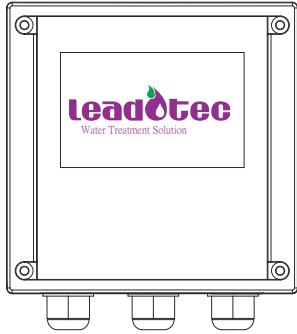


Free Chlorine Controller



6000 Series



800 Series

G

Content

Unpacking instruction	2
Safety precaution	2
Instrument application.....	2
Product content	2
Specifications	3
Instrument installation	4
Connection label	7
Electrode connection figure	7
Relay contact protection.....	9
Measurement display	10
Buttons	11
Keeping mode	11
Setting.....	12
Main display	12
Current 1 settings	13
Current 2 settings	13
Relay 1 settings	13
Relay 2 settings	14
Relay 3 settings	14
Measuring settings	15
Temperature settings.....	15
RS485 settings	15
Date settings	16
Data log settings	16
Output test	16
Language settings	17
Backlight settings	17
Reset parameters	17
Record query	18
Calibration.....	18
USB	20
Default settings.....	21
Password	22
Error code	22
RS485 command	22

Unpacking instruction

Check for any damages on the content after unpacking.
Read the manual before installing and operating the instruments.
Confirm the wiring connections with the wiring diagram before switching on the power to avoid damages and injuries.

Safety precaution

1. The instrument must be operated by trained professional and technical personnel.
2. Avoid installing in a high humidity, high temperature, corrosive and in direct with sunlight environment.
3. Separate instrument signal cables from power lines and machine that produces high noise interference.

Instrument application

Instruments are used in industrial measuring of the free chlorine, such as wastewater treatment, environmental monitoring, drinking water, food production process, etc.

Product content

1. 6000 series
1 meter, 1 operational manual, 1 quality check form, and four sets of mounting kits (Fixed box, fixed bar and screw).
2. 800 series
1 meter, 1 operational manual, 1 quality check form, and two sets of mounting kits

-2-

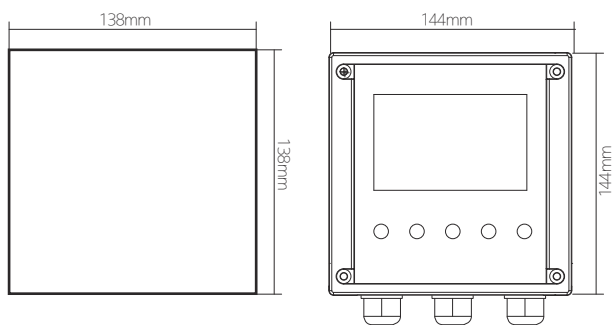
Specifications

Functions	Free chlorine
Measuring range	0.050 to 20.000 mg/L
Resolution	0.001 mg/L
Accuracy	< 3% (at 16 mg/L)
Temp. range	0.0 to +45.0°C
Temp. resolution	0.1°C
Temp. accuracy	±0.2°C
Readings refresh	1-10 seconds
Ambient temperature range	0 to +70°C
Storage temp.	-20 to +70°C
Display	Back light,dot matrix
FCL 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	Mod bus 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 data
Language selection	English/ traditional Chinese/simplified Chinese
USB port(for 6000 series only)	Download records and update program
IP Rating	IP65
Power supply	From 90 to 260VAC, power consumption <5 watts
Installation	panel/wall/pipe installation
Weight	6000 series:0.85Kg/ 800 series:0.55Kg

-3-

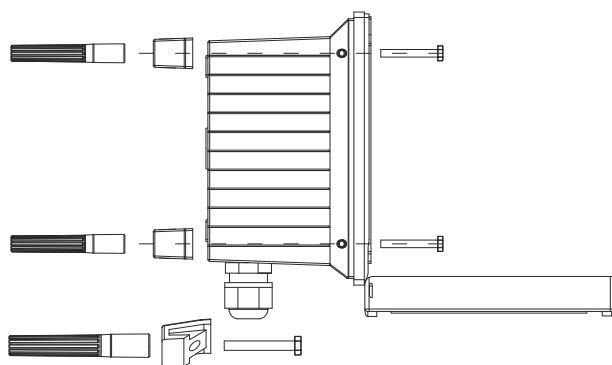
Instrument installation

6000series : 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.



