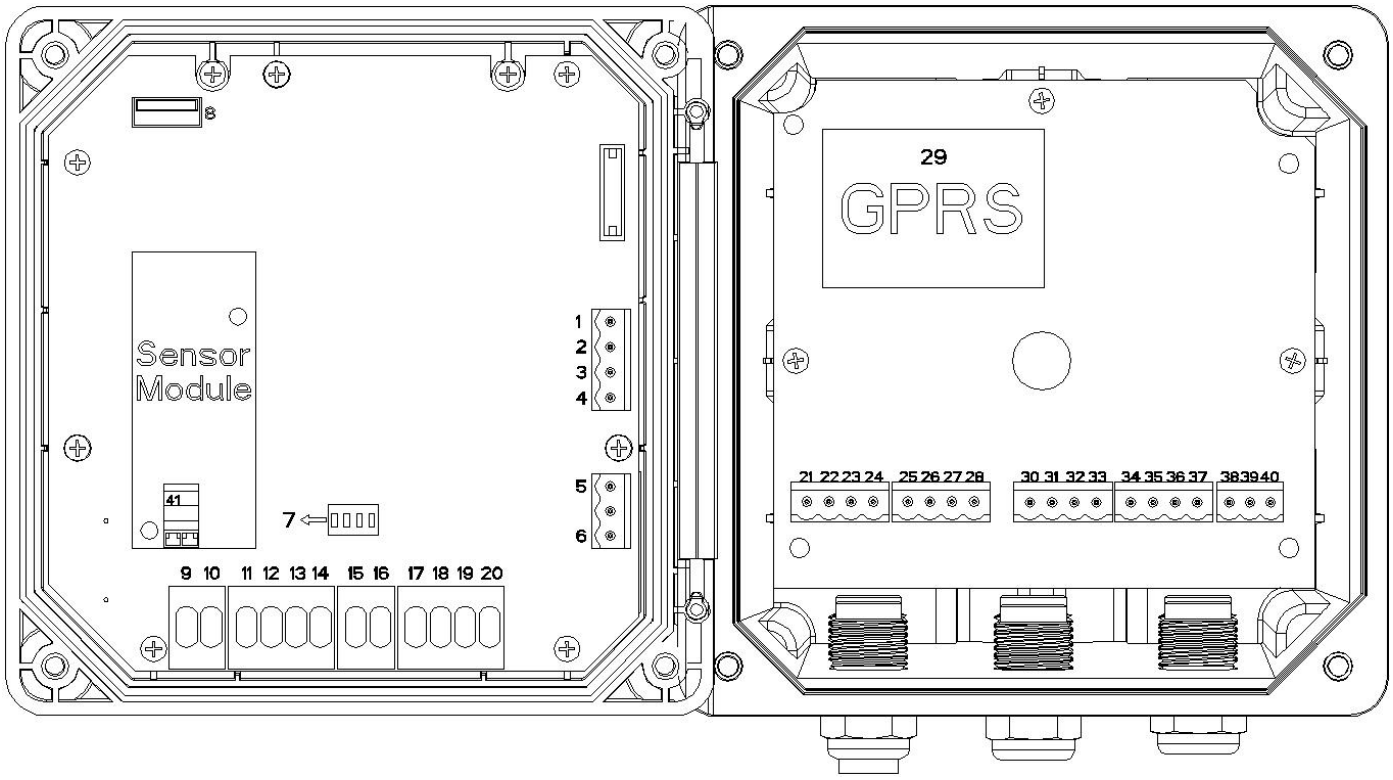
Wall installation diagram



M6 self-attack screw



Pipe installation diagram



1.3 The wiring instructions

Serial number	Function	Serial number	Function	Serial number	Function	Serial number	Function
1	#1 loop 4-20mA+	9	Sensor 1 Related wiring (Please consult the detailed wiring instructions according to the electrode type to the appendix)	21	NC	30	4#Relay +
2	#1 loop 4-20mA-	10		22	NC	31	4#Relay -
3	#2 loop 4-20mA+	11		23	NC	32	3#Relay +
4	#2 loop 4-20mA-	12		24	NC	33	3#Relay -
5	RS-485B	13		25	NC	34	2#Relay +
6	RS-485A	14		26	NC	35	2#Relay -
7	Dial switch	15	As mentioned above	27	NC	36	1#Relay +
8	USB Socket	16		28	NC	37	1#Relay -
41	G/S+	17		29	GPRS Socket	38	E
		18				39	VB(N)
		19				40	VA(L)
		20					

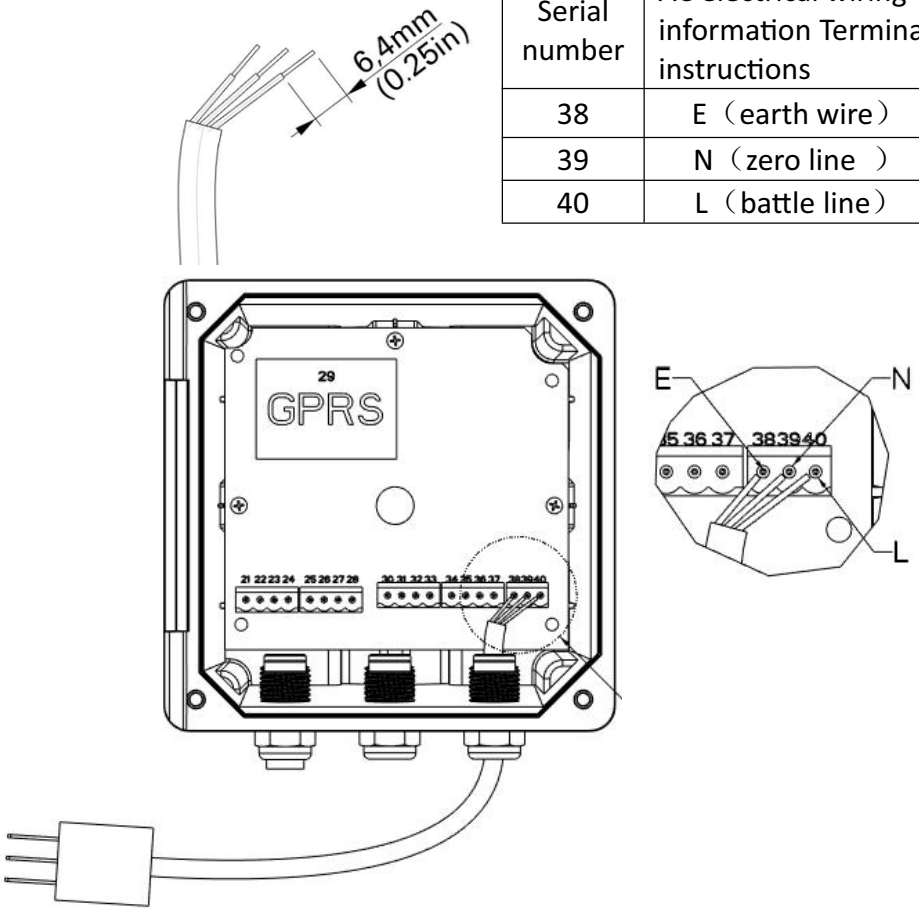
Pour:

At the dial switch 7, if the digital electrode is connected, dial the switch to ON. For other cases, please dial to Off. If special electrodes, such as voltage chlorine dioxide, will be set before the factory, do not change at will.

1.4 Power supply wiring instructions

Terminal description

Serial number	AC electrical wiring information Terminal instructions	Description of the DC electric wiring information terminal
38	E（earth wire）	—
39	N（zero line ）	V-（Power anode）
40	L（battle line）	V+（Power positive pole）



The wiring process

Power wiring the controller according to the numbered steps and wiring instructions. Insert all wires into the corresponding terminals until the connector is insulated and no bare wires are exposed. Pull gently after insertion to ensure a secure connection. Seal the unused openings on all controllers with catheter opening sealing plugs.

B、Safety precautions

Read the operation manual carefully before installation to avoid safety problems and instrument damage caused by the wrong wiring.

- Power can be sent after all wiring is completed and checked, so as to avoid danger.
- Please install the transmitter away from high temperature, high humidity and corrosive environment, and avoid direct sunlight.
- The electrode signal transmission line shall adopt a special coaxial cable. It is recommended to use the coaxial cable provided by the company, Do not replace it with general wires.
- When using the power supply, we should avoid the power supply wave interference, especially when using the three-phase power supply, the ground wire should be used correctly.(If there is a power supply burst interference phenomenon, the power supply and control device of the transmitter, such as dosing machine, mixer and other power supply, can be separated, that is, the transmitter adopts a separate power supply, or the coil of all electromagnetic switch and power control device to eliminate the burst wave).
- When using the output contact of the transmitter to undertake the alarm or control load for safety and protection reasons, be sure to carry the relay with sufficient current resistance to ensure the safety of the instrument.
- Considerations regarding electrostatic discharge (ESD):

Note: In order to minimize the hazard and the risk of electrostatic discharge, remove the power supply without connecting the analyzer power supply. The manufacturer recommends the following steps to avoid ESD damage.

• Release the static electricity from the body before touching any instrument electronic components (such as the printed circuit card and the components on them). To release static electricity by touching the ground metal surface, such as the chassis of the instrument, or touching the metal wire or pipe.

• To reduce static electricity production, excessive movement should be avoided. Use an antistatic container or packaging when transporting static-sensitive components.

• To release the static electricity from your body and keep it released, wear a wristband attached to the ground wire.

• Operating all electrostatic-sensitive components in the electrostatic-safe area. Use antistatic floor mats and bench pads, if possible.

C、Function Introduction

3.1 Measurement interface

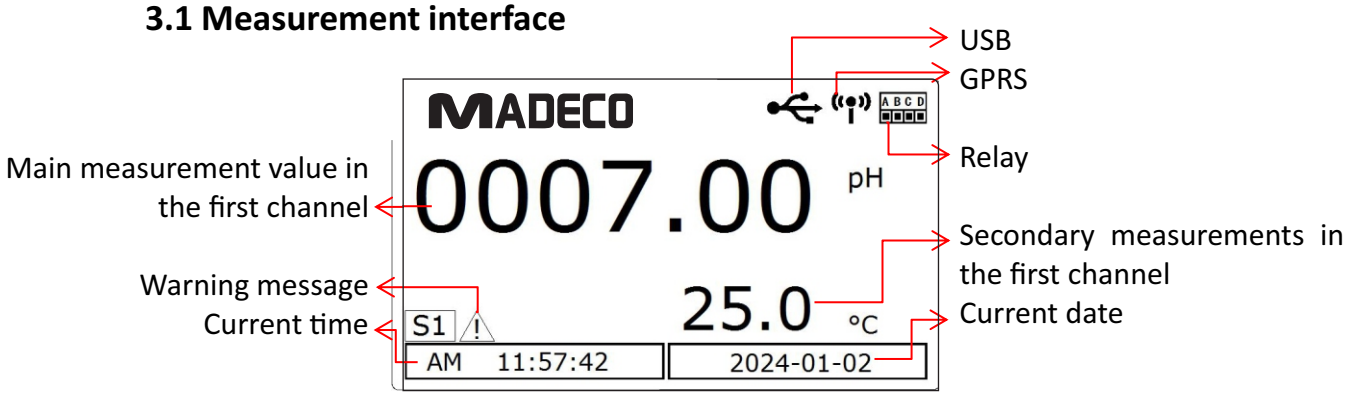


Figure 1. Single-channel measurement interface

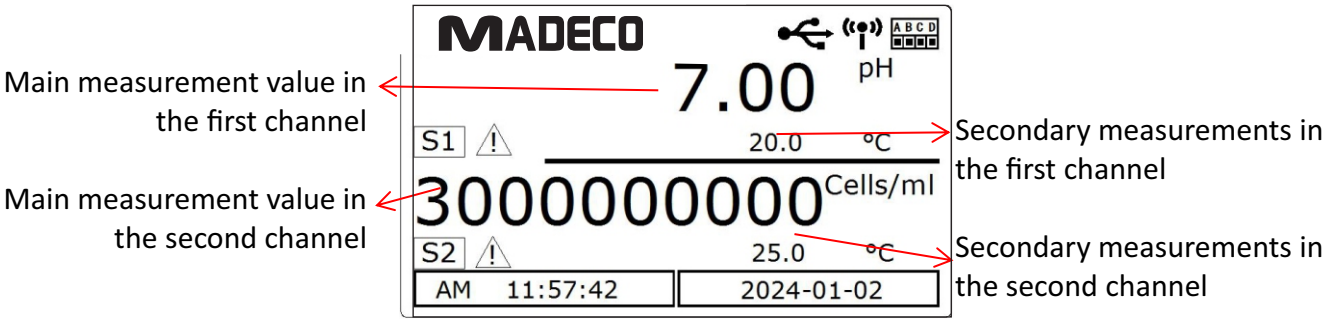


Figure 2 Dual-channel measurement interface

Under the measurement interface , click  maybe  Switchable single-channel interfaces.

