

SS/Turbidity/Sludge blanket Controller



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Safe operation procedures

Read the following instructions before using the instrument.

1. After unpacking the instrument please check for damage due to shipping.
2. The instrument must be operated by trained professional and technical personnel.
3. Read the manual carefully to avoid incorrect wiring connection that can cause equipment damage and safe problem.
4. After wiring carefully check all are correct then can power on and make sure the others equipments are correct.
5. Please avoid installing in a high humidity, high temperature, corrosive and in a direct sunlight environment.
6. Please separate the power lines of instrument from other machines that produces high noise in the power lines.

Instrument use

Instruments are used in industrial measuring of the temperature and suspended solids turbidity, sludge blanket, such as urban wastewater treatment, treatment of industrial effluents, sludge treatment, dredging site, sedimentation tank, etc.

The instrument can be panel, wall or pipe mounted.

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

The instrument provides 3 relays. It can pass through a maximum of 5 Amps at 250 VAC or 5 Amps at 30VDC.

Product content

6000 series, the product package contains 1 instrument, the printed manual, 4 sets of holder.(fixed block, fixed bar, screw)

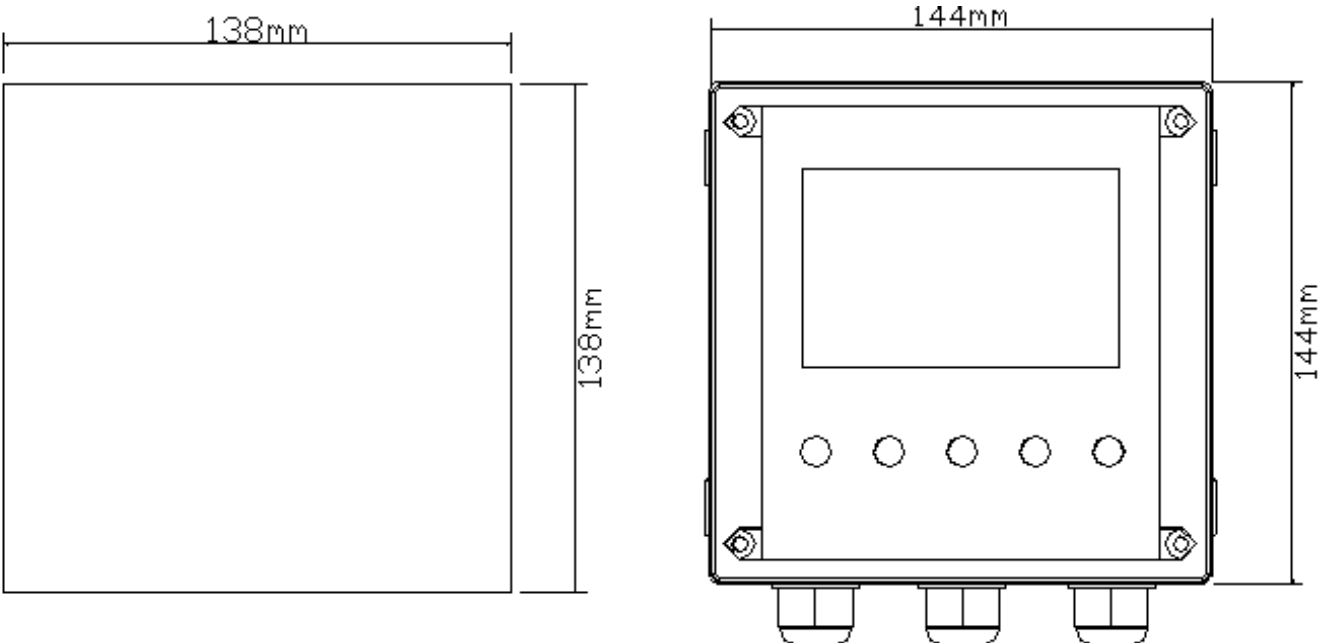
800 series, the product package contains 1 instrument, the printed manual, 2 holders

Specifications

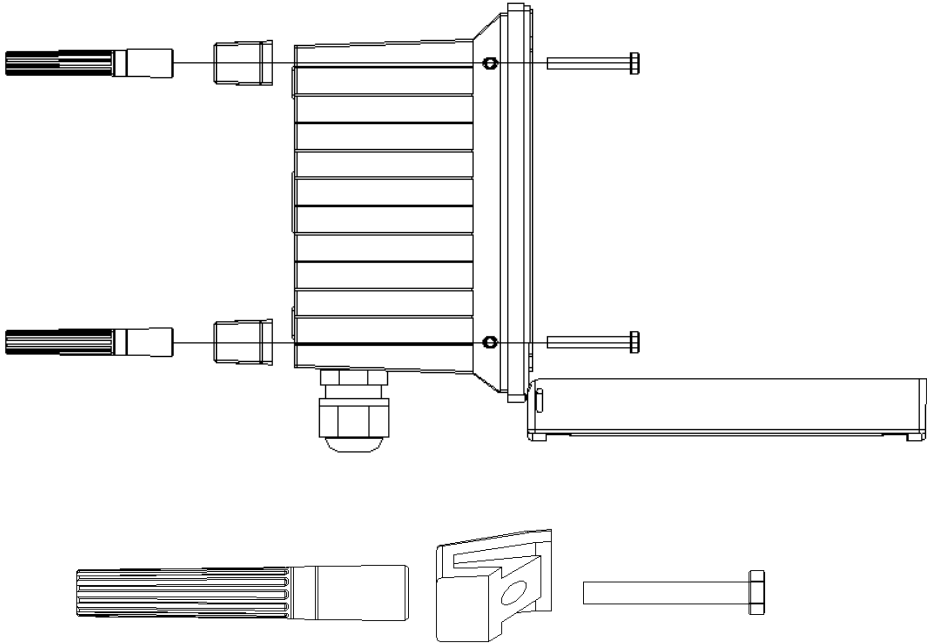
Functions	SS	Sludge blanket	Turbidity
Measuring range	0.00 – 50.00g/L	0.0-100.0%	0.0-4000.0
Resolution	0.01	0.1	0.1
Accuracy	<±5%	<±2%	±5%
Temp. compensation	NTC		
Temp. range	0.0 to +50.0°C		
Temp. resolution	0.1°C		
Temp. accuracy	±0.2°C		
Data update time	1-60 Second		
Ambient temperature range	0 to +70°C		
Storage temp.	-20 to +70°C		
Display	Back light, dot matrix		
Main 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		
Maximum 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		
Language selection	English/traditional Chinese/simplified Chinese		
Waterproof grade	IP65		
Power supply	From 90 to 260 VAC, power consumption < 5 watts		
Installation	panel/wall/pipe installation		
Weight	6000 series:0.85Kg/ 800 series:0.55Kg		