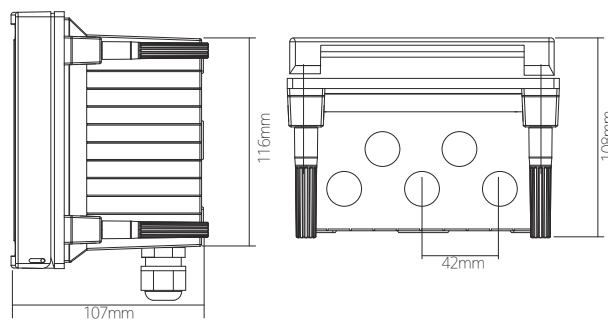
Cutout size - 6000 series

Front view - 6000 Series

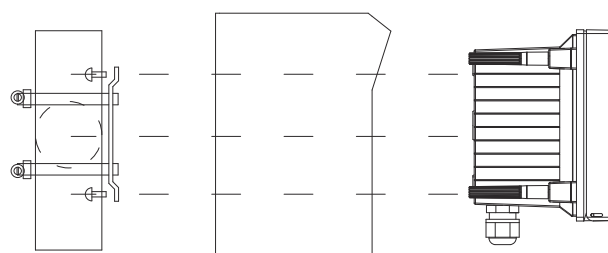


Exploded view - 6000 Series

-4-



Side and bottom view - 6000 Series

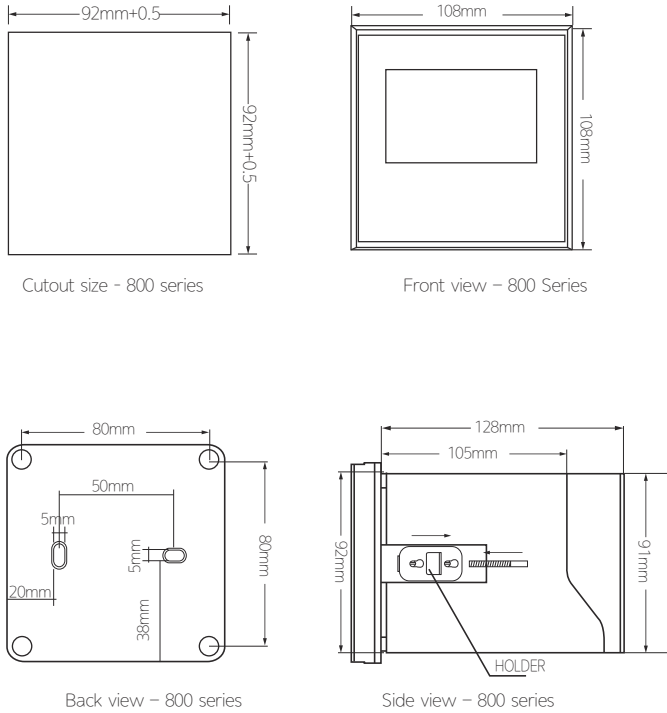


Wall and pipe installation - 6000 Series

-5-

Instrument installation

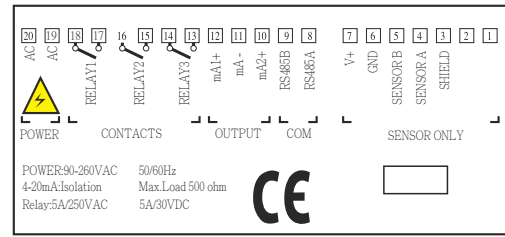
800 Series: The instrument can be panel, wall or pipe mounted installation.
To install 800 series on panel, make a 92x92 mm square cutout and insert the instrument then screw in the fixed HOLDER.



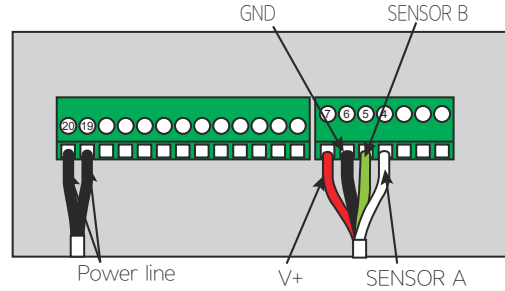
-6-

Connection label

6000Series

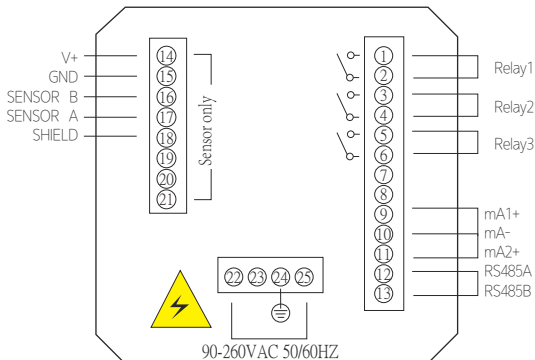


Electrode connection figure

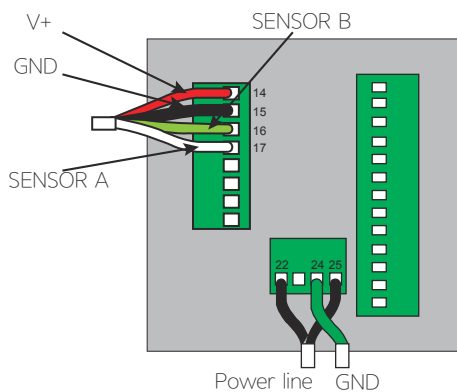


-7-

Connection label (800 series)



