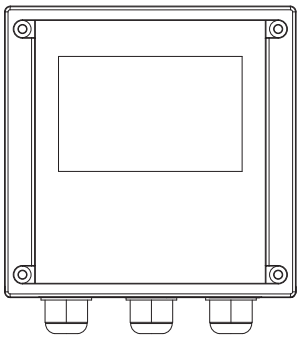
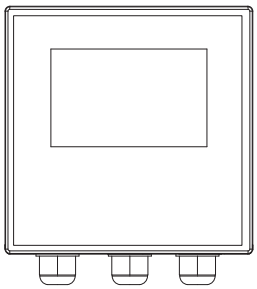
Version:2023-01

pH/FCL controller



6000 Series



800 Series

Content

Safety instructions

Read the manual before installing and operating the instruments.

1. Check for any damages on the content after unpacking
2. The instrument must be operated by trained professional and technical personnel.
3. Confirm the wiring connections with the wiring figure before switching on the power to avoid damages and injuries.
4. Avoid installing in a high humidity, high temperature, corrosive and in direct with sunlight environment.
5. Separate instrument signal cables from power lines and machine that produces high noise interference.

Instrument application

The instrument is used to measure pH/residual chlorine in industry, such as drinking water, swimming pool, process treatment, industrial water, Domestic water

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

Supplies 2 current outputs for a maximum load of 500Ω

Supplies 3 control relays with a maximum voltage and current of 5A/250VAC or 5A/30VDC.

Product content

6000 series：1 meter, 1 operational manual and four sets of mounting kits(Fixed box, fixed bar and screw).

800 series：1 meter, 1 operational manual and two sets of mounting kits

Specifications

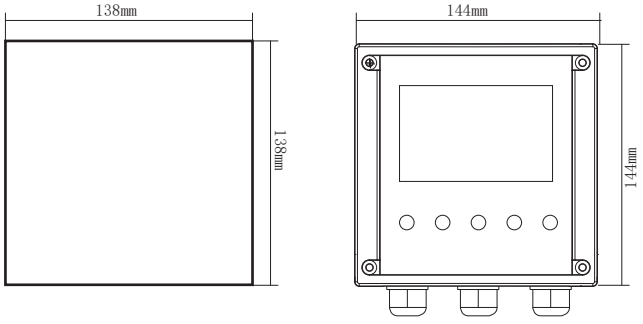
Functions	pH	FCL
Measuring range	-2.00 to +16.00 pH	0.050 to 20.000 mg/L
Resolution	0.01pH	0.001 mg/L
Accuracy	±0.01pH	< 1% （At 16 mg/L）
Temp.compensation	NTC	
Temp.range	0 to +45.0℃	
Temp.compensation range	0 to +45.0℃	
Temp.resolution	0.1℃	
Temp.accuracy	±0.2℃	
Ambient temperature range	0 to +55℃	
Storage temp.	5 to +40℃（No electrolyte）	
Input impedance	$>10^{12}\Omega$	
Display	Back light, dot matrix	
pH current output 1	Isolated, 4 to 20mA output , max. load 500 Ω	
Residual chlorine current output 2	Isolated, 4 to 20mA output , max. load 500 Ω	
Current output accuracy	±0.05 mA	
RS485	Modbus RTU protocol	
Baud rate	9600/19200/38400	
MAX. relay contacts capacity	5A/250VAC,5A/30VDC	
Cleaning setting	ON: 1 to 1000 seconds, OFF: 0.1 to 1000.0 hours	
One multi-function relay	clean/period alarm/error alarm	
Relay delay	0-120 seconds	
Data logging capacity	500,000 records	
Language selection	English	
USBport	Download records and update program (144 series only)	
IP Rating	IP65	
Power supply	90 to 260VAC, power consumption<5W	
Installation	panel/wall/pipe installation	
Weight	6000 series: 0.85Kg/ 800 series:0.55Kg	

Instrument installation

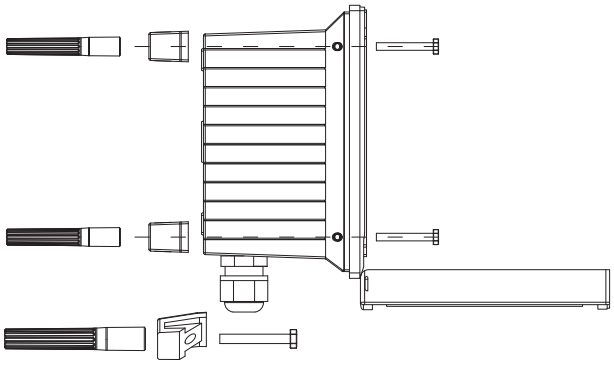
6000 series: The instrument can be panel,wall or pipe mounted installation.