Name	Function
Main measurement value in the first channel	Display the first channel main measurement value
Secondary measurements in the first channel	First-channel secondary measurements are shown
Main measurement value in the second channel	Display the second channel main measurement value
Secondary measurements in the second channel	The second-channel secondary measurements are shown
USB	This icon appears when the U disk is plugged in, indicating that the current U disk is connected to the controller.(this feature is optional)
GPRS	This icon is displayed when the GPRS is successfully launched (this feature is optional)
Relay	There are four relays for one or more relays in the system settings.
Current time	Displays the current time
Current date	Displays the current date
Warning message	When there is an error occurring in the communication, click Enter on the measurement interface to display the detailed information.

3.2 System Settings

Under the measurement interface,click MENU/Back push-button,Enter the system Settings intrface;

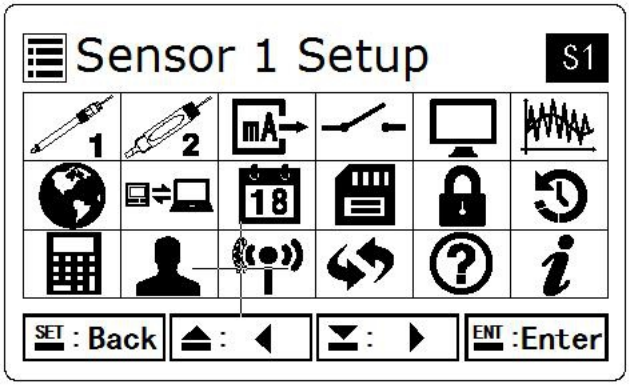


Figure 3 System Setup interface

The functions in the above figure are arranged as follows:

Icon	Name	Number	Function
	Sensor 1 Setup	3.2.1	Set up the relevant parameters and communication of the first channel sensor
	Sensor 2 Setup	3.2.2	Set up the relevant parameters and communication of the second channel sensor
	4-20mA	3.2.3	Set the relevant parameters for the dual-channel 4-20 mA
	Relay	3.2.4	Set up the relevant parameters of the four-way relays
	Display	3.2.5	Adjust the controller display brightness and the backlight switch
	Filter	3.2.6	Set the filter time for the controller
	Language	3.2.7	Optional English, simplified Chinese, traditional Chinese
	RS485	3.2.8	Set the RS485 communication-related parameters
	Date and Time	3.2.9	Set the current time of the controller
	Datalog Setup	3.2.10	View and download the historical data collected by the controller
	Password	3.2.11	Set the password when entering the parameter settings page

	Return	3.2.12	Set the automatic return time under no operation
	Calculate Setup	3.2.13	The data collected by the sensor can be calculated twice
	User Defines	3.2.14	Set the relevant communication parameters of the third-party sensor
	GPRS	3.2.15	Set up the wireless transmission of the controller
	Reset Defaults	3.2.16	Restore the initial settings for the system settings page
	Help	3.2.17	Current and plant settings
	Information	3.2.18	Displays the current version number and the serial number

3.2.1 Sensor 1 Setup

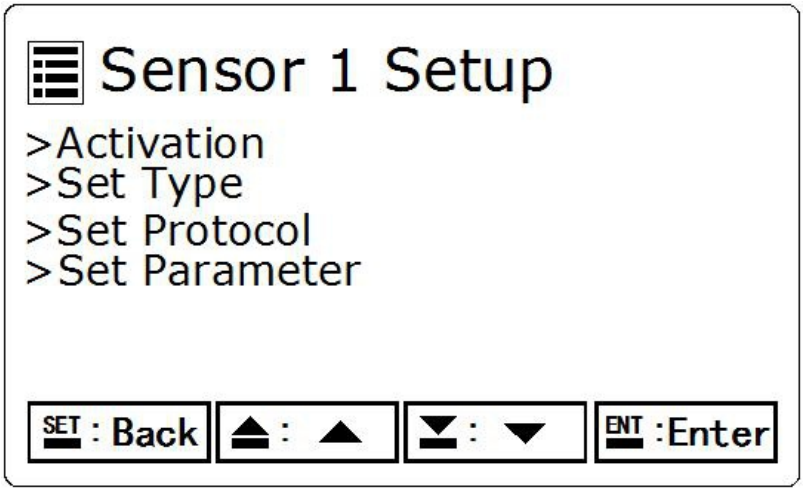
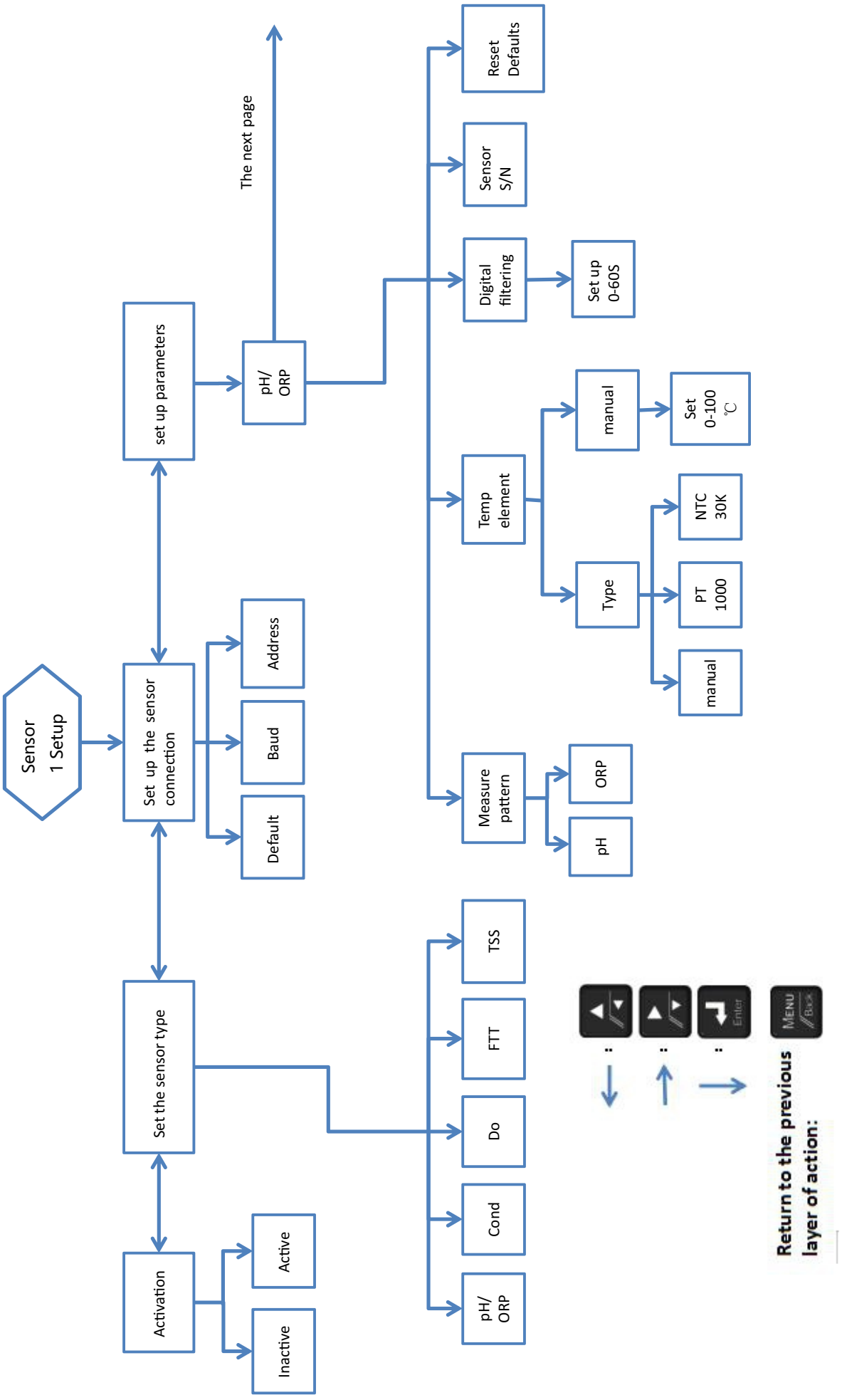