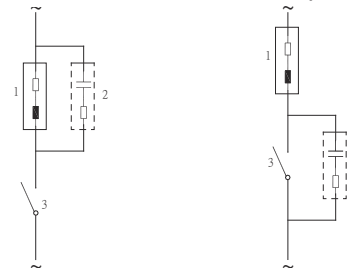
Electrode connection figure (800 series)



-8-

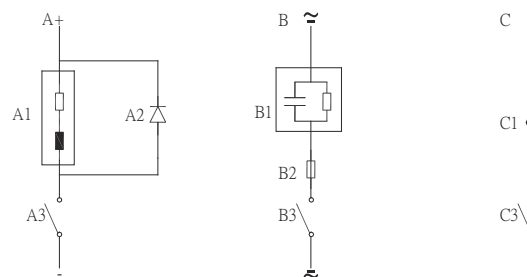
Relay contact protection

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

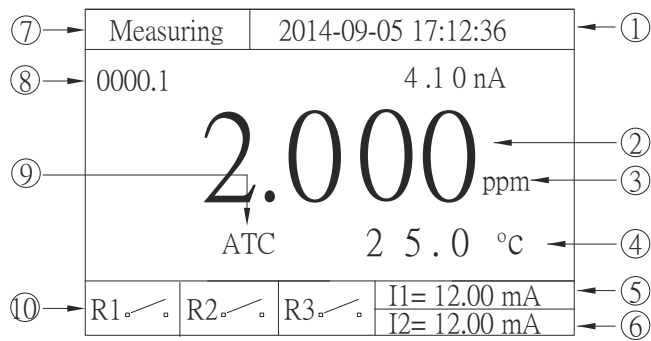
1. Load
2. RC eliminate spark, using in 220VAC, R=100 ohm 1W,
3. Relay contact



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

-9-

Measurement display



1. Date and time
2. Main measurement display
3. Unit
4. Temperature and unit
5. Current output 1
6. Current output 2
7. Measurement status and error indicator (Does not show when meter is in keeping mode)
8. Count down timer - Cycle time/ clean time (Displays "delay" when relay3 has delay function enabled)
9. Temperature compensation (ATC - Automatic or MTC - Manual)
10. Relay status indicator

-10-

Buttons



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

Keeping mode

1. Activates during startups, setting, calibration, record, and cleaning.
2. Relay will return to default status - All relays will not be energized (Inactive).
3. Current output:
 - a) Fixed current - Values set on output test
 - b) Last current - Hold the last output before entering Keeping mode.
4. Keeping mode will be deactivated 10 seconds after returning to measurement mode.

-11-

Setting

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

PASSWORD	PASSWORD
0 0 0 0	1 2 0 0

Main display

Press UP/DOWN key to choose functions, press ENTER key enter the function.

CONF I GURATION	CONF I GURATION
■ Current1 Settings □ Current2 Settings □ Relay1 Settings □ Relay2 Settings □ Relay3 Settings □ Measurement Settings □ Temperature Settings □ RS485 Settings	■ Date Settings □ Data Log Settings □ Output Test □ Language Settings □ Back Light Settings □ Reset Parameters

Page1

Page2

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.

-12-

Current 1 settings

CURRENT 1 SETTINGS	
4.00 mA	= 0 0 . 0 0 ppm
20.00 mA	= 2 0 . 0 0 ppm
Offset	= + 0 . 0 0 mA
Filter Time	= 0 0 0 SEC
HOLD Type	= ☐ Fixed
	0 4 . 0 0 mA
	☐ Last

1. Set the ppm value to the corresponding 4.00mA and 20.00mA point.
2. The minimum range between 4.00mA and 20.00 mA at least is 0.0100.
3. Set the offset current of ppm,mg/L, the range is ±1.00mA.
4. The filter time range is 0-120 seconds. The low pass filter of software will be activated when the current from one point to another point if user sets the filter time.
5. Set the current 1 output mode (Fixed / Last) during keeping mode.