Instrument installation

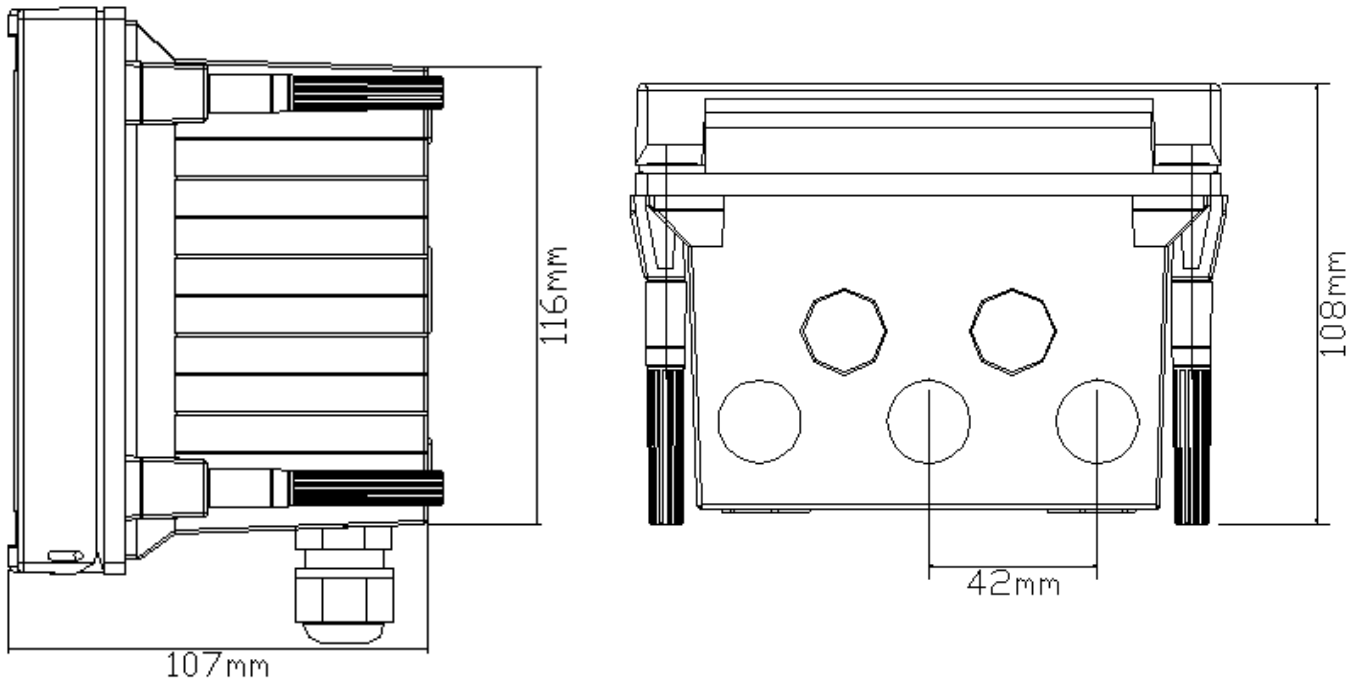
6000 series : The instrument can be panel, wall or pipe mounted installation.
Panel Installation: Make a 138x138 mm square cutout and insert the instrument. Screw in the fixed block with the screws and fixed bar.