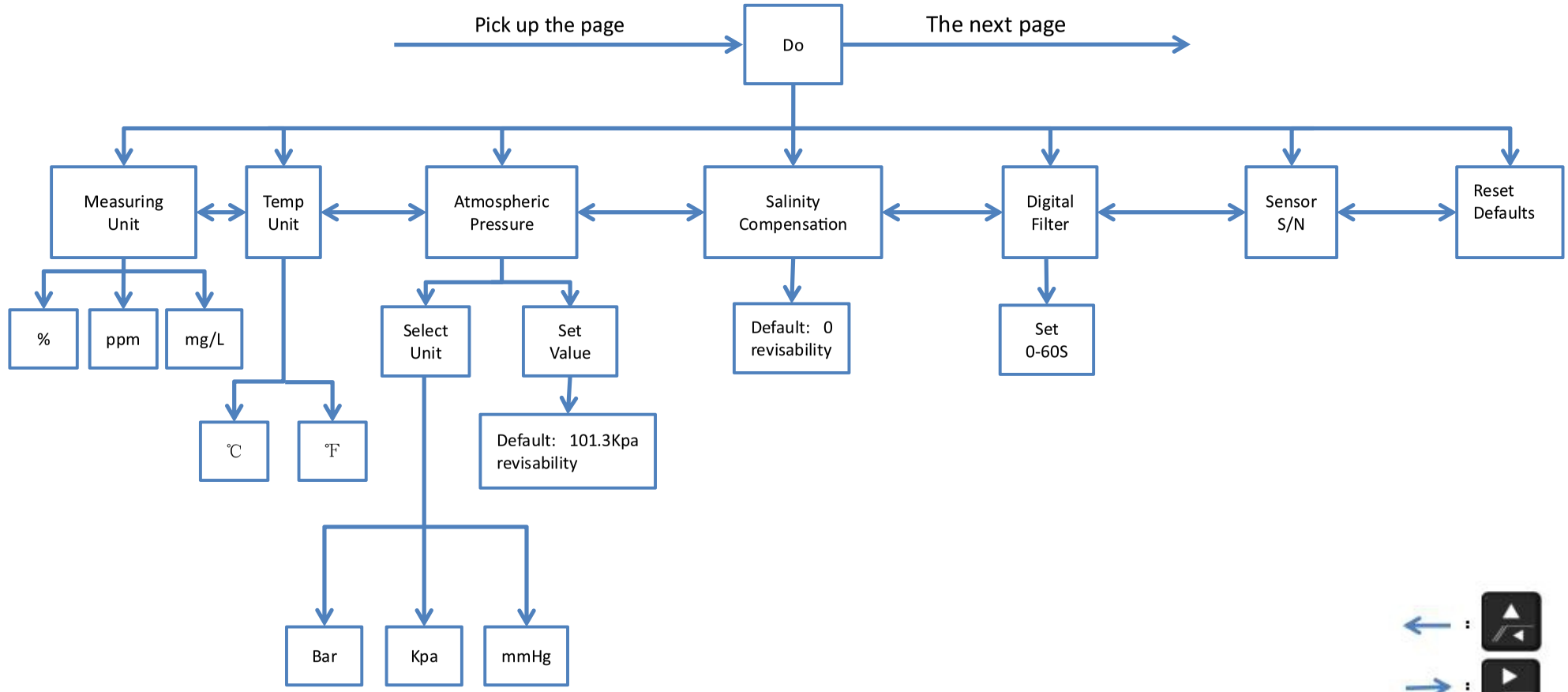
Figure 4. Sensor 1 setting interface

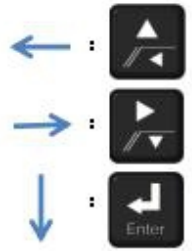
Name		Function		
Set the sensor type		The measurement electrode can be switched, after selection, click Enter		
Activation		Non-activation	Close this channel	
		activation	Turn on this channel	
Set up the sensor connection		Default setting	Restore the initial settings	
		Baud rate	Selectable:4800/9600/19200/38400	
		Sensor address	Can set:1~255	
set up parameters (Different sensor types, then the corresponding content is also different)	pH	measurement pattern	The measurement parameters can be changed depending on the electrode	
		temperature element	Can change Manual mode、PT1000、NTC30K	
		Digital filtering time	The filter time can be changed	
		Sensor serial number	View this sensor serial number	
		factory data reset	Restore the electrode factory settings	
	DO	measurement unit	optional %， ppm， mg/L	
		temperature unit	optional ℃， ℉	
		Atmospheric pressure compensation	selection unit	Optional:Bar， Kpa， mmHg
			Set up atmospheric pressure	Def default 101.3Kpa, can be modified according to the actual environment
		Salinity	The default is 0, can be modified	

		compensation	according to the actual environment
		Digital filtering time	The filter time can be changed
		Sensor serial number	View this sensor serial number
		factory data reset	Restore the electrode factory settings
	Circulation type TURB	measurement unit	optional NTU、FTU、FNU
		Digital filtering time	optional 0S、5S、10S、15S
		Sensor serial number	View this sensor serial number
		factory data reset	Restore the electrode factory settings
	TURB/ SS	measurement pattern	Switch the TURB and the concentration of SS
		measurement unit	optional NTU、FTU、FNU
		Sludge coefficient ratio	SS special use Final displayed value = sludge coefficient ratio * current measured value
		Cleaning interval	
		Digital filtering time	The filter time can be changed
		Sensor serial number	View this sensor serial number
		factory data reset； restore factory setting	Restore the electrode factory settings
	Cond	measurement pattern	Suitable conductivity, resistivity, salinity and TDS
		Measure the range	Optionally select different range display according to the field water sample
		temperature element	Can change Manual mode 、PT1000、NTC30K
		Digital filtering time	The filter time can be changed
		temperature compensation temperature	Temperature compensation method: no compensation, linear compensation, Nonlinear compensation

		compensation	Linear compensation value: the default is 2 and can be modified
		frequency compensation	50HZ/60HZ
		Salinity factor	Default: 0.47,which is modifiable
		Salinity unit	-
		TDS factor	Default: 1, which is modifiable
		Sensor serial number	View this sensor serial number
		factory data reset	Restore the electrode factory settings
	User-Defines	Measuring unit	Select the unit of measurement
		Register start address	Set the register starting address, and the data is fixed to the floating-point type
		Data format	Set the data to high and low bits
		Display format	Set the data resolution

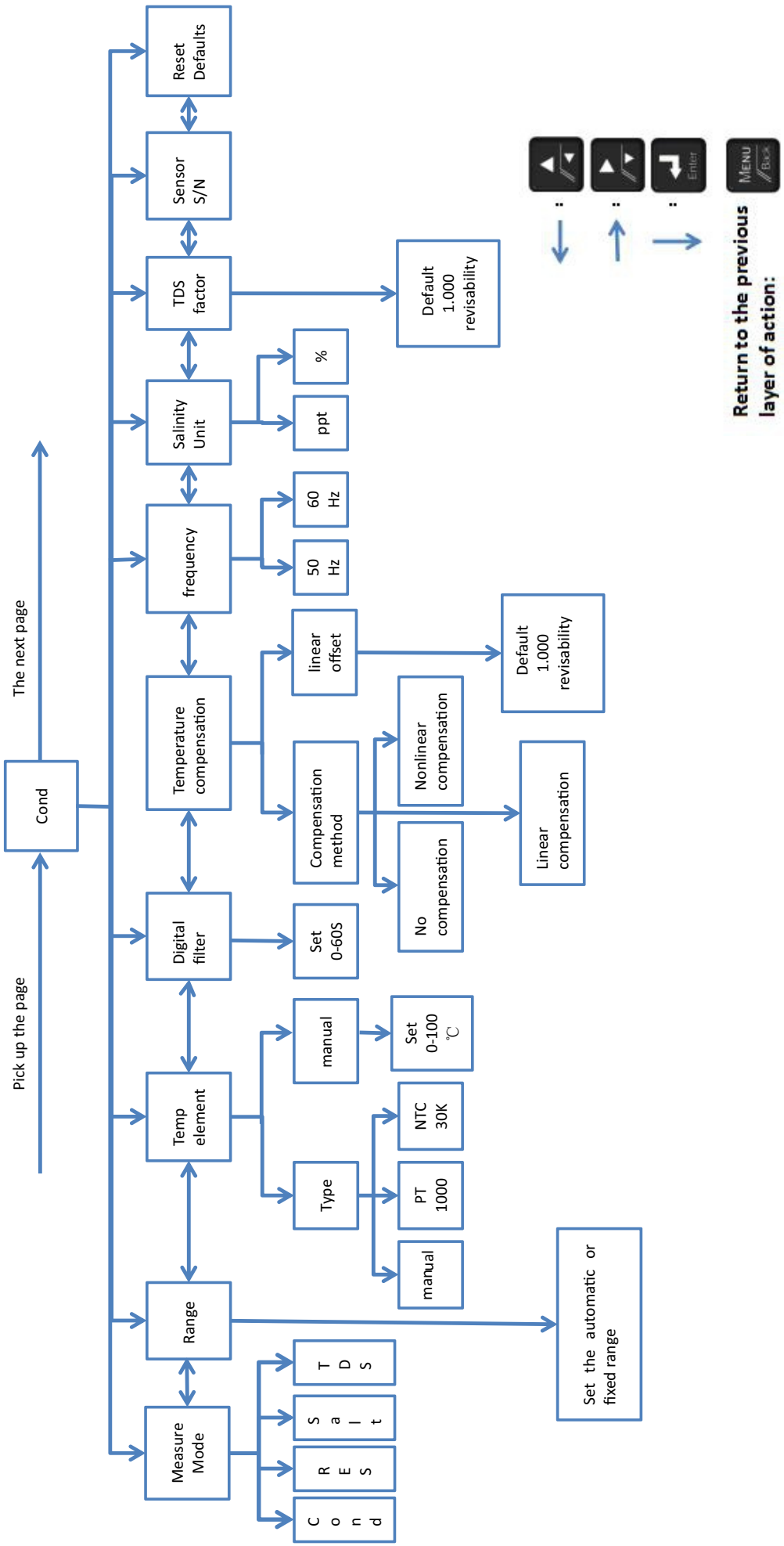

Sensor 1 Setup
Set up the sensor connection
Address
Baud
Default
Set the sensor type
Activation
Active
Inactive
set up parameters
pH/ ORP
The next page
Reset Defaults
Sensor S/N
Digital filtering
Set up 0-60S
Temp element
manual
Set 0-100 ℃
Type
NTC 30K
PT 1000
manual
Measure pattern
ORP
pH
TSS
FTT
Do
Cond
pH/ ORP
Enter
MENU Back
Return to the previous layer of action:

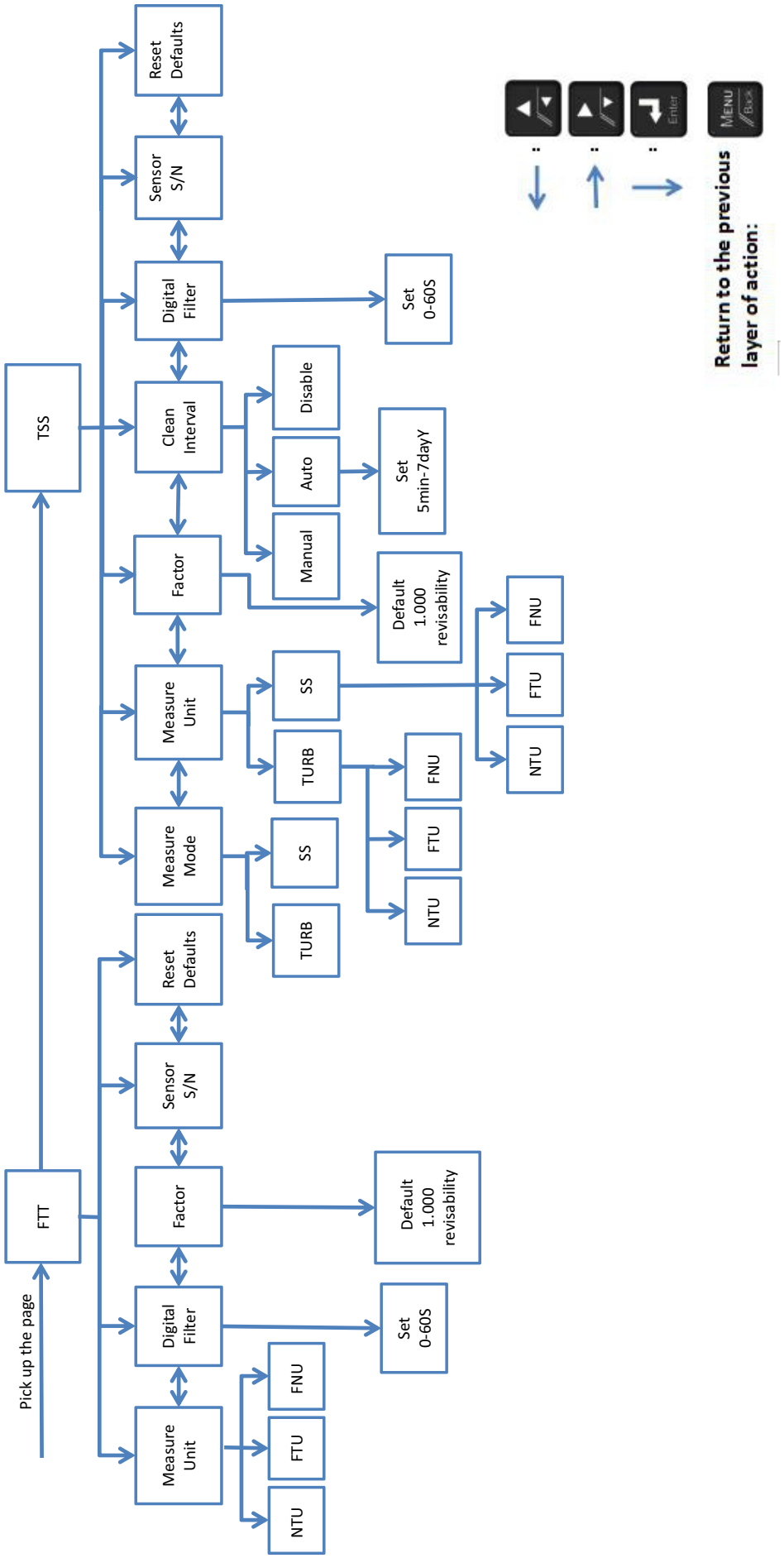




Return to the previous layer of action: MENU Back

Email : Info@madecotech.com
www.madecotech.com


Cond
The next page
Pick up the page
Reset Defaults
Sensor S/N
TDS factor
Default 1.000 revisability
Salinity Unit
%
ppt
frequency
60 Hz
50 Hz
Temperature compensation
linear offset
Default 1.000 revisability
Compensation method
Nonlinear compensation
No compensation
Linear compensation
Digital filter
Set 0-60S
Temp element
manual
Set 0-100 ℃
Type
NTC 30K
PT 1000
manual
Range
Set the automatic or fixed range
Measure Mode
TDS
Salt
RES
Cond
Enter
MENU Back
Return to the previous layer of action:


Reset Defaults
Sensor S/N
Digital Filter
Set 0-60S
TSS
Clean Interval
Disable
Auto
Set 5min-7dayY
Manual
Factor
Default 1.000 revisability
Measure Unit
SS
FNU
FTU
NTU
TURB
FNU
FTU
NTU
Measure Mode
SS
TURB
Reset Defaults
Sensor S/N
FTT
Factor
Default 1.000 revisability
Digital Filter
Set 0-60S
Measure Unit
FNU
FTU
NTU
Pick up the page
Enter
MENU Back
Return to the previous layer of action:

3.2.2 Sensor 2 Setup

Set the same as above 3.2.1。

3.2.3 4-20mA Setup

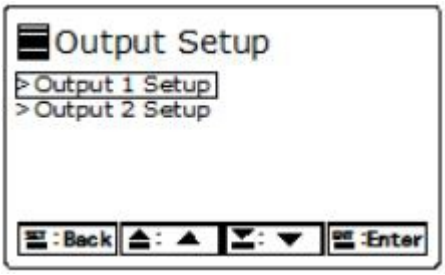
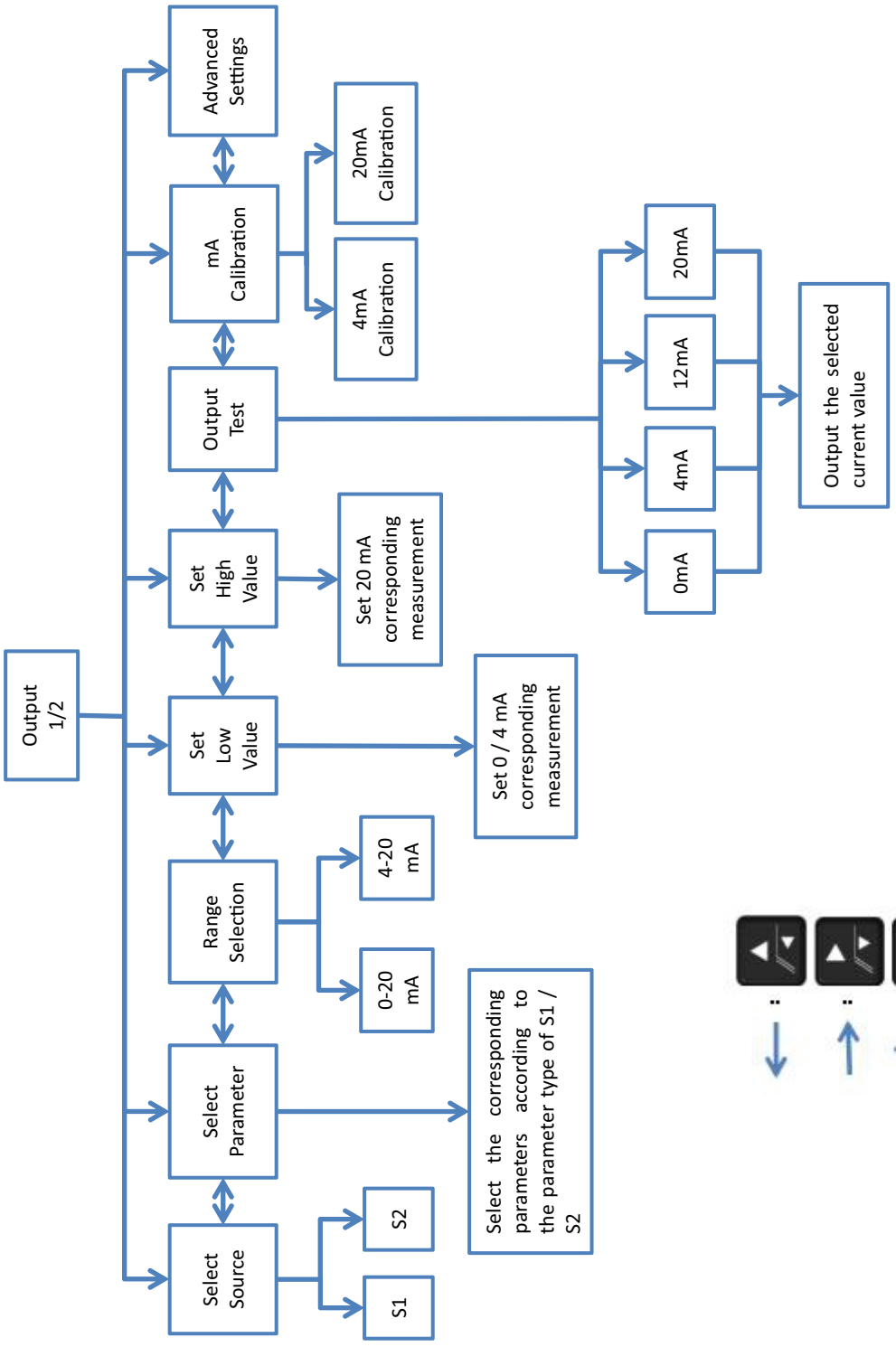


Figure 5 4-20 mA for the output

Output 1 is set for the first channel output, and output 2 is set for the second channel output;

The two channel setting method is the same, the following 1 output example;

Name	Function
Select source and parameter	Select the current channel 4-20 mA to output the primary or secondary measurements
Range selection	Set the range to be 0-20 mA or 4-20 mA
Set low limits	Set the lowest measurement value
Set high limits	Set the highest measurement value
Test output	The test output is 0 mA / 4 mA, 12 mA, 20 mA
Faults hold mode	Maintain output: continuously output the last correct measurement Conversion output: Take the converted value as the output measurement value
signal calibration	Correct the 0 / 4-20 mA signal


Output 1/2
Set Low Value
Set High Value
Output Test
mA Calibration
Advanced Settings
Range Selection
Select Parameter
Select Source
4-20 mA
0-20 mA
S2
S1
Set 0 / 4 mA corresponding measurement
Set 20 mA corresponding measurement
20mA Calibration
4mA Calibration
20mA
12 mA
4mA
0mA
Output the selected current value
Select the corresponding parameters according to the parameter type of S1 / S2
Enter
MENU Back
Return to the previous layer of action:

3.2.4 Relay Setup

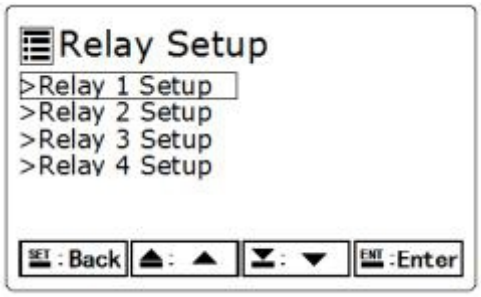
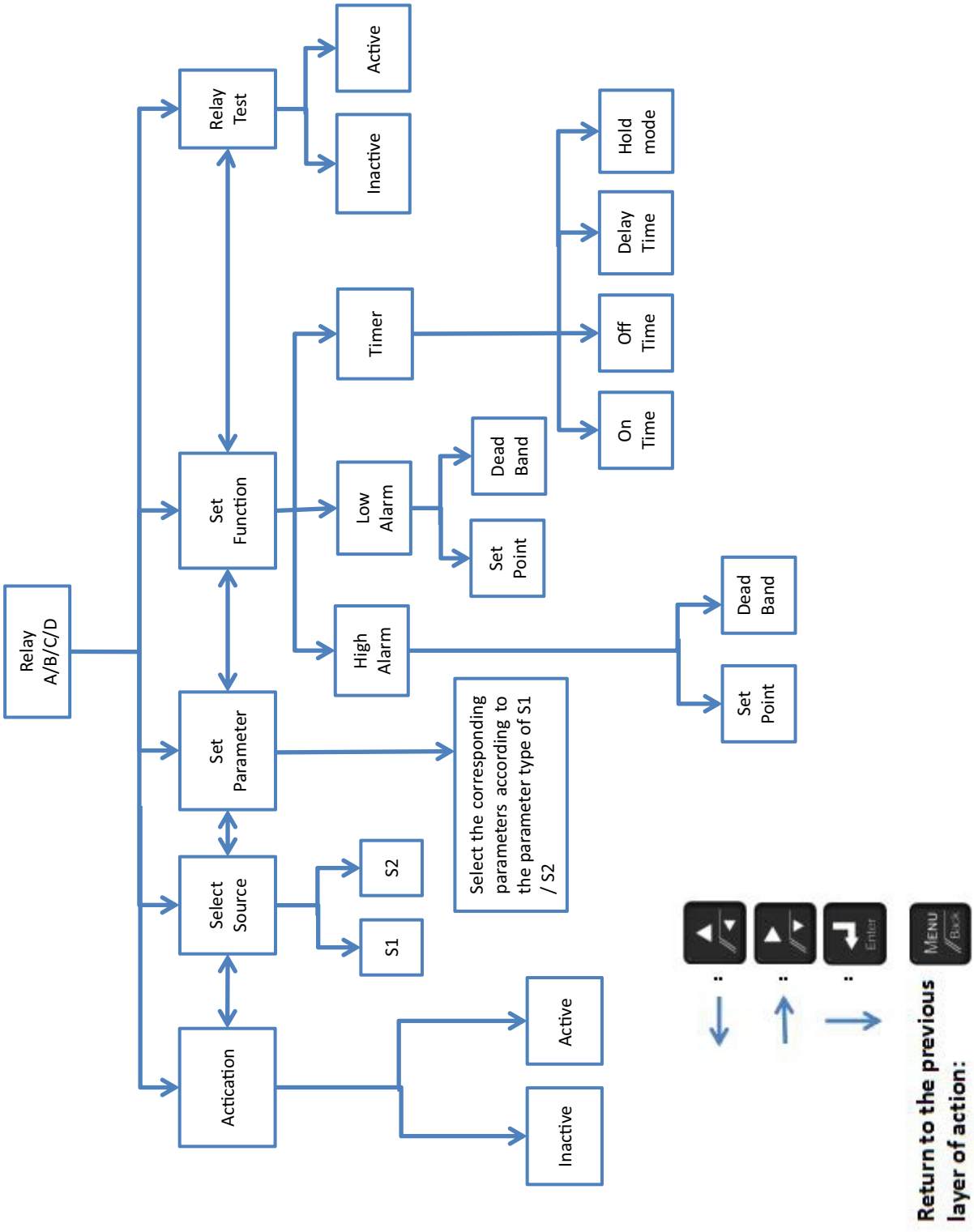