Panel installation: Make a 138mm square cutout and insert the instrument.

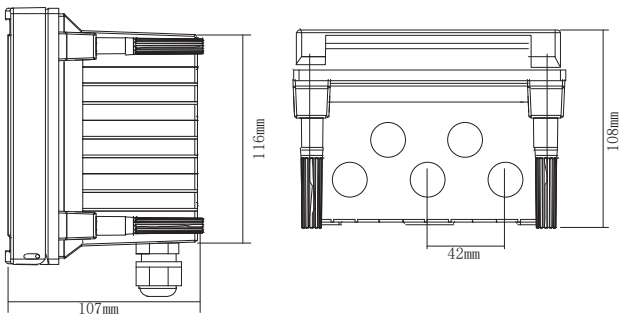
Screw in the fixed block with the screws and fixed bar.



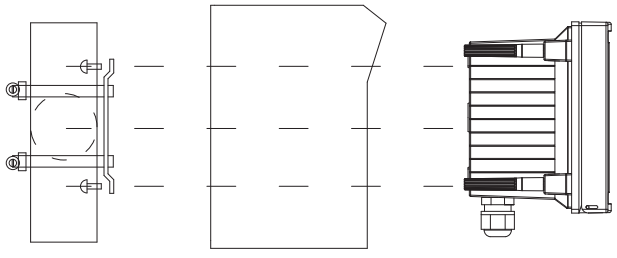
Cutout size -144 series　　Front view



Installation - 6000 series

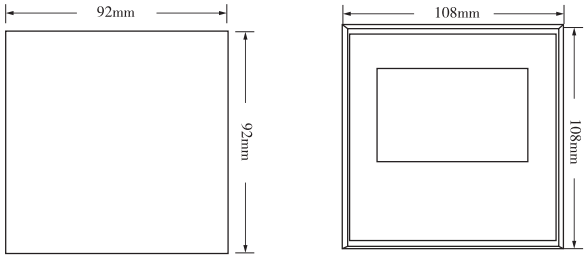


Exploded view -6000 series

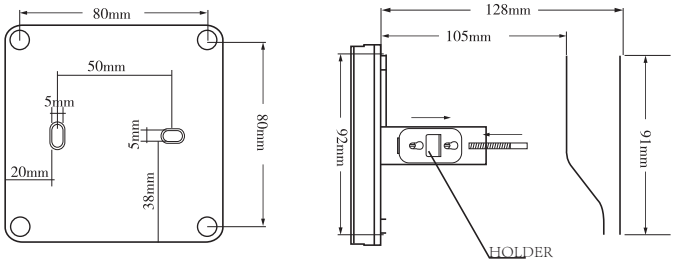


Wall and pipe installation - 6000 series

800 Series: The instrument can be panel,wall or pipe mounted installation. Panel installation: Make a 92x92mm square cutout and insert the instrument then screw in the fixed HOLDER.