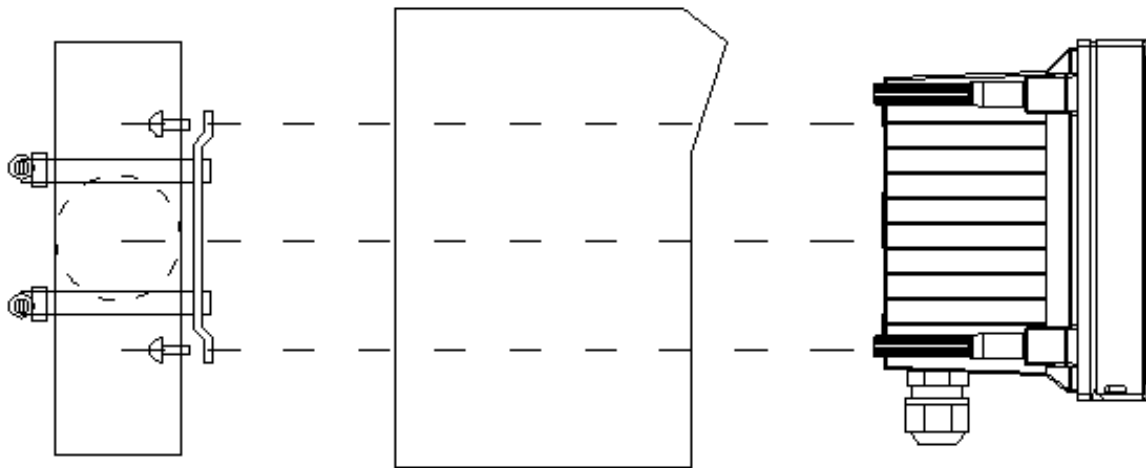
6000 series cutout size



6000 series installation figure



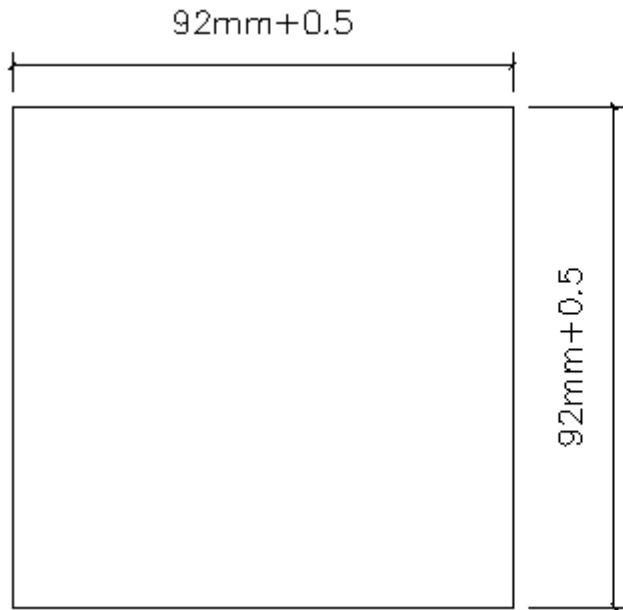
6000 series dimension



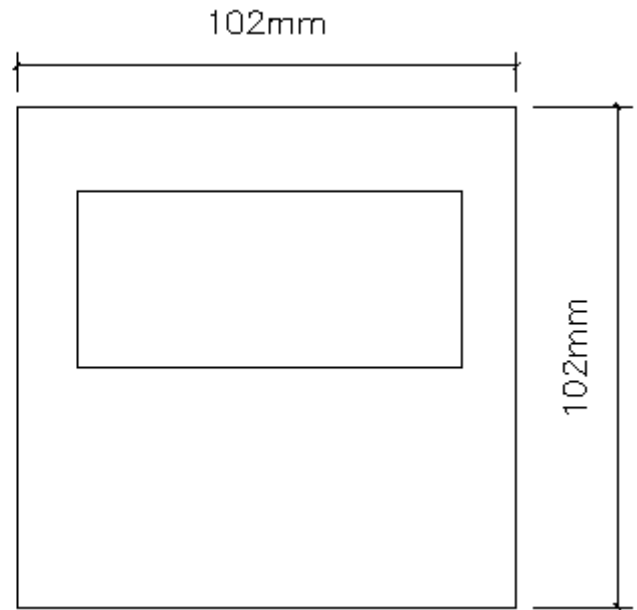
6000 series wall and pipe installation

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

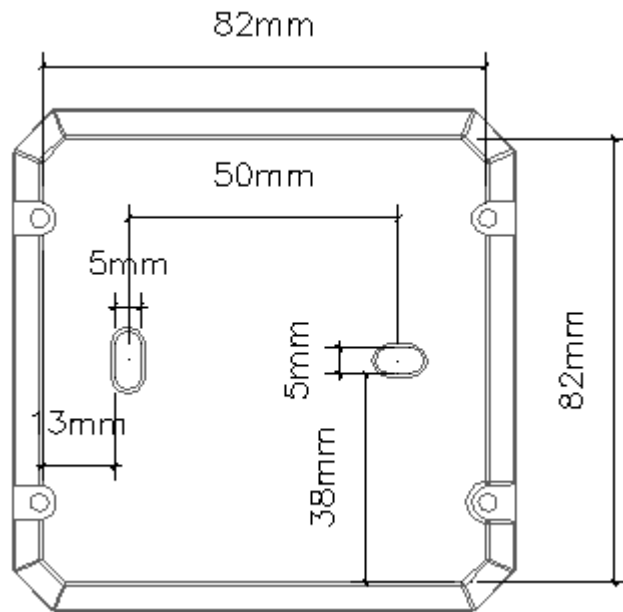
Panel Installation: Make a 92x92 mm square cutout and insert the instrument then screw in the fixed HOLDER.