Figure 6 Relay Setup

This function area has four relays with the same setting method, the following is demonstrated with the first relay:

Name	Function
Activation	Activation: Relay function is turned on Unactivated: Relay function is off
Select the sensor source	Select Channel 1 or Channel 2
selection parameter	Select the parameters based on the type of the measured channel
Set the function	High and low limit alarm: beyond the maximum value or below the minimum value, the relay activates Timer: activate the relay according to the set time; after holding mode activation, the controller does not collect new data from the sensor when the relay is on and delay the time, maintain the last measurement before the relay is on.
Relay types	Select the relay status when not working.
Test output	Activation: Relay closes Unactivated: Relay is disconnected


Relay A/B/C/D
Relay Test
Active
Inactive
Set Function
Timer
Hold mode
Delay Time
Off Time
On Time
Low Alarm
Dead Band
Set Point
High Alarm
Dead Band
Set Point
Set Parameter
Select the corresponding parameters according to the parameter type of S1 / S2
Select Source
S2
S1
Actication
Active
Inactive
Enter
MENU Back
Return to the previous layer of action:

3.2.5 Display Setup

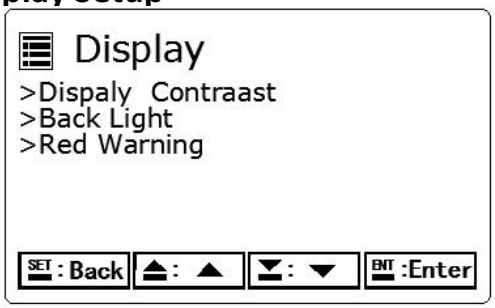


Figure 7 shows the Setup

Name	Function	
Show contrast	Regulate contrast	
be in a poor light	Often open: the backlight is often open Regular closed: backlight off Timing: Start time and backlight duration can be set	
Red backlight warning	activation	Activate when the sensor current exceeds the limit
		Activate when the measurement is limit
		Activate when current output exceeds
		Activation of relay trigger
	Non-activation	Turn off the red backlight
	Self detection	After the opening, the screen has a long red light, and it can be closed after the exit

3.2.6 Filter Setup

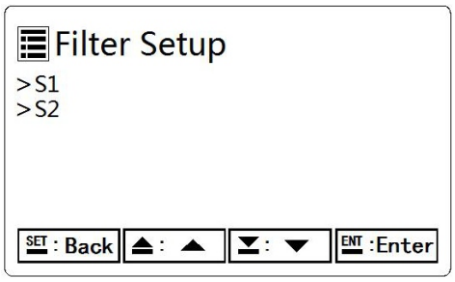


Figure 8 filter Setup

Adjust the measured value stability through the filter coefficient, and the factory default is 01.

Filter coefficient range: 0~60

3.2.7 Language Setup

Figure 9. Language Set up

There are three languages available： English

3.2.8 RS485 Setup

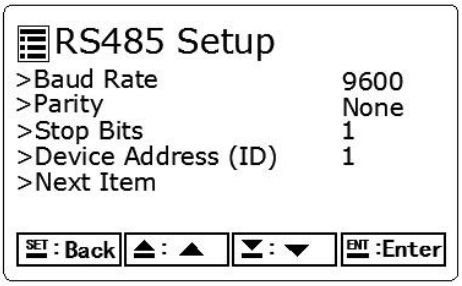


Figure 10 RS485 Setup

Name	Function
Baud rate	Can set 4800、9600、19200、38400
verification mode	Can set no check, odd check, even check
stop bit	Either 1 or 2 stop bits
Local address (ID)	Can set 1-255
Register start address	Set the read start address
data format	Can set the data low in the front or high in the front

3.2.9 Time and date Setup

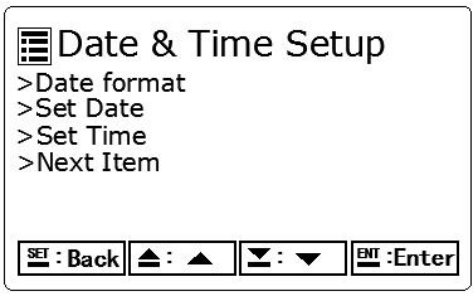


Figure 11 Time and date Setup

Name	Function
date format	Can set the year-month-day, day-month-year, month-day-year and so on with 12 hours or 24 hours display
date	Set the current date
time	Set the current time

3.2.10 Data log Setup

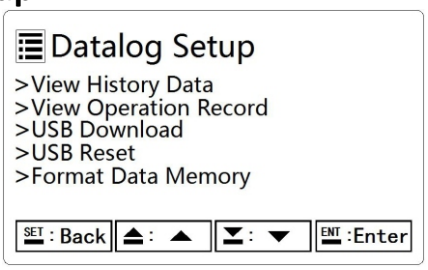


Figure 12 Data log Setup

Name	Function
View historical data	You can view the 30 sets of data closest to the end time
View operation record	View the operation record of the controller
USB download	Download the data to the USB
USB reset	When the U disk is not recognized, the reset is available
Format storage	Clear the historical data and operation records

Note: Because the outlet equipment is not allowed to install the button battery, it will cause the time error of the controller. If the USB download the pause, please restart the controller and format the storage.

3.2.11 Password Setup

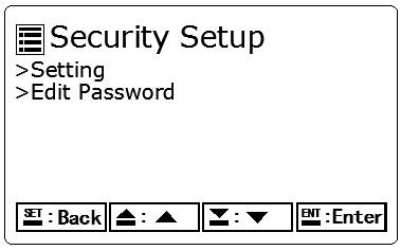


Figure 13 Password Setup

Name	Function
Set a password	Failure: This feature is not enabled Active: When enabled, enter the password to enter the menu.
Edit the password	Set up a new password

3.2.12 Auto Return Time Setup

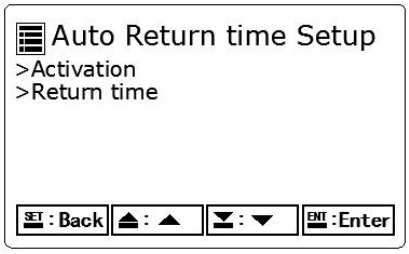


Figure 14 Auto-return to the Setup

Name	Function
Activation	Activation: After activation, automatically return to the measurement interface for a certain time without operation Inactivated: Cancel auto return function
Return time	Set the return time interval

3.2.13 Calculate the Setup

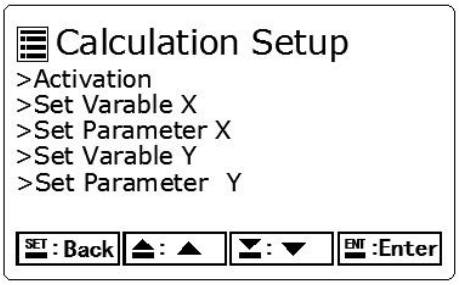


Figure 15 for the calculated Setup

Name	Function
Activation	Activation: Enable functionality Unactivated: Turn off function
Set variable X	Channel one or two was selected as the data source for the variable X
Setup parameters X	Select the calculation parameters
Set variable Y	Channel one or two was selected as the data source for the variable Y
Setup parameters Y	Select the calculation parameters
Set the formula	Set the calculation method of X and Y
display form	Set the resulting decimal place
display form	Calculate the result unit setting

instance 1:

One section of the pipe is equipped with a flowmeter to obtain the current flow of the pipe.

If the current acquisition flow rate of the first channel is 5m/S and the acquisition cross section of the second channel is 0.5 ㎡, it shall be set as follows:

Set the variable X as the first channel, **and the parameter X** selects the main measurement value，

Set the variable Y as the second channel**, and the parameter Y** selects the main measurement value，

The formula is set to X * Y, the unit selects m^3 /S,

The calculation result shows that the current flow rate is 2.5m^3 /S

instance 2：

The site environment has two sewage filters, knowing the total PH value of the two pools

The first channel electrode assumes that pool A pH is 6pH，

The pH of pool B is 5pH, which should be set as follows

Set the variable X as the first channel and the parameter X selects pH，

Set the variable Y as the second channel, parameter Y selects pH,

The formula is set to X + Y, the unit selects pH, and the name is edited to the total PH value.

The calculation result shows that the current total pH level is 11pH.

3.2.14 User-defined Setup

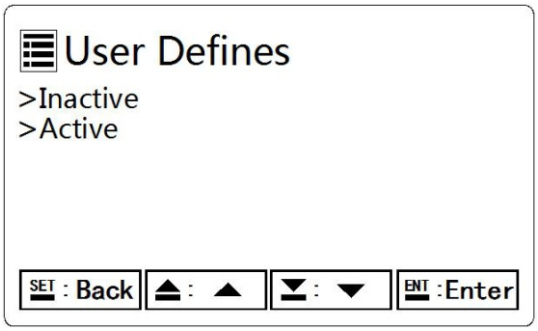


Figure 16. User-defined Setup

Name	Function
Activation	Active: To enable this function, you can connect the non-standard electrodes by setting up Inactivate: Turn off this function

This function is used only for setting non-standard electrodes, which when activated can be selected in the sensor types in Sensor 1 settings and Sensor 2 settings. Then according to the normal electrode setting / Calibration.