Cutout size -800 series

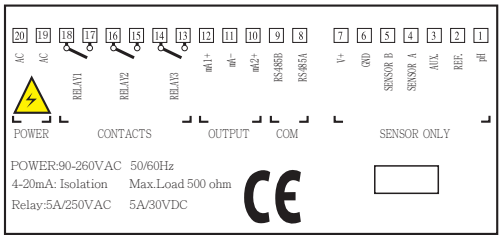


Back view - 800 series

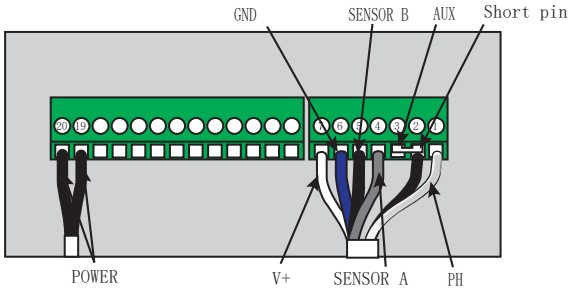
Side view -800 series

Connection label

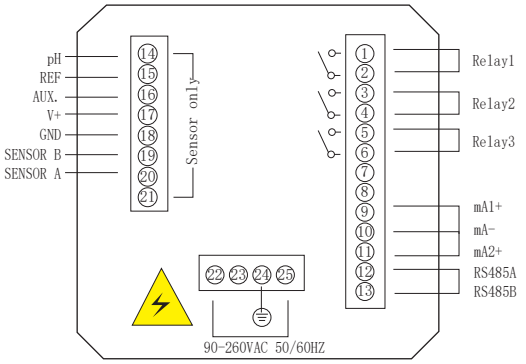
6000 Series



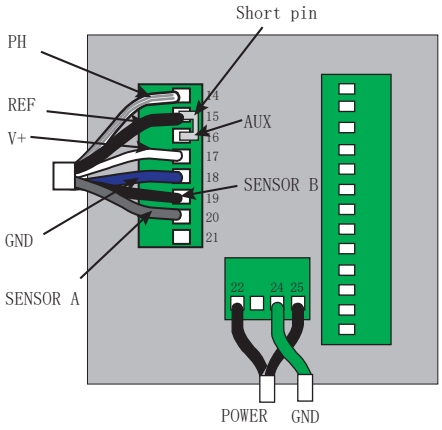
Electrode connection figure (6000 Series)



800 Series

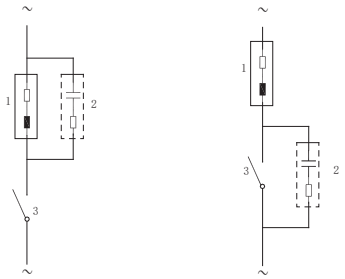


Electrode connection figure (800 Series)

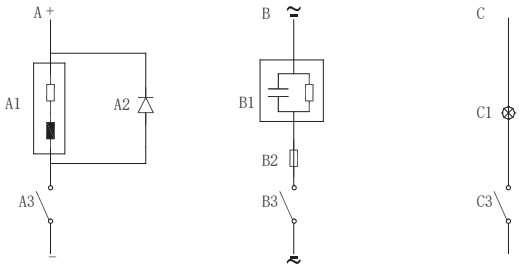


Relay contact protection

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.

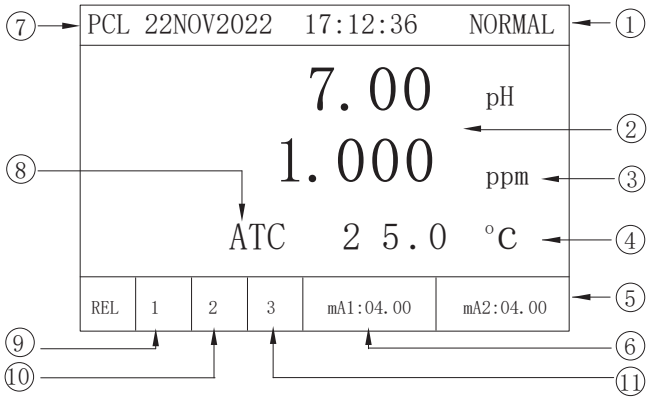


AC protection, use for inductive load
1. Load
2. RC eliminate spark, using in 220VAC, R=100 ohm/1W
3. Relay contact



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

Display illustration



1. Measurement status (NORMAL/ERROR)
2. Main mesurement display
3. Unit
4. Temperature and unit
5. Current output 2
6. Current output 1
7. Mesurement mode,date and time
8. Temperature compensation(ATC-Automatic or MTC-Manual)
9. Relay 1 status indicator
10. Relay 2 status indicator
11. Relay 3 status indicator

Buttons

MODE SHIFT UP DOWN ENTER

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

Keeping mode

Keeping mode is a safe mode, mainly used for calibration mode, setting mode, record view mode and relay cleaning mode. In keeping mode, the relays are open (deactivated), the current is set according to the setting (fixed current / last current) and the measurement display remains fixed.
When entering the four modes above, it will enter the keeping mode
When leaving the four modes and returning to the measurement mode, it takes about 10 seconds to leave the keeping mode.
When the instrument is switched on, it enters the keeping mode and leaves the keeping mode for about 10 seconds to enter the measurement mode

Output current in keeping mode
two modes are available:

Fixed

Last

- Fixed current - The output current is fixed.
- Last current - Hold the last output before entering keeping mode.
- Relays will return to default status - All relays will be inactived.

Setting

Press MODE key to enter the password menu and then press UP/DOWN/SHIFT key to input password 1200 then press ENTER to go to the setting mode or press MODE key to exit. Controller will return to measurement mode after 10 minutes of inactivity.

PASSWORD
0000

PASSWORD
1200

Main display

Press UP/DOWN key to choose items then press ENTER key to enter the function.