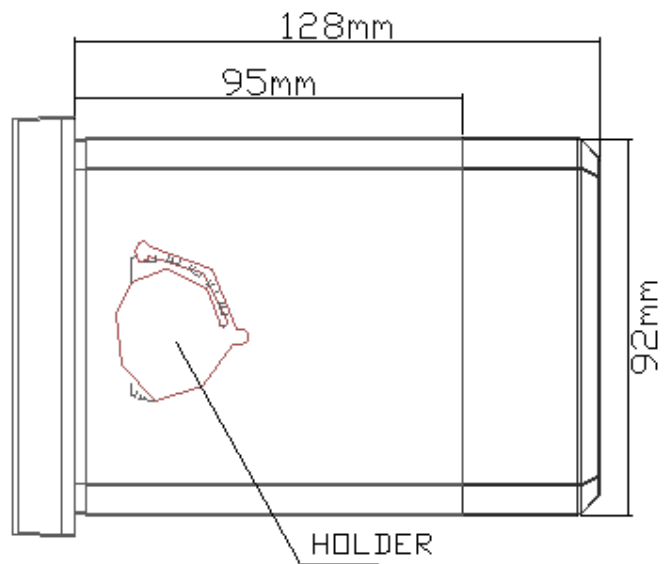
800 series panel cutout size



800 series front



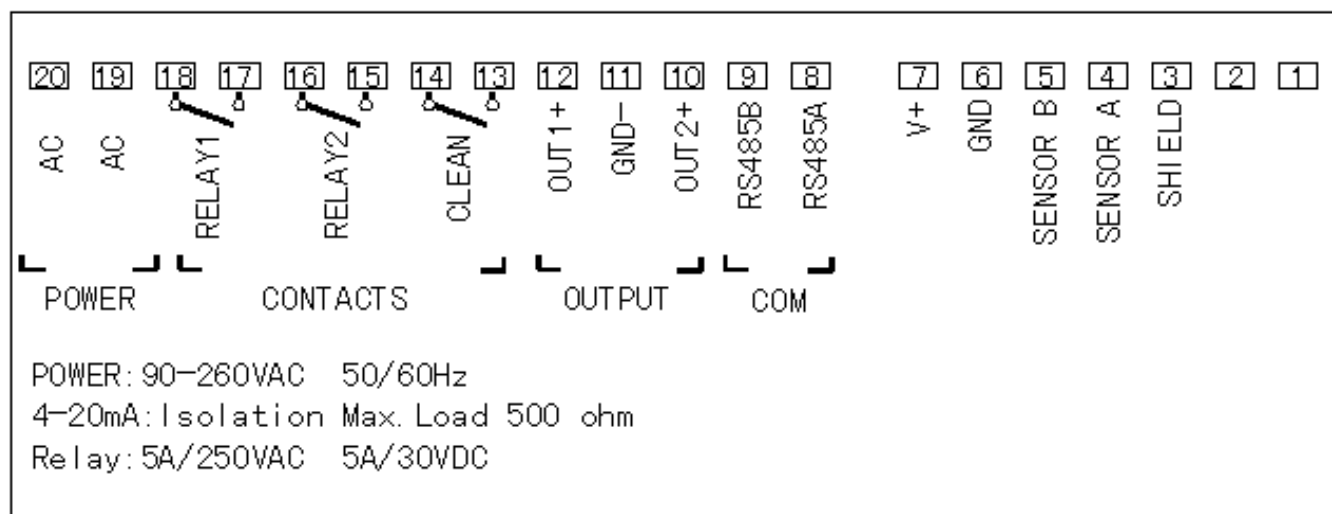
800 series back (for wall/pipe mounting)