3.2.15 GPRS Setup

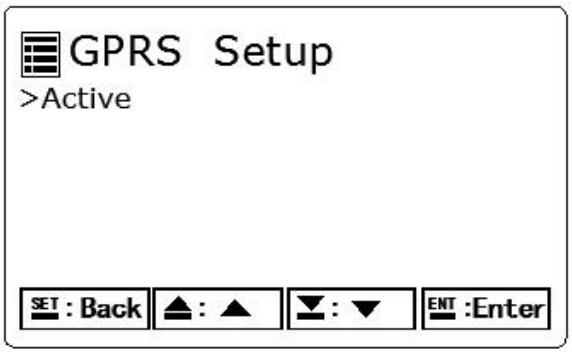


Figure 17 The GPRS Setup

Name	Function
Activation	Active: Enable this feature to transfer data remotely (optional) Inactivate: Turn off this function

3.2.16 Reset Defaults

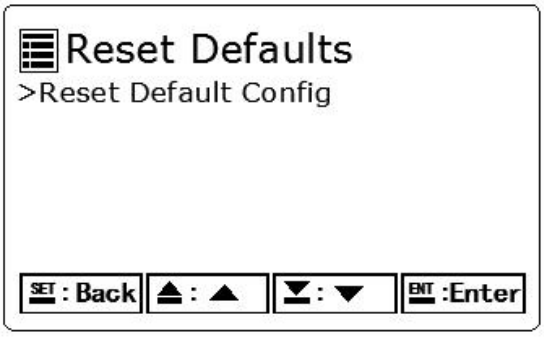


Figure 18 Restoring the factory setup

Name	Function
Factory data reset	Restore the controller settings to the factory settings

3.2.17 Help

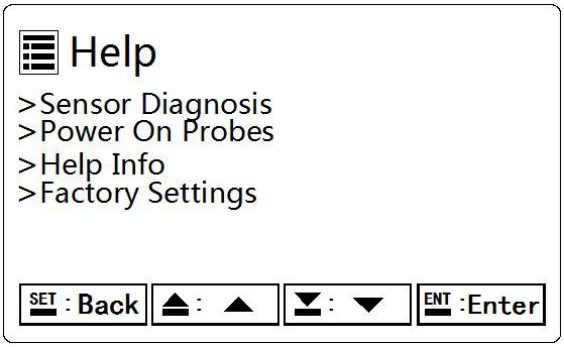


Figure19 Help

Name	Function
Sensor Diagnosis	View the current electrode current in the S1 and S2 channels
Power On Probes	When the power is cut off, this function can reset the controller power supply
Help information	After entering, scan the QR code to obtain the electronic instruction manual
Factory setting	-

3.2.18 Information

3.3 Calibration Setup

Under the measurement interface, click to enter the calibration page:

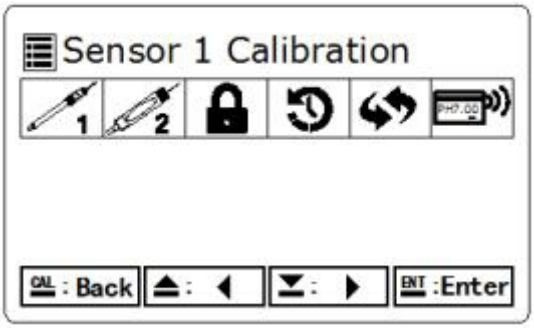


Figure 20. calibration page

The functions in the above figure are arranged as follows:

icon	Function	icon	Function	icon	Function	icon	Function	icon	Function	icon	Function
	Sensor 1 Calibration		Sensor 2 Calibration		password set up		Automatic return		factory set up		Calibration card

3.3.1 Sensor 1 Calibration

3.3.1.1 pH Calibration page

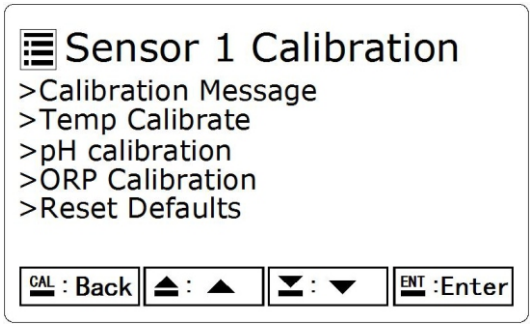


Figure 21 Sensor 1 Calibration page

Name	Function	
Calibration Message	View the current electrode basic information	
Temp Calibrate	Calibration temperature, with a precision of 0.1℃	
pH Calibration	2 Point Any Buffer	Any standard buffer can be used for Calibration
	2 Point TECH Buffer	Any two standard buffers in 4.01,7.00,10.00 were used for Calibration
	2 Point NIST Buffer	Any two standard buffers in 4.01,6.86,9.18 were used for Calibration
	3 Point Any Buffer	Any standard buffer can be used for Calibration
	3 Point TECH Buffer	The standard buffer of 4.01,7.00,10.00 were used for Calibration
	3 Point NIST Buffer	Standard buffer of 4.01,6.86,9.18 were used for Calibration
	Offset	The deviation values were corrected
ORP Calibration	Revised ORP with an accuracy of 1 mV	
Reset Defaults	Restore factory Calibration	

3.3.1.2 Cond Calibration page

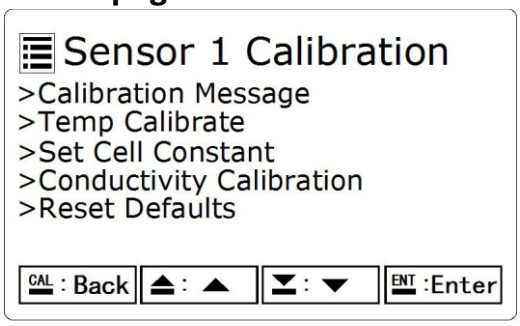


Figure 22 The Sensor 1 Calibration page

Name	Function	
Calibration Message	View the current electrode basic information	
Temp Calibrate	Calibration temperature, with a precision of 0.1℃	
Set Cell Constant	Modifiable, default 1, precision 0.0001	
Conductivity Calibration	1413uS/cm STD Solution	Place the electrode into 1413 uS / cm standard solution and click Enter after the measured value is stable.
	84 uS/cm STD Solution	Place the electrode into 84 uS / cm standard solution and click Enter after the measured value stabilizes.
	12.88mS/cm STD Solution	Place the electrode into 12.88mS/cm standard solution and click Enter after the measured value stabilizes.
	Any STD Solution uS/cm	Put the electrode into this standard solution, enter the standard value of the solution first, and click Enter. After the measured value is stable, click Enter again.
	Any STD Solution mS/cm	Put the electrode into this standard solution, enter the standard value of the solution first, and click Enter. After the measured value is stable, click Enter again.
	Offset	The deviation values were corrected
Reset Defaults	Restore factory Calibration	

3.3.1.3 DO Calibration page

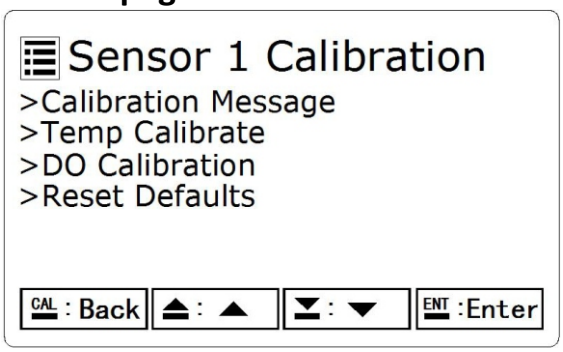


Figure 23 Sensor 1 Calibration page

Name	Function	
Calibration Message	View the current electrode basic information	
Temp Calibrate	Calibration temperature, with a precision of 0.1℃	
DO Calibration	Air Calibrate	Put the electrode in air. After the measured value is stable, click Enter.
	Zero Point Calibrate	Put the electrode in anaerobic water. After the measured value is stable, click Enter.
	Offset	The deviation values were corrected
Reset Defaults	After recovery, the slope is 1 and the deviation value is 0	

3.3.1.4 TSS Calibration page

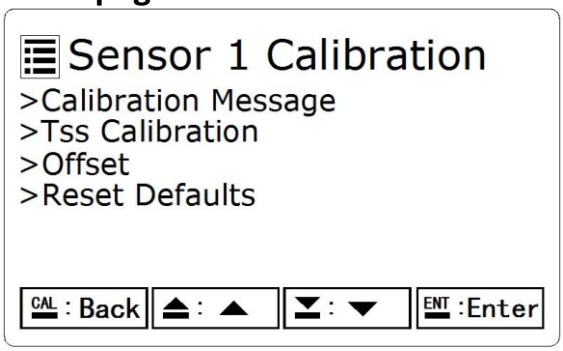


Figure 24 Sensor 1 Calibration page

Name	Function
Calibration Message	View the current electrode basic information
Tss Calibration	Place the electrode in the first point Calibration solution. After the measured value is stable, click Enter and enter the standard value of this Calibration solution. After completion, the electrode is put into the second point Calibration solution. After the measured value is stable, click Enter and enter the standard value of the Calibration solution to complete the two-point calibration.
Offset	The deviation values were corrected
Reset Defaults	After recovery, the slope is 1 and the deviation value is 0

3.3.1.5 FTT Calibration page

Set the same as with the 3.3.1.4 TSS Calibration page

3.3.1.6 User Defines Calibration page

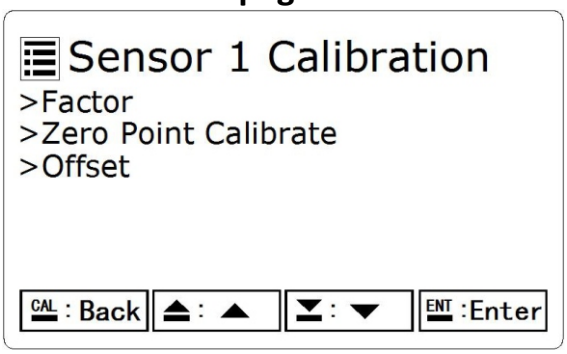


Figure 25 Sensor 1 Calibration page

Name	Function
Factor	measurement result=Factor*Current measurement value
Zero Point Calibrate	Adjust the measurement zero point
Offset	The deviation values were corrected

Calibration principles:

measurement result=Factor*（Current measurement value±Zero Point Calibrate）±Offset

3.3.2 Sensor 2 Calibration

The calibration mode is the same as the above 3.3.1 Sensor 1 calibration.

3.3.3 Password

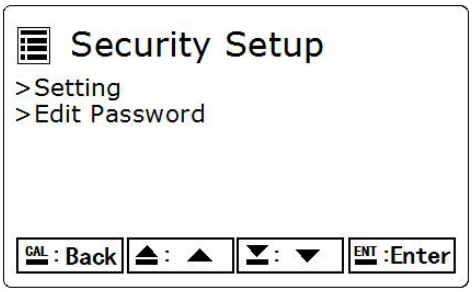


Figure 24. Security Settings

Name	Function
Setting	Disable: This feature is not enabled Enable: When enabled, enter the password when entering the calibration setting.
Edit Password	Set up a new password

3.3.4 Return

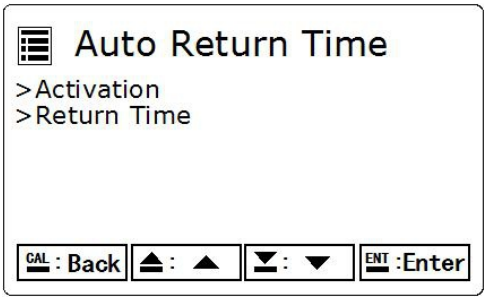


Figure 25 Auto-return to the settings

Name	Function
Activation	Inactivated: Cancel auto return function Activation: After activation, automatically return to the measurement interface for a certain time without operation
Return Time	Set the return time interval

3.3.5 Reset Defaults

Restore the controller Calibration interface factory settings.