CONFIGURATION
■ Current 1 Settings
□ Current 2 Settings
□ Relay 1 Settings
□ Relay 2 Settings
□ Relay 3 Settings
□ Measurement Settings
□ Temperature Settings
□ RS485 Settings

Page 1

CONFIGURATION
■ Data Log Settings
□ Date Settings
□ Back Light Settings
□ Output Test
□ Language Settings
□ Reset Parameters

Page 2

Note:
1. Error on measurement page indicates that input data is not in the correct range.
2. Press ENTER on setting pages to save any changed data.
3. Press MODE to return to the previous page.
4. Meter will return to measurement mode after 10 minutes of inactivity.

Current 1 settings

CURRENT 1 SETTINGS		
4.00 mA	=	+000.00 pH
20.00 mA	=	+140.00 pH
Offset	=	+0.000 mA
Filter Time	=	000 SEC
HOLD Type	=	□ Fixed
		04.000 mA
		□ Last

or

CURRENT 1 SETTINGS		
4.00 mA	=	+140.00 pH
20.00 mA	=	+000.00 pH
Offset	=	+0.000 mA
Filter Time	=	000 SEC
HOLD Type	=	□ Fixed
		04.000 mA
		□ Last

1. Set the pH mapping value for the 4.00mA output
2. Set the pH correspondence to the 20.00mA output
3. The pH value corresponding to 4.00mA - 20.00mA is reversible (-2.00pH 16.00pH)
4. Set the current offset within ± 1.00mA
5. Set the current filtering time 0-120 seconds, when the current changes from one point to another, after a software low-pass filter intervention, the current would be more smooth
6. Set the current holding type, UP/DOWN key to select fixed current or last current, if fixed current is selected, press ENTER key to input fixed current

Current 2 settings

CURRENT 2 SETTINGS	
4.00 mA	=000.000 mg/L
20.00 mA	=20.000 mg/L
Offset	= +0.00 mA
Filter Time	= 000 SEC
HOLD Type	= □ Fixed
	04.00 mA
	□ Last

1. Set the corresponding value of ppm/mgL of 4.00mA output.
2. Set the corresponding value of ppm/mgL of 20.00mA output.
3. set current offset, range ±1.00mA
4. set the current filtering time 0-120 seconds, when the curre nt changes from one point to another, after a software low-pass filter intervention, the current would be more smooth.
5. set the current holding type, UP/DOWN key to select fixed current or last current, if fixed current is selected, press ENTER key to input fixed current.

Relay 1 settings

RELAY 1 SETTINGS	
Mode	= ■ pH
	□ FCL
ON/OFF	= □ ON
	□ OFF
Close S.P.	= + 1 0 .0 0 pH
Open S.P.	= + 0 4 .0 0 pH
Delay Time	= 0 0 0 SEC

RELAY 1 SETTINGS	
Mode	= □ pH
	■ FCL
ON/OFF	= ■ ON
	□ OFF
Close S.P.	= 2 0 .0 0 0 mg/L
Open S.P.	= 0 0 .0 0 0 mg/L
Delay Time	= 0 0 0 SEC

RELAY 1 SETTINGS	
Mode	= □ pH
	■ FCL
ON/OFF	= ■ ON
	□ OFF
Close S.P.	= 2 0 .0 0 0 ppm
Open S.P.	= 0 0 .0 0 0 ppm
Delay Time	= 0 0 0 SEC

1. Mode: Press UP/DOWN to select pH or FCL
2. Press UP/DOWN key to ON/OFF (enable/disable) relay 1.
2. Close S.P.: Closing point of relay pH/ppm/mgL (action)
3. Open S.P.: release point of relay pH/ppm/mgL (no action)
4. Delay time: Relay will only be activated when this timer time out. Timer range from 0 to 120 seconds.

Note: User targets to switch on the pump at 10.00pH and switch off at 4.00pH. Set close S.P. to 10.00pH and open S.P. to 4.00pH.