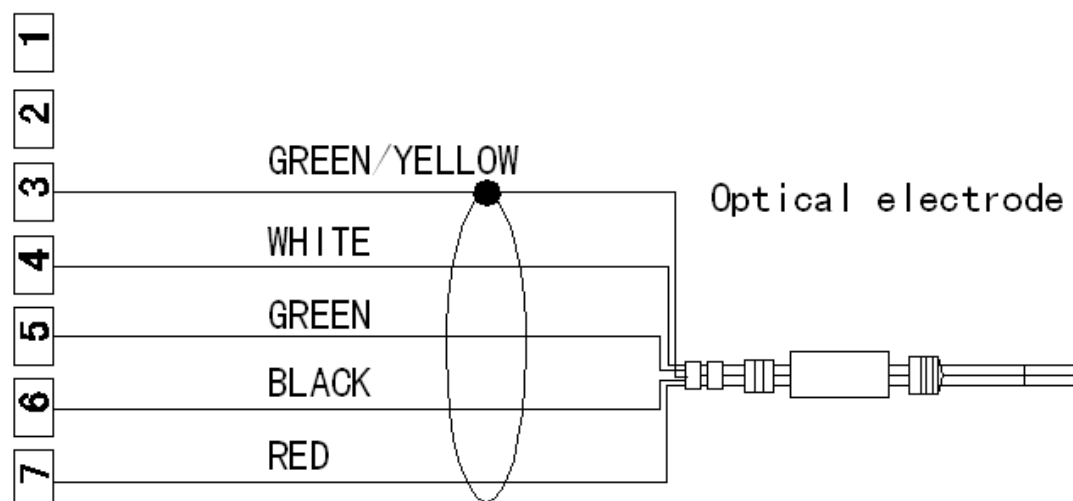
800 series dimension

Connection label

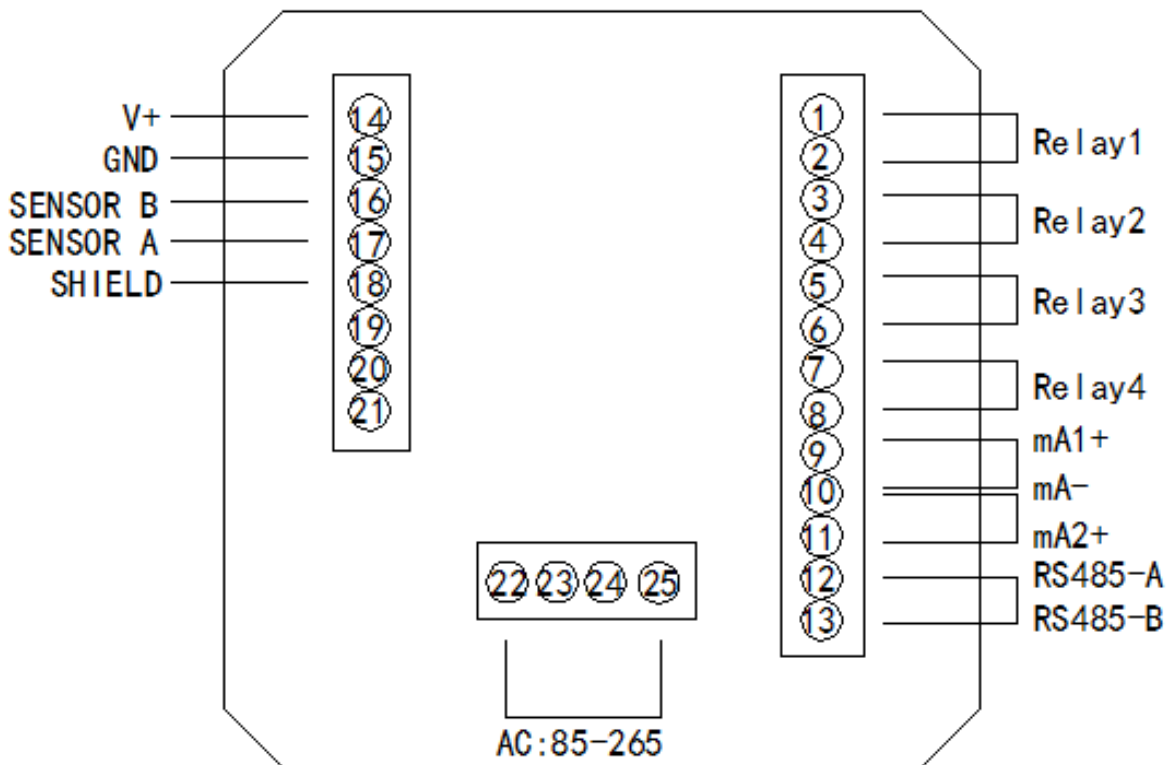
6000 Series



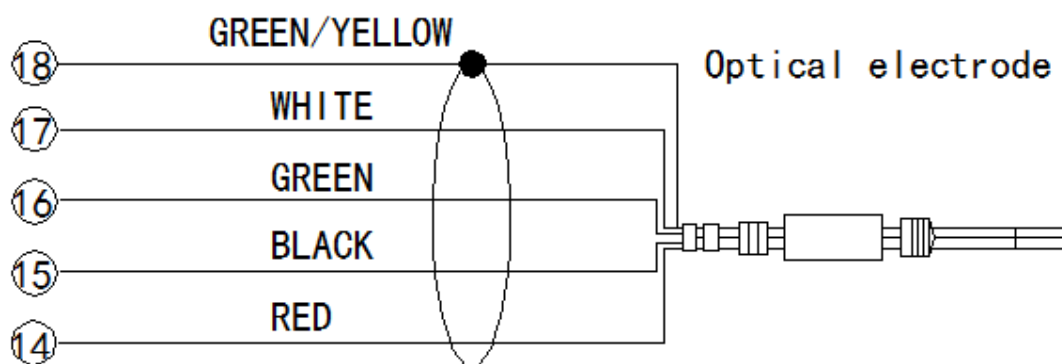
Electrode connection figure



800 Series

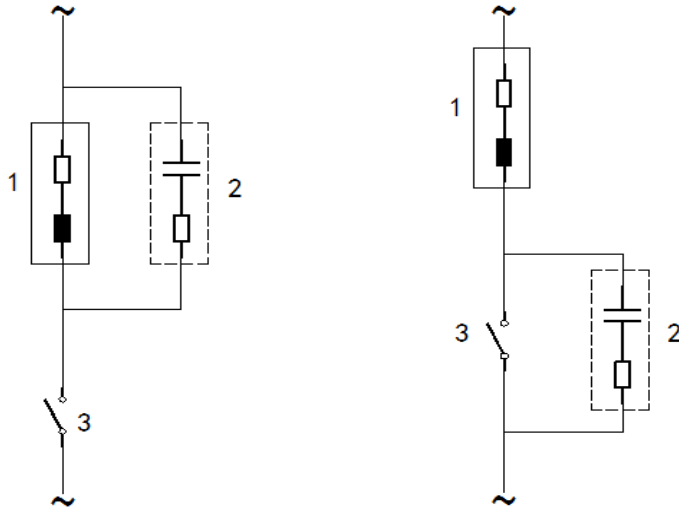


Electrode connection figure



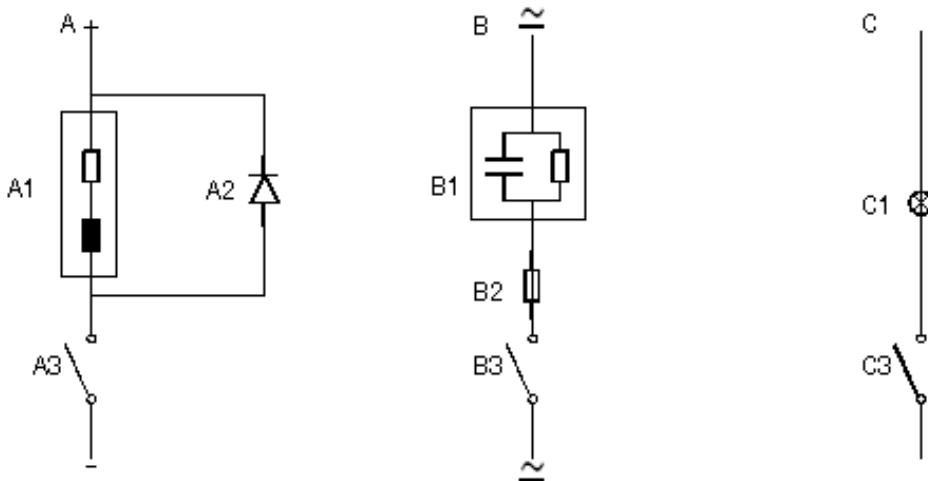
Relay contact protection

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.