Current 2 settings

CURRENT 2 SETTINGS	
4.00 mA	= 0 0 . 0 0 °C
20.00 mA	= 4 5 . 0 0 °C
Offset	= + 0 . 0 0 mA
Filter Time	= 0 0 0 SEC
HOLD Type	= ☐ Fixed
	0 4 . 0 0 mA
	☐ Last

1. Set the temperature value to the corresponding 4.00mA and 20.00mA point.
2. The minimum range between 4.00mA and 20.00 mA is 10.0°C.
3. Set the offset current of temperature (The maximum range is ±1.00mA).
4. The filter time range is 0-120 seconds. The low pass filter of software will be activated when the current from one point to another point if user sets the filter time.
5. Set the current 2 output mode (Fixed / Last) during keeping mode.

Relay 1 settings

RELAY 1 SETTINGS	
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. Press UP/DOWN key to ON/OFF (enable/disable) relay1.
2. Close set point: Target value to activate relay.
3. Open set point: Target value to deactivate relay.
4. Delay time: Relay will only be activated when this timer time out. Timer range from 0 to 120 seconds.

Ex: User targets to switch on the pump at 20.000ppm and switch off at 0.000ppm. Set close S.P. to 20.000ppm and open S.P. to 0.050ppm.

-13-

Relay 2 settings

RELAY 2 SETTINGS	
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. Press UP/DOWN key to ON/OFF (enable/disable) relay2.
2. Close set point: Target value to activate relay.
3. Open set point: Target value to deactivate relay.
4. Delay time: Relay will only be activated when this timer time out. Timer range from 0 to 120 seconds.

Ex: User targets to switch on the pump at 0.000ppm and switch off at 20.000ppm. Set close S.P. to 0.000ppm and open S.P. to 20.000ppm.

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 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 time 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 time will restart.
3. Error alarm: Relay will be activated when an error is detected. Timer is not available for this function.

-14-

Measurement settings

MEASUREMENT SETTINGS	
Unit	= ☒ ppm = ☐ mg/L
Offset	= + 0 0 . 0 ppm
Filter	= 0 1 SEC

1. Unit: select the display unit
2. Offset: offset for the readings.
3. Filter: average the readings.

Temperature settings

TEMPERATURE SETTINGS	
Offset	= + 0 . 0 °C
Display	= ☒ YES = ☐ NO

1. Offset: offset for the readings.
2. Display: display the temperature on measuring mode or not.

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 preferred baud rate.

-15-

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. Clock will continue to run for about 1 week after power down.

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.

Notice: Reset record will take around 10 seconds.

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. Current 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.

5. Relay 3: Open or close contact. Press UP/DOWN to select.

Notice: This function for testing the output only.

-16-

Language settings

LANGUAGE SETTINGS	
Language	= ☒ English = ☐ 繁體中文 = ☐ 简体中文

Language preference. Press UP/DOWN key to select the language.

Back light settings

BACK LIGHT SETTING	
Back Light	= ☒ 60 Seconds = ☐ Manual

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

Reset parameters

RESET PARAMETERS	
Reset Type	= ☒ Current = ☐ Relay1 = ☐ Relay2 = ☐ Relay3 = ☐ All

Reset all parameters. Press UP/DOWN key to select the targeted preference to reset.

Notice: The reset will not affect the calibrated parameters.

-17-

Record query

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

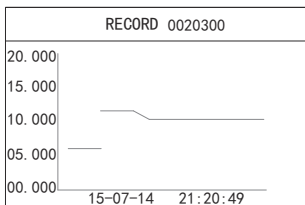
INPUT RECORD START NUMBER
0 1 0 3 0 0

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 (ppm) data in detail view

RECORD 0020300			
15-08-14	01.999	ppm	
21:20:49	025.0	°C	
15-08-14	01.999	ppm	
21:20:59	025.0	°C	
15-08-14	01.999	ppm	
21:21:09	025.0	°C	
15-08-14	01.999	ppm	
21:21:19	025.0	°C	
15-08-14	01.999	ppm	
21:21:29	025.0	°C	

Display (ppm) 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 will proceed 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
0 0 0 0

PASSWORD
1 1 0 0

-18-

Main display

CALIBRATION
☒ Zero Calibration ☐ Slope Calibration ☐ Reset Parameters

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

1. Zero calibration.
2. Slope calibration.
3. Reset.

Zero calibration

ZERO CALIBRATION
Cal. Value = 0 mg/L nA Reading = 2.00 nA
Wait stable and press ENTER

1. Put the sensor into the water that without disinfectant.
2. Wait the current is stable then press ENTER key to exit.

Slope calibration

SLOPE CALIBRATION
nA Reading = 52.00 nA
Wait stable and press ENTER

1. Put the sensor into the water that with a known concentration of disinfectant.
2. Wait the current is stable then press ENTER key to input the correct value

-19-

Slope calibration

SLOPE CALIBRATION
nA Reading = 52.00 nA
02.000 ppm
Input standard data

1. Input the Known disinfectant concentration
2. Press ENTER key to finish the calibration

USB function

Press MODE key to enter the password menu. Press UP/DOWN/SHIFT key to input password (1300). Press ENTER will proceed 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 setting menu

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.