Relay 2 settings

RELAY 2 SETTINGS	
Mode	= ■ pH
	□ FCL
ON/OFF	= □ ON
	□ OFF
Close S.P.	= + 0 4 .0 0 pH
Open S.P.	= + 1 0 .0 0 pH
Delay Time	= 0 0 0 SEC

RELAY 2 SETTINGS	
Mode	= □ pH
	■ FCL
ON/OFF	= ■ ON
	□ OFF
Close S.P.	= 0 0 .0 0 0 mg/L
Open S.P.	= 2 0 .0 0 0 mg/L
Delay Time	= 0 0 0 SEC

RELAY 2 SETTINGS	
Mode	= □ pH
	■ FCL
ON/OFF	= ■ ON
	□ OFF
Close S.P.	= 0 0 .0 0 0 ppm
Open S.P.	= 2 0 .0 0 0 ppm
Delay Time	= 0 0 0 SEC

1. Mode: Press UP/DOWN to select pH or FCL
2. Press UP/DOWN key to ON/OFF (enable/disable) relay 2.
2. Close S.P.: Closing point of relay pH/ppm/mgL (action)
3. Open S.P.: release point of relay pH/ppm/mgL (no action)
4. Delay time: Relay will only be activated when this timer time out. Timer range from 0 to 120 seconds.

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. ON/OFF:Press UP/DOWN key to ON/OFF (enable/disable)relay 3.
2. Period time: Rinsing or interval function only.
3. Clean time: Relay operation period.
4. Delay time: Relay will only be activated when this timer is time out.
5. Function: Press UP/DOWN key to select Rinsing /Interval/Error.

Notice:

1. Rinsing: Relay will be activated when period time out. Relay will remain activated throughout cleaning time. Period timer will restart when cleaning is completed.
2. Interval alarm: Relay will be activated when period time out. Relay will remain activated until user resets the alarm. Period timer will restart.
3. Error alarm:Relay will be activated when an error is detected. Timer is not available for this function.

Measurement settings

Measurement SETTINGS	
FCL unit	= ■ ppm
	□ mg/L
pH Offset	= + 0 .0 0 pH
FCL Offset	= + 0 .0 0 0 pH
Filter	= 0 1

1. Press UP/DOWN to select the measurement unit
2. pH Offset input: range±1.00pH
3. FCL Offset input: range±2.000 ppm,mg/L
4. Filter setting (range 0-10)

Note: When you find that the reading is unstable, you can try to turn up the filter value appropriately, but it will also make the reading change slowly.

Temperature settings

TEMPERATURE SETTINGS	
Offset	= + 0 .0 ℃
Manual Temp.	= + 0 2 5 .0 ℃
Display	= □ YES
	□ NO

1. Temp.Offset,range±5.00℃(Automatic only)
2. Manual temperature input
3. Display:Whether the measurement screen shows temperature

RS485 settings

RS485 SETTINGS	
ID Address	= 0 0 1
Baud Rate	□ 9600
	□ 19200
	□ 34800

1. ID Address: 1-255
2. Baud Rate: Press UP/DOWN key to select correct baud rate.

Data log settings

DATA LOG SETTINGS	
OFF/ON	= ■ ON
	□ OFF
Display Type	= □ Record
	□ XY Chart
Reset Record	= □ YES
	□ NO
Save Period	= 0 6 0 SEC

1. ON/OFF:Enable or disable data logging function.
2. Display Type:Select data logging display mode.
3. Reset Record:Erase all recorded data.
4. Saving Period:Recording interval.

Note:

1. When Data Logging is on, data will be saved according to the time of the storage interval in measurement mode.
2. The logging method can be selected as either a log display (5 data per page) or a graphical display (150 data per page).
3. When Reset Record is selected, it will take about 10 seconds for all logs to be cleared.

Date Settings

DATE SETTINGS	
Year	= 2 0 1 8
Month	= 0 1
Day	= 0 1
Hour	= 0 2
Minute	= 3 8
Sec	= 5 5

Press UP/DOWN key to set the date.Clock will continue to run for about 2 days after power down.

Back light settings

BACK LIGHT SETTING	
Back Light	= ■ 60 Seconds
	□ Manual
Contrast	= 0 5

1. 60 seconds: The back light will turn off when no key is pressed in 60 seconds.
2. Manual: User needs to press the ENTER key to turn on/off the back light in manual.

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

1. Current 1:Injects current ranging from 4.00-20.00mA to the output. Press UP/DOWN to set.
2. Curent 2:Injects current ranging from 4.00-20.00mA to the output. Press UP/DOWN to set.
3. Relay 1:Open or close contact. Press UP/DOWN to select.
4. Relay 2:Open or close contact. Press UP/DOWN to select.
3. Relay 3:Open or close contact. Press UP/DOWN to select.Notice:This function for testing the output only.

Language settings

LANGUAGE SETTINGS	
Language	= ■ English

Press UP/DOWN key to select the language.