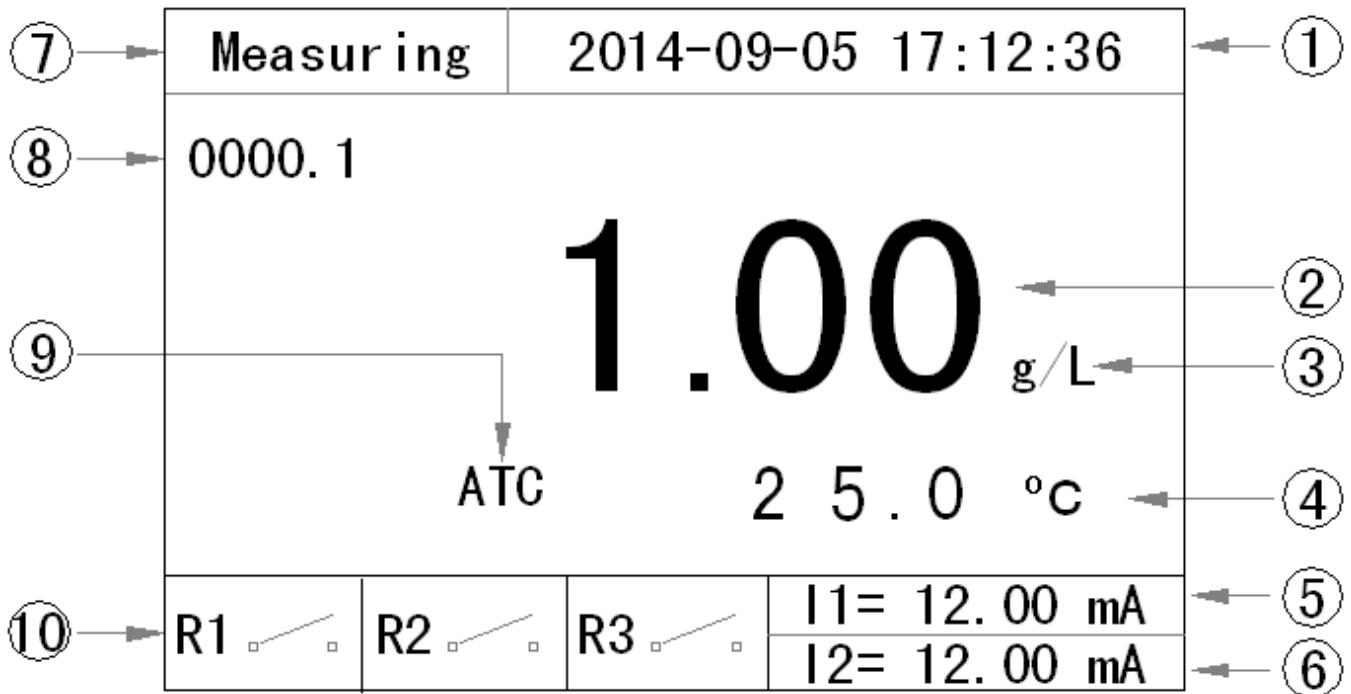
AC protection, use for inductive load

1. load
2. RC eliminate spark, using in 220VAC, $R=100\ \text{ohm}1\text{W}$,
3. Relay contact



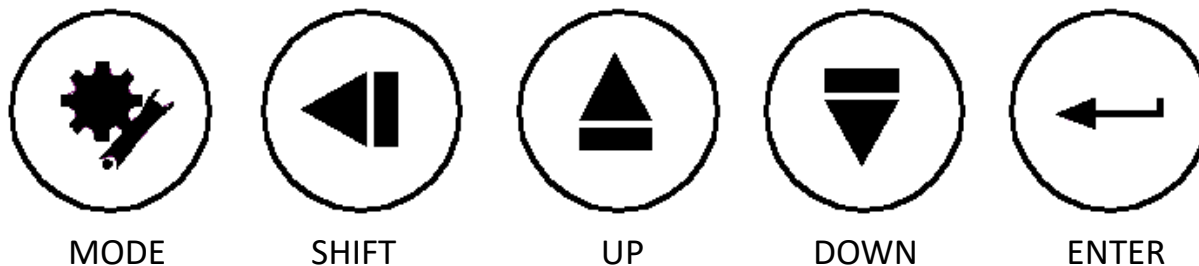
- A. DC protection ,A1: inductive load A2: 1N4007, A3: relay contact
- B. AC/DC protection ,B1: capacitive load ,B2: $0.8\ \text{Ohm}/1\text{W}$ (DC24V) ,B3: relay contact
- C. Resistive load ,C1:lamp bulb ,C3:relay contact

Display



1. Date and time
2. Main display
3. Unit
4. Temperature and unit
5. First current output
6. Second current output
7. Measurement status and Error indicator, there is no display if meter is in keeping mode
8. Count down timer: cycle time/clean time, it also displays the “delay” when relay3 has a delay enabled.
9. Temp. compensation: auto(ATC)
10. Relay indicator

Key



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/OFF back light	Enter	Enter	Enter

Keeping mode

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

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

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

The instrument will go into the keeping mode when turn on the power.

Current output in keeping mode:

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

Fixed current: User can set the output current from 4.00 to 20.00mA when instrument goes into keeping mode.

Last current: User can set the output current keep at the last current when instrument goes into keeping mode.

Relays in keeping mode: All relays are opened.(inactive)

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

PASSWORD
0 0 0 0

PASSWORD
1 2 0 0

Main display

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

CONF IGURATION
<input checked="" type="checkbox"/> Current1 Settings
<input type="checkbox"/> Current2 Settings
<input type="checkbox"/> Relay1 Settings
<input type="checkbox"/> Relay2 Settings
<input type="checkbox"/> Relay3 Settings
<input type="checkbox"/> Measurement Settings
<input type="checkbox"/> Temperature Settings
<input type="checkbox"/> RS485 Settings

Page1

CONF IGURATION
<input checked="" type="checkbox"/> Date Settings
<input type="checkbox"/> Data Log Settings
<input type="checkbox"/> Output Test
<input type="checkbox"/> Language Settings
<input type="checkbox"/> Reset Parameters

Page2

Notices:

1. When the input data is not in correct range then it will display ERROR on the top of LCD
2. After input data user needs to press ENTER to save the data.
3. Press MODE to exit.
4. No key is be pressed in 10 minutes then it will go back to measurement mode.