3.3.6 Calibration Card

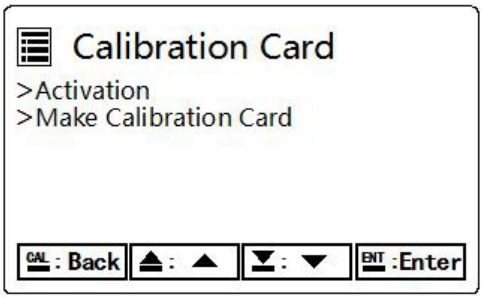
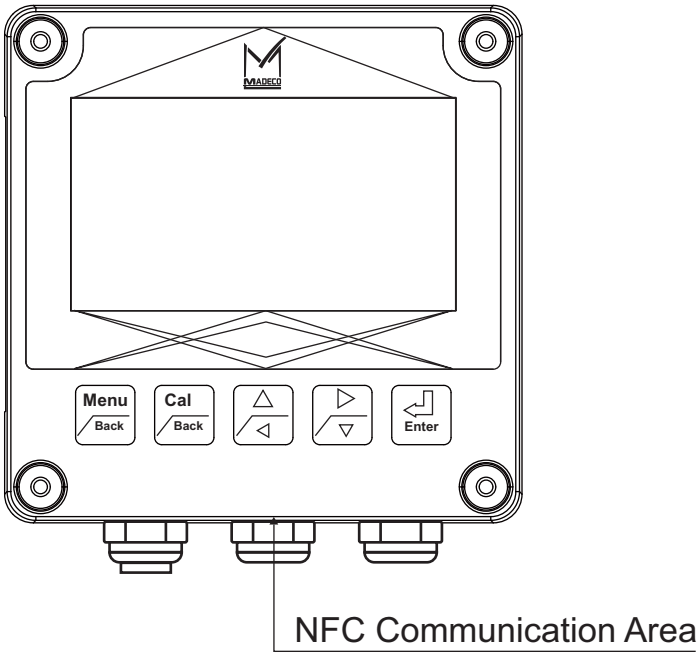


Figure 21 Calibration card page

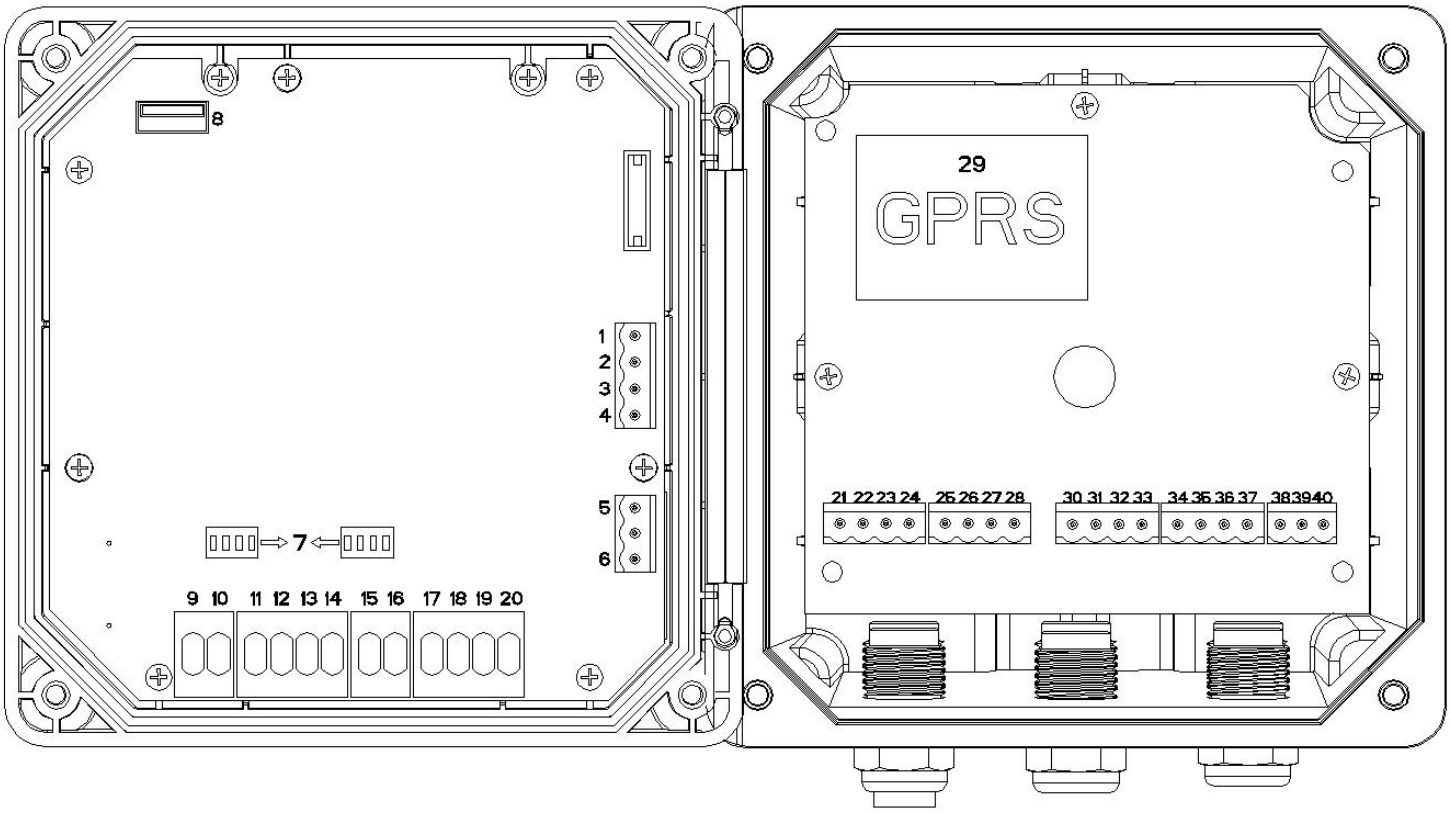
Name	Function
Activation	Activation: open the credit card calibration function Unactivated: turn off the credit card calibration function
Make calibration card	After selecting the information required to input the calibration card, put the NFC card close to the key area until it is successfully displayed.



Calibration card style

Note: the distance between the Calibration card and the NFC communication area should be close to or less than 1mm.

Appendix I: wiring diagram of the digital electrode controller



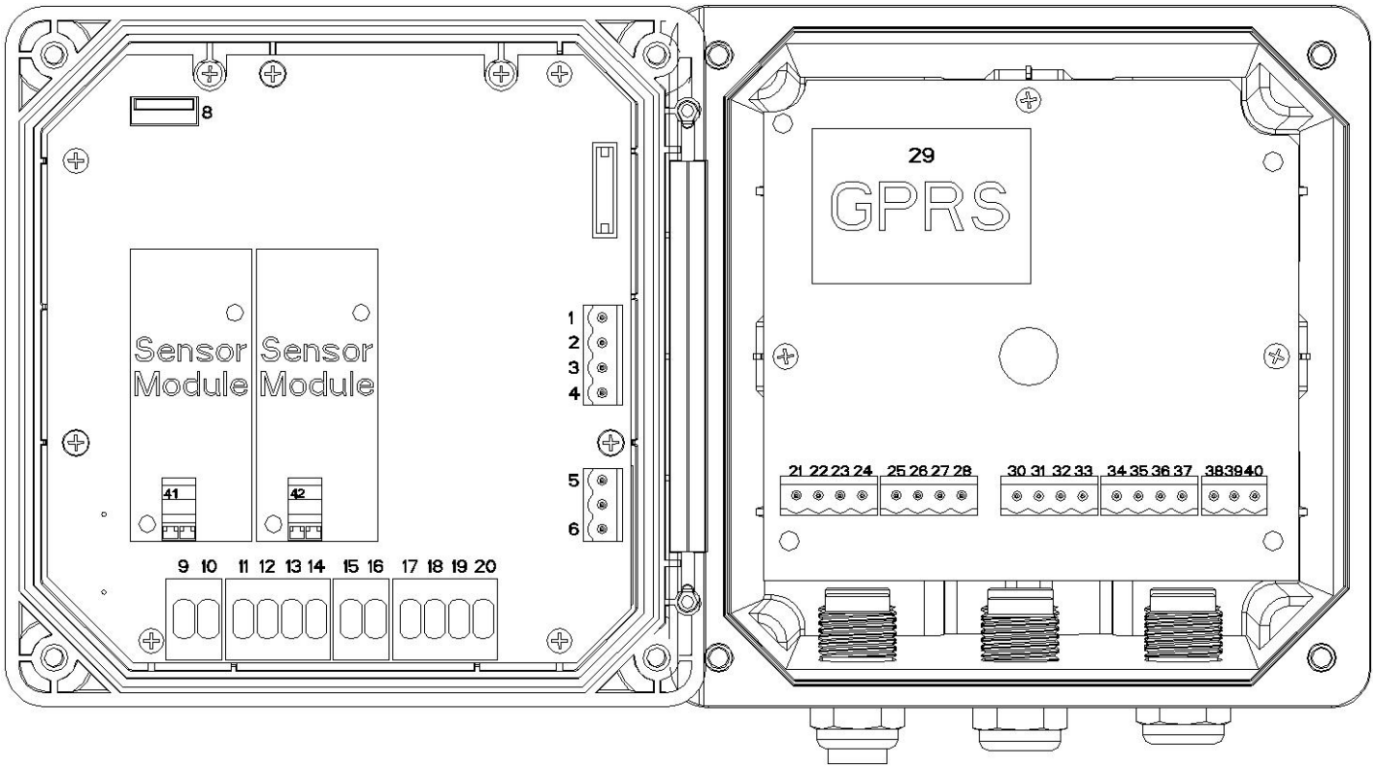
Serial number	Function	Serial number	Function	Serial number	Function	Serial number	Function
1	**#1 loop 4-20mA+**	9	NC	21	NC	30	**4#Relay +**
2	**#1 loop 4-20mA-**	10	NC	22	NC	31	**4#Relay -**
3	**#2 loop 4-20mA+**	11	**Sensor 1 A**	23	NC	32	**3#Relay +**
4	**#2 loop 4-20mA-**	12	**Sensor 1 B**	24	NC	33	**3#Relay -**
5	**RS-485B**	13	**Sensor 1 V+**	25	NC	34	**2#Relay +**
6	**RS-485A**	14	**Sensor 1 V-**	26	NC	35	**2#Relay -**
7	**Dial switch**	15	NC	27	NC	36	**1#Relay +**
8	**USB Socket**	16	NC	28	NC	37	**1#Relay -**
		17	**Sensor 2 A**	29	**GPRS Socket**	38	**E**
		18	**Sensor 2 B**			39	**VB(N)**
		19	**Sensor 2 V+**			40	**VA(L)**
		20	**Sensor 2 V-**				

Pour:

Digitized electrodes include (digital pH, digital conductivity, digital dissolved oxygen, digital turbidity, digital COD and other electrodes)

Before connecting the electrode, check the dial switch and dial 1234 to ON.