-20-

Default settings

FCL 20.00mA corresponding	20.000 ppm	range: 0.100 - 20.000
FCL 4.00mA corresponding	0.0 ppm	range: 0.0-19.000
Temp. 20.00mA corresponding	45.0 °C	difference : 0.100
Temp. 4.00mA corresponding	0.0 °C	range: 10.0 - 45.0
		range: 0.0 - 35.0
		difference : 10.0
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
Current 2 filter	0 second	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
Relay 1 close S.P.	20.000 ppm	range: 0.000- 20.000
Relay 1 open S.P.	0.000 ppm	range: 0.000- 20.000
		difference : 0.001
Relay 1 delay time	0 second	range: 0 - 120
Relay 2 close S.P.	0.000 ppm	range: 0.000- 20.000
Relay 2 open S.P.	20.000 ppm	range: 0.000- 20.000
		difference : 0.1
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
Record period	60 second	range: 5 - 120
ID address	1	range: 1 - 255
Baud rate	9600	range: 9600,19200,38400
offset	0.000 ppm	range: +/-2.000
Mode	ppm	range: ppm,mg/L
Temp. Offset	0.0 °C	range: +/- 5.0
Language	English	range: English/ traditional Chinese /simple Chinese
Record type	record	range: record/XY chart
Measuring period	1 Second	range:1 - 10

-21-

Password

Press MODE key
1100: Calibration mode
1200: Setting mode
1300: USB mode

*If no key is be 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 99 Default parameters lost

RS485 command

The instrument come in standard with 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.

command 03: read the settings
command 04: read the readings

- 04:definition
address
- | | | | |
|------|------|---------------------|------------------|
| (00) | 0x00 | FCL reading | reading: X 0.001 |
| (01) | 0x01 | FCL current | reading: X 0.01 |
| (02) | 0x02 | Temperature | reading: X 0.1 |
| (03) | 0x03 | Temperature current | reading: X 0.01 |
| (04) | 0x04 | Error code | reading: X 1 |
| (05) | 0x05 | | |
| (06) | 0x06 | | |
| (07) | 0x07 | | |
| (08) | 0x08 | | |
| (09) | 0x09 | Model type | Fixed to 15 |

- 03:definition
Address
- | | | | |
|------|------|-----------------------------|---------------------------|
| (00) | 0x00 | FCL 20.00mA corresponding | reading:X0.001 |
| (01) | 0x01 | FCL 4.00mA corresponding | reading:X0.001 |
| (02) | 0x02 | Temp. 20.00mA corresponding | reading:X0.1 |
| (03) | 0x03 | Temp. 4.00mA corresponding | reading:X0.1 |
| (04) | 0x04 | Current 1 offset | 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 2 HOLD type | reading:X1 0=fixed,1=last |
| (12) | 0x0C | Relay1 FCL close S.P. | reading:X0.001 |
| (13) | 0x0D | Relay1 FCL open S.P. | reading:X0.001 |
| (14) | 0x0E | Relay1 delay time | reading:X1 |
| (15) | 0x0F | Relay2 FCL close S.P. | reading:X0.001 |

- | | | | |
|------|------|----------------------|---|
| (16) | 0x10 | Relay2 FCL open S.P. | reading:X0.001 |
| (17) | 0x11 | Relay2 delay time | reading:X1 |
| (18) | 0x12 | Relay3 clean period | reading:X0.1 |
| (19) | 0x13 | Relay3 clean time | reading:X1 |
| (20) | 0x14 | Relay3 delay time | reading:X1 |
| (21) | 0x15 | Relay3 function | reading:X1 0:clean,1:period alarm
2>Error alarm |
| (22) | 0x16 | Record period | reading:X1 |
| (23) | 0x17 | FCL offset | reading:X0.1 |
| (24) | 0x18 | Temp. offset | reading:X0.1 |
| (25) | 0x19 | Language | reading:X1 0=English ,1=traditional
Chinese,2=simple Chinese |