Current 1 settings

CURRENT 1 SETTINGS	
4.00 mA	= 0 0 0 0 . 0 NTU
20.00 mA	= 0 1 0 0 . 0 NTU
Offset	= + 0 . 0 0 mA
Filter Time	= 0 0 0 SEC
HOLD type	= <input type="checkbox"/> Fixed
	0 4 . 0 0 mA
	<input type="checkbox"/> Last

CURRENT 1 SETTINGS	
4.00 mA	= 0 0 . 0 %
20.00 mA	= 1 0 0 . 0 %
Offset	= + 0 . 0 0 mA
Filter Time	= 0 0 0 SEC
HOLD type	= <input type="checkbox"/> Fixed
	0 4 . 0 0 mA
	<input type="checkbox"/> Last

CURRENT 1 SETTINGS	
4.00 mA	= 0 0 . 0 0 g/L
20.00 mA	= 5 0 . 0 0 g/L
Offset	= + 0 . 0 0 mA
Filter Time	= 0 0 0 SEC
HOLD type	= <input type="checkbox"/> Fixed
	0 4 . 0 0 mA
	<input type="checkbox"/> Last

1. Set the corresponding 4.00mA to SS/SB/NTU.
2. Set the corresponding 20.00mA to SS/SB/NTU, the difference between 4.00mA and 20.00 mA at least for SS is 1.00g/L, for SB is 10.0%, for NTU is 10.0.
3. Set the offset current of SS/SB/NTU, the range is ± 1.00 mA.
4. The filter time range is 0-120 seconds, the low pass filter of software will active when

the current from one point to another point if user sets the filter time.

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

Current 2 settings

CURRENT 2 SETTINGS	
4.00 mA	= 0 0 . 0 °C
20.00 mA	= 5 0 . 0 °C
Offset	= + 0 . 0 0 mA
Filter Time	= 0 0 0 SEC
HOLD type	= <input type="checkbox"/> Fixed
	0 4 . 0 0 mA
	<input type="checkbox"/> Last

1. Set the corresponding 4.00mA to temperature.
2. Set the corresponding 20.00mA to temperature, the difference at least between 4.00mA and 20.00 mA is 10.0°C.
3. Set the offset current of temperature, the range is ± 1.00 mA.
4. The filter time range is 0-120 seconds, the low pass filter of software will active when

the current from one point to another point if user sets the filter time.

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

Relay 1 settings

REALY 1 SETTINGS	
ON/OFF	= <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF
Close S. P.	= 0 1 0 0 . 0 NTU
Open S. P.	= 0 0 0 0 . 0 NTU
Delay Time	= 0 0 0 SEC

REALY 1 SETTINGS	
ON/OFF	= <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF
Close S. P.	= 1 0 0 . 0 %
Open S. P.	= 0 0 0 . 0 %
Delay Time	= 0 0 0 SEC

REALY 1 SETTINGS	
ON/OFF	= <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF
Close S. P.	= 5 0 . 0 0 g/L
Open S. P.	= 0 0 . 0 0 g/L
Delay Time	= 0 0 0 SEC

1. Press UP/DOWN key to ON/OFF (enable/disable) relay1.
2. Close set point: active point for SS/SB/NTU.
3. Open set point: inactive point for SS/SB/NTU
4. Delay time: the range is 0-120 seconds. Relay needs to delay first then active if the measuring data is reach to close set point.

Ex: If user wants turn on the pump at 100.0 NTU and turn off it at 0.0 NTU, then the close

S.P. needs to set to 100.0 NTU, Open S.P. sets to 0.0 NTU.

Relay 2 settings

REALY 2 SETTINGS	
ON/OFF	= <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF
Close S. P.	= 0 0 0 0 . 0 NTU
Open S. P.	= 0 1 0 0 . 0 NTU
Delay Time	= 0 0 0 SEC

REALY 2 SETTINGS	
ON/OFF	= <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF
Close S. P.	= 0 0 . 0 0 g/L
Open S. P.	= 5 0 . 0 0 g/L
Delay Time	= 0 0 0 SEC

REALY 2 SETTINGS	
ON/OFF	= <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF
Close S. P.	= 0 0 0 . 0 %
Open S. P.	= 1 0 0 . 0 %
Delay Time	= 0 0 0 SEC

1. Press UP/DOWN key to ON/OFF (enable/disable) relay2.
 2. Close set point: active point for SS/SB/NTU.
 3. Open set point: inactive point for SS/SB/NTU.
 4. Delay time: the range is 0-120 seconds.
Relay needs to delay first then active if the measuring data is reach to close set point.
- Ex: If user wants turn on the pump at 0.0 NTU and turn off it at 100.0 NTU, then the close S.P. needs to set to 0.0 NTU, Open S.P. sets to 100.0 NTU.

Relay 3 settings

RELAY 3 SETTINGS	
ON/OFF	= <input checked="" type="checkbox"/> ON = <input type="checkbox"/> OFF
Period Time	= 0 0 0 1 . 0 HOUR
Clean Time	= 0 0 1 0 SEC
Delay Time	= 0 0 0 SEC
Function	= <input type="checkbox"/> Rinsing <input type="checkbox"/> Interval Alarm <input type="checkbox"/> Error Alarm

1. Press UP/DOWN key to ON/OFF (enable/disable) relay3.
2. Period time: The period for Rinsing or interval function.
3. Clean time: When period is timeout then relay active.
4. Delay time: the range is 0-120 seconds.
Relay needs to delay first then active if the period is timeout.