Appendix II: wiring diagram of pH/ION electrode controller

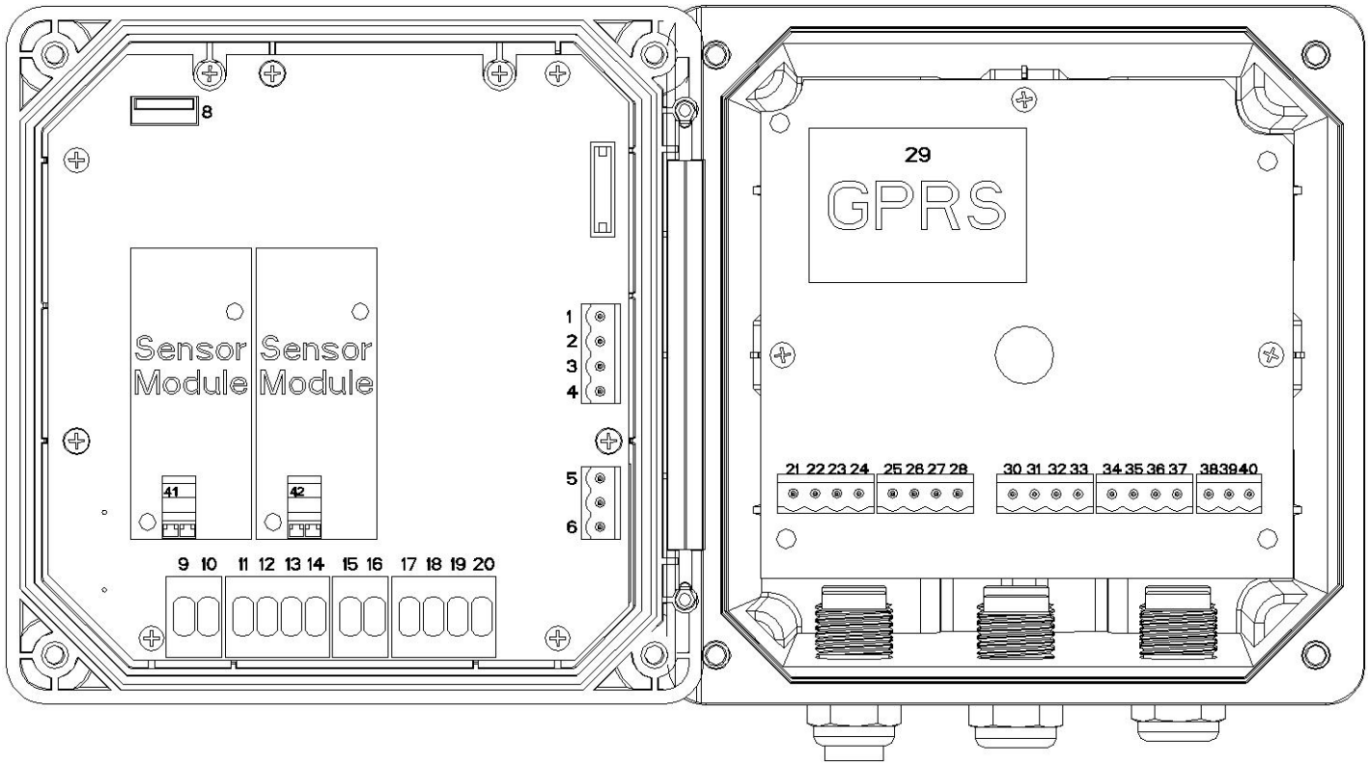


Serial number	Function	Serial number	Function	Serial number	Function	Serial number	Function
1	**#1 loop 4-20mA+**	9	NC	21	NC	30	**4#Relay +**
2	**#1 loop 4-20mA-**	10	NC	22	NC	31	**4#Relay -**
3	**#2 loop 4-20mA+**	11	**Sensor 1 R**	23	NC	32	**3#Relay +**
4	**#2 loop 4-20mA-**	12	**Sensor 1 SGND**	24	NC	33	**3#Relay -**
5	**RS-485B**	13	**Sensor 1 T+**	25	NC	34	**2#Relay +**
6	**RS-485A**	14	**Sensor 1 T-**	26	NC	35	**2#Relay -**
8	**USB Socket**	15	NC	27	NC	36	**1#Relay +**
41	**Sensor 1 G**	16	NC	28	NC	37	**1#Relay -**
42	**Sensor 2 G**	17	**Sensor 2 R**	29	**GPRS Socket**	38	**E**
		18	**Sensor 2 SGND**			39	**VB(N)**
		19	**Sensor 2 T+**			40	**VA(L)**
		20	**Sensor 2 T-**				

Pour：

Before connecting the electrode, check the dial switch and dial 1234 to Off.(Because the dial switch will be covered by the module, the dial switch position will be set before leaving the factory, and this step will be ignored)

Appendix III: wiring diagram of voltage and current electrode controller

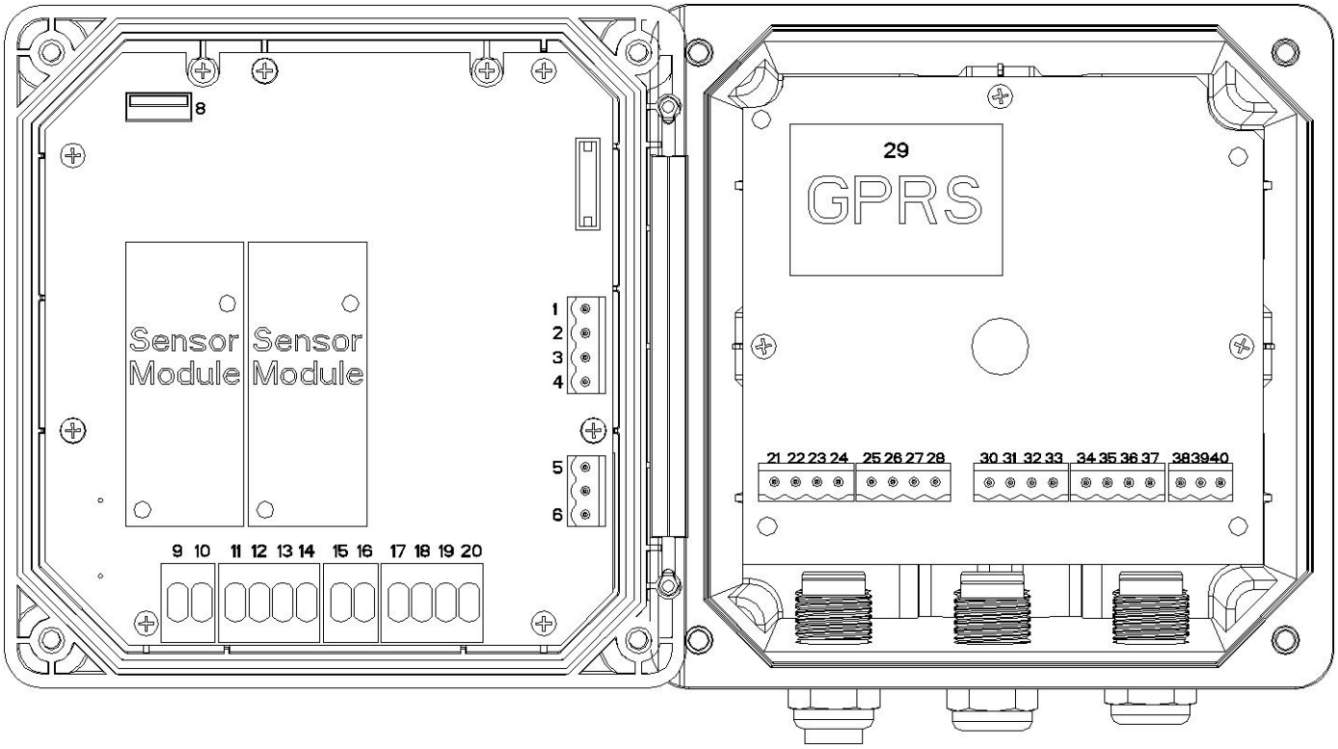


Serial number	Function	Serial number	Function	Serial number	Function	Serial number	Function
1	**#1 loop 4-20mA+**	9	NC	21	NC	30	**4#Relay +**
2	**#1 loop 4-20mA-**	10	NC	22	NC	31	**4#Relay -**
3	**#2 loop 4-20mA+**	11	**Sensor 1 S-**	23	NC	32	**3#Relay +**
4	**#2 loop 4-20mA-**	12	**Sensor 1 SGND**	24	NC	33	**3#Relay -**
5	**RS-485B**	13	**Sensor 1 V+**	25	NC	34	**2#Relay +**
6	**RS-485A**	14	**Sensor 1 V-**	26	NC	35	**2#Relay -**
8	**USB Socket**	15	NC	27	NC	36	**1#Relay +**
41	**Sensor 1 S+**	16	NC	28	NC	37	**1#Relay -**
42	**Sensor 2 S+**	17	**Sensor 2 S-**	29	**GPRS Socket**	38	**E**
		18	**Sensor 2 SGND**			39	**VB(N)**
		19	**Sensor 2 V+**			40	**VA(L)**
		20	**Sensor 2 V-**				

Pour:

Before connecting the electrode, check the dial switch and dial 12 to ON and 34 to Off.(Because the dial switch will be covered by the module, the dial switch position will be set before leaving the factory, and this step will be ignored)

Appendix IV: The wiring diagram of the conductivity electrode controller



Serial number	Function	Serial number	Function	Serial number	Function	Serial number	Function
1	**#1 loop 4-20mA+**	9	**Sensor 1 C1**	21	NC	30	**4#Relay +**
2	**#1 loop 4-20mA-**	10	**Sensor 1 C2**	22	NC	31	**4#Relay -**
3	**#2 loop 4-20mA+**	11	**Sensor 1 C3**	23	NC	32	**3#Relay +**
4	**#2 loop 4-20mA-**	12	**Sensor 1 C4**	24	NC	33	**3#Relay -**
5	**RS-485B**	13	**Sensor 1 TP**	25	NC	34	**2#Relay +**
6	**RS-485A**	14	**Sensor 1 Shield**	26	NC	35	**2#Relay -**
8	**USB Socket**			27	NC	36	**1#Relay +**
		15	**Sensor 2 C1**	28	NC	37	**1#Relay -**
		16	**Sensor 2 C2**	29	**GPRS Socket**	38	**E**
		17	**Sensor 2 C3**			39	**VB(N)**
		18	**Sensor 2 C4**			40	**VA(L)**
		19	**Sensor 2 TP**				
		20	**Sensor 2 Shield**				

Pour:

Before connecting the electrode, check the dial switch and dial 1234 to Off.(Because the dial switch will be covered by the module, the dial switch position will be set before leaving the factory, and this step will be ignored)

Appendix V:MODBUS registration information

a、Communication instructions

number	Label name	Register	Data type	length	R/W
1	Main measurement value in the first channel	0	Float	2	R
2	Secondary measurements in the first channel	2	Float	2	R
3	Main measurement value in the second channel	4	Float	2	R
4	Secondary measurements in the second channel	6	Float	2	R
5	Calculated results display value (for calculation function)	8	Float	2	R

If the measurement parameter has no secondary measurement values, ignore this register, such as turbidity.

If the starting address is changed, the subsequent register addresses are sorted in order.

b、Communication setting requirements

Initial default configuration:
Baud rate: 9600, ID: 1, data bit: 8, stop bit: 1, no check bit.
Data type is: Float CD AB

Number	Communication Settings Project	Communication setting requirements
1	protocol	MODBUS RTU
2	CRC Check	None/Odd/Even
3	Baud rate	4800/9600/ 19200/38400
4	stop bit	1/2
5	address	1~255 Can be set
6	Register Start Address	Change according to demand
7	Date Format	CDAB/DCBA/ABCD/BADC