Reset parameters

RESET PARAMETERS
Reset Type = ■ Current □ Relay1 □ Relay2 □ Relay3 □ All

Press UP/DOWN key to select the targeted parameters to reset.However, it does not affect the following values: LANGUAGE SETTINGS、Contrast、RS485 SETTINGS、Unit of measurement of residual chlorine

Note: Reset will not change the calibration value of ppm/mgL

Record query

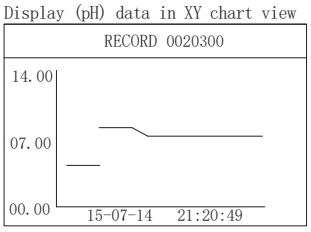
INPUT RECORD START NUMBER
010300

Press UP key at the measurement mode to enter the record query mode.
Press UP/DOWN and SHIFT key to input record number then press ENTER key to confirm record number or press MODE key to exit.

Display (pH) data in detail view

RECORD 0020300
15-08-14 07.00 pH 21:20:49 00.262 mg/L 15-08-14 07.00 pH 21:20:59 00.246 mg/L 15-08-14 07.00 pH 21:21:09 00.235 mg/L 15-08-14 07.00 pH 21:21:19 00.222 mg/L 15-08-14 07.00 pH 21:21:29 00.210 mg/L

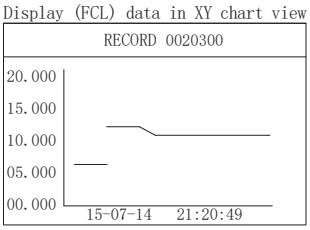
Display (pH) data in XY chart view



Display (FCL) data in detail view

RECORD 0020300
15-08-14 07.00 pH 21:20:49 00.262 ppm 15-08-14 07.00 pH 21:20:59 00.246 ppm 15-08-14 07.00 pH 21:21:09 00.235 ppm 15-08-14 07.00 pH 21:21:19 00.222 ppm 15-08-14 07.00 pH 21:21:29 00.210 ppm

Display (FCL) data in XY chart view



Calibration

Press MODE key to enter the password menu. Then press UP/DOWN/SHIFT key to input password 1100. Pressing ENTER to go to calibration mode or press MODE to exit. If no key is pressed for over 10 minute, then it will go back to measurement mode.

PASSWORD
0000

PASSWORD
1100

Main display

CALIBRATION
■pH Automatic CAL. □pH Manual CAL. □pH Reset Parameters □FCL Zero Calibration □FCL Slope Calibration □FCL Reset Parameters

Press UP/DOWN to select the function, and press ENTER to enter the correction

1. Automatic CAL.: Select the appropriate first and second standard solution for correction according to the instructions
2. Manual CAL.: The value of two-point standard solution must be entered manually
1. FCL Zero Calibration: Corrected zero value
2. FCL Slope Calibration: Corrected full point value
3. Reset Parameters: Restore the factory correction value

Note: If the electrode efficiency is lower than 80%, or the calibration waiting time is too long to automatically lock, check whether the electrode is aging, and if it is aging, it should be updated in time (note: during calibration, use a flow tank with stable flow rate)

pH Automatic CAL.

The 1st point calibration

CALIBRATION
SLOPE = 59.16 mV/pH EFFICIENCY = 100.0 %
Press ENTER

CALIBRATION	
■ 6.86 □ 7.00	7.00 pH 25.0 ℃
Select buffer and press ENTER	

1. Put the electrode to the first buffer.
2. Press UP/DOWN key input the standard buffer and then press ENTER key to start calibration. User can press ENTER to go next or wait for it auto lock. If the input is over 7.00+/-1.5pH then it will display ERROR on the top of LCD.
3. Display the idea pH on the right side.
4. If the idea pH is over 7.00+/-1.5 pH or temperature is over 0.0-60.0℃ then it willdisplay error message on the button of LCD.

The 2st point calibration

CALIBRATION	
Buffer Value □ 1.68 ■ 4.01 □ 9.18 □ 10.01 □ 12.45	4.00 pH 25.0 ℃
Select buffer and press ENTER	

1. Put the electrode into the second buffer.
2. Press UP/DOWN key to select the correct buffer and then press ENTER to start calibration.
3. User can press ENTER to go next or wait for auto lock.
4. Display the ideal pH on the right side.

Calibration finish

RESULT CALIBRATION
Status=Pass Slope = 58.00 mV/pH EFFICIENCY = 99.0 %
Sensor is in good condition

If the efficiency is lower than 80%, that means the electrode is aged, user should replace a new electrode.

pH Manual CAL.