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

Notice:

1. Rinsing: when period timeout then clean-relay will active, when clean time is timeout the repeat count for the period.
2. Interval alarm: When period timeout then clean-relay active until user resets the interval then the clean-relay inactive and repeat count for the period.
3. Error alarm: The clean-relay active when there is a error produce. No delay time function in this mode.

MEASUREMENT SETTINGS	
Mode	= <input type="checkbox"/> NTU <input type="checkbox"/> % <input checked="" type="checkbox"/> g/L
Offset	= + 0.0 g/L
Filter	= 0 1
Meas. Peri.	= 0 5 秒

Measurement settings

1. Choose the mode for measuring, press UP/DOWN key to choose.
2. Offset , range for SS is $\pm 5.00\text{g/L}$,for SB is $\pm 10.0\%$,for NTU is ± 100.0 .
3. Filter: Range 0-10.
4. Measuring period, range is 1-60 second.

Notice:

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

Temperature settings

TEMPERATURE SETTINGS	
Offset	= + 0 . 0 °C
Display	= <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO

1. Temperature offset ,the range is $\pm 5.00^\circ\text{C}$.
2. Temperature display: display the temperature on measurement mode or not.

RS485 settings

RS485 SETTINGS	
ID Address	= 0 0 1
Baud Rate	= <input type="checkbox"/> 9600 = <input type="checkbox"/> 19200 = <input type="checkbox"/> 38400

1. ID address:1-255.
2. Baud rate , press UP/DOWN key to choose.

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

Date settings

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

Data log settings

DATE LOG SETTINGS	
ON/OFF	= <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF
Display Type	= <input type="checkbox"/> Record <input type="checkbox"/> XY Chart
Reset Record	= <input type="checkbox"/> Yes <input type="checkbox"/> No
Save Period	= 0 6 0 SEC

1. Press UP/DOWN key to ON/OFF (enable/disable) this function.
2. Display type, press UP/DOWN key to choose
3. Erase all the records.
4. Saving period from 5 to 120 second.

Notice:

1. When user chooses ON, then it will save measuring data follow the save period time.
2. Display type: Record, display the detail of record(5 records in one page), XY chart, display a chart.(150 records in one page)
3. When reset the records, it will spend around 10 seconds.

Output test

OUTPUT TEST	
Current1	= 0 4 . 0 0 mA
Current2	= 0 4 . 0 0 mA
Relay1	= <input type="checkbox"/> CLOSE <input type="checkbox"/> OPEN
Relay2	= <input type="checkbox"/> CLOSE <input type="checkbox"/> OPEN
Relay3	= <input type="checkbox"/> CLOSE <input type="checkbox"/> OPEN

1. Current 1 output: 4.00-20.00mA, press UP/DOWN to set.
 2. Current 2 output: 4.00-20.00mA, press UP/DOWN to set.
 3. Relay 1 output, press UP/DOWN to choose.
 4. Relay 2 output, press UP/DOWN to choose.
 5. Relay 3 output, press UP/DOWN to choose.
- Notice: This function for testing the output only.

LANGUAGE SETTINGS	
Language	= <input checked="" type="checkbox"/> English <input type="checkbox"/> 繁體中文 <input type="checkbox"/> 简体中文

Language settings

Press UP/DOWN key to choose the language.

Reset parameters

RESET PARAMETERS	
Reset Type	= <input checked="" type="checkbox"/> Current
	<input type="checkbox"/> Relay1
	<input type="checkbox"/> Relay2
	<input type="checkbox"/> Relay3
	<input type="checkbox"/> All

Press UP/DOWN key to choose the reset.

Notice: The reset will not affect the calibrated parameters.

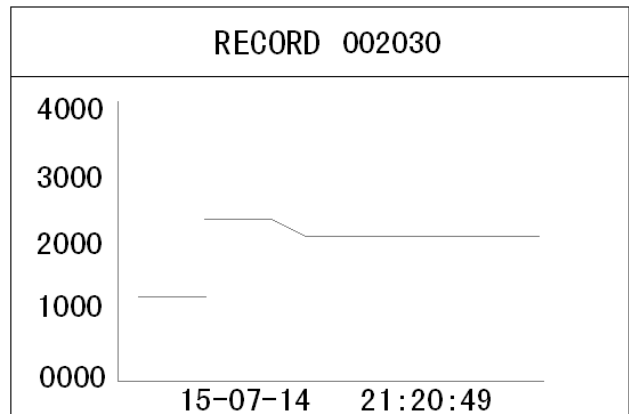
Record query

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 enter or press MODE key exit.

RECORD 002030		
15-08-14	0100.0	NTU
21:20:49	25.0	°C
15-08-14	10.00	g/L
21:20:59	25.0	°C
15-08-14	10.00	g/L
21:21:09	25.0	°C
15-08-14	100.0	%
21:21:19	25.0	°C
15-08-14	100.0	%
21:21:29	25.0	°C



Calibration

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

PASSWORD
0 0 0 0

PASSWORD
1 1 0 0

Manu

CALIBRATION
<ul style="list-style-type: none">■ NTU Calibration<input type="checkbox"/> NTU Working Mode<input type="checkbox"/> SB Calibration<input type="checkbox"/> SB Working Mode<input type="checkbox"/> SS Calibration<input type="checkbox"/> SS Working Mode

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

1. NTU calibration and working mode.
2. Sludge Blanket calibration and working mode.
3. Suspended Solid calibration and working mode.

Turbidity calibration

Zero