The 1st point calibration

CALIBRATION
SLOPE = 59.16 mV/pH EFFICIENCY = 100.0 %
Press ENTER

CALIBRATION	
7.00	7.00 pH 25.0 ℃
Input buffer and press ENTER	

1. Put the electrode to the first buffer.
2. Press UP/DOWN key input the standard buffer and then press ENTER key to start calibration. User can press ENTER to go next or wait for it auto lock. If the input is over 7.00+/-1.5pH then it will display ERROR on the top of LCD.
3. Display the idea pH on the right side.
4. If the idea pH is over 7.00+/-1.5 pH or temperature is over 0.0-60.0℃ then it willdisplay error message on the button of LCD.

The 2st point calibration

CALIBRATION	
04.01	4.00 pH 25.0 ℃
Input buffer and press ENTER	

Calibration finish

RESULT CALIBRATION
Status=Pass Slope = 58.00 mV/pH EFFICIENCY = 99.0 %
Sensor is in good condition

1. Put the electrode to the second buffer.
2. Press UP/DOWN key input the standard buffer and then press ENTER key to start calibration. User can press ENTER to go next or wait for it auto lock. If the input is over 0.00 to 14.00pH then it will display “ERROR” on the top of LCD.
3. Display the ideal pH on the right side.
4. If the input is over 0.00-14.00 pH, or temperature is over 0.0-60.0℃ then it will display error message on the button of LCD
5. If the efficiency is lower than 80%, that means the electrode is aged. User should replace a new electrode.
6. Press Enter to finish the calibration

pH Reset Parameters

RESET PARAMETERS
RESET

This will reset all the calibrated parameters to default.

Note: The “RESET” here is to reset the calibration to the factory parameters and does not affect the parameters changed in “SETTINGS”.

FCL Zero Calibration

Zero Calibration
Cal.Value = 0 mg/L nA Reading = 0 . 0 3 nA
Wait stable and press ENTER

Put the electrode in chlorine-free water and wait for the reading value to stabilize Press the OK key to complete zero point correction

Note: When calibrating, use a flow tank with stable flow rate!

FCL Slope Calibration

When putting the electrode into the flow tank (the maximum pressure is 1 Bar, the pH range is pH4-pH9), wait until the reading value is stable, press ENTER to the next screen to complete the full point correction

SLOPE CALIBRATION
nA Reading = 0 5 . 0 0 nA
Wait stable and press ENTER

SLOPE CALIBRATION
nA Reading = 0 5 . 0 0 nA 0 1 . 0 0 0 mg/L
Input standard data

FCL Reset Parameters

RESET PARAMETERS
RESET

This will reset all the calibrated parameters to default.
Note: The “RESET” here is to reset the calibration to the factory parameters and does not affect the parameters changed in “SETTINGS”.

USB Function (144 Series)

Press MODE key to enter the password menu. Press UP/DOWN/SHIFT key to input password 1300. Press ENTER to go to USB setting or press MODE key to exit. If no key is pressed for over 10 minutes, it will go back to measurement mode.

PASSWORD
0 0 0 0

PASSWORD
1 3 0 0

USB Settings

Press UP/DOWN key to select the functions and then press ENTER key to proceed.

USB SETTINGS
■ Download records □ Update program

1. To download records, plug in a USB flash disk into the USB port and then download all of the records. It takes around 10 minutes to download 500,000 records or 1 minute to download 50,000 records.
2. To update program, save the correct file to the USB flash disk. Plug it to the USB port. Enter the update program function to update it.

Default settings

pH 20.00mA corresponding	14.00	pH	range: -1.00 -16.00
pH 4.00mA corresponding	0.00	pH	range: -2.00 - 16.00 difference: 1.00
FCL 20.00mA corresponding	20.000	ppm	range: 0.100 - 20.000
FCL 4.00mA corresponding	0.0	ppm	range: 0.0-19.000 difference: 0.100
Current 1 output offset	0.00	mA	range: +/- 1.00
Current 2 output offset	0.00	mA	range: +/- 1.00
Current 1 filter	0	SEC	range: 0-120
Current 2 filter	0	SEC	range: 0-120
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
Relay1 pH close S.P.	10.00	pH	range: -2.00 - 16.00
Relay1 pH open S.P.	4.00	pH	range: -2.00 - 16.00 difference: 0.01
Relay1 FCL close S.P.	20.000	ppm	range: 0.000- 20.000
Relay1 FCL open S.P.	00.000	ppm	range: 0.000- 20.000 difference: 0.001
Relay1 delay time	0	SEC	range: 0-120
Relay2 pH close S.P.	4.00	pH	range: -2.00 - 16.00
Relay2 pH open S.P.	10.00	pH	range: -2.00 - 16.00 difference: 0.01
Relay2 close S.P.	00.000	ppm	range: 0.000-20.000
Relay2 open S.P.	20.000	ppm	range: 0.000-20.000 difference: 0.001
Relay2 delay time	0	SEC	range: 0-120
Relay 3 period time	1.0	hour	range: 0 - 1000.0
Relay 3 clean time	10	SEC	range: 0 - 1000
Relay 3 delay time	0	SEC	range: 0 - 120
Relay 3 function	error alarm		range: clean/period alarm /error alarm
Record period	60	SEC	range: 5 - 120
ID address	1		range: 1 - 255
Baud rate	9600		range: 9600,19200,38400
offset	0.0		range: +/- 2.000

Unit	ppm		range: pH,ppm, mg/L
Temp. Offset	0.0	℃	range: +/- 5.0
Language	English		range: English/traditional Chinese /Simplified Chinese
Filter	1		range: 0-10
Record type	record		range: record/XY chart
Measurement interval	1	SEC	range: 1 - 10

Password

Press MODE key
1100: Calibration mode
1200: Setting mode
1300: USB mode
If no key is pressed within 10 minutes, it will return to measurement mode.

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 12 Electrode fault or not connected
Error 99 Default parameters lost

RS485 command

The instrument comes in standard with Modbus-RTU protocol. All of the data are word type (2 bytes) or floating type (4 bytes), the word type range is -32767～32767.

PC command:

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

Instrument response

	ID address	command	Start address	Data number	CRC16
length	1 byte	1 byte	1 byte	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.
Command 03: read the settings
Command 04: read the readings

04: definition

address			
(00)	0x00	pH reading	reading : float
(02)	0x02	FCL reading	reading : float
(04)	0x04	pH current	reading: X0.01
(05)	0x05	FCL current	reading: X0.01
(06)	0x06	Temperature current	reading: X0.1

03: definition

address			
(00)	0x00	pH 20.00mA corresponding	reading: X0.01
(01)	0x01	pH 4.00mA corresponding	reading: X0.01
(02)	0x02	FCL20.00mA corresponding	reading: X0.01
(03)	0x03	FCL4.00mA corresponding	reading: X0.01
(04)	0x04	Current 1 offse	reading: X0.01
(05)	0x05	Current 2 offset	reading: X0.01
(06)	0x06	Current 1 filter	reading: X1
(07)	0x07	Current 2 filter	reading: X1
(08)	0x08	Current 1 fixed current	reading: X0.01
(09)	0x09	Current 2 fixed current	reading: X0.01

(10)	0x0A	Current 1 HOLD type	reading: X1 0=fixed 1=last
(11)	0x0B	Current 1 HOLD type	reading: X1 0=fixed 1=last
(12)	0x0C	Relay1 pH close S.P.	reading: X0.01
(13)	0x0D	Relay1 pH open S.P.	reading: X0.01
(14)	0x0C	Relay1 FCL close S.P.	reading: X0.01
(15)	0x0D	Relay1 FCL open S.P.	reading: X0.01
(16)	0x10	Relay1 delay time	reading: X1
(17)	0x11	Relay2 pH close S.P.	reading: X0.01
(18)	0x12	Relay2 pH open S.P.	reading: X0.01
(19)	0x13	Relay2 FCL close S.P.	reading: X0.01
(20)	0x14	Relay2 FCL open S.P.	reading: X0.01
(21)	0x15	Relay2 delay time	reading: X1
(22)	0x16	Relay3 clean period	reading: X0.1
(23)	0x17	Relay3 clean time	reading: X1
(24)	0x18	Relay3 delay time	reading: X1
(25)	0x19	Relay3 function	reading: X1 0:clean 1:period alarm 2:Error alarm
(26)	0x1A	Record saving time	reading: X1
(27)	0x1B	Unit	reading: X1, 0=ppm 1=mg/L
(28)	0x1C	PH offset	reading: X0.01
(29)	0x1D	FCL offset	reading: X0.01
(30)	0x1E	Temp. offset	reading: X0.1
(31)	0x1F	Manual Temp.for measurement	reading: X0.1
(32)	0x20	Manual Temp.for calibration	reading: X0.1
(33)	0x21	Language	reading: X 1 0=English 1=traditional Chinese 2=simple Chinese
(34)	0x22	Filter	reading: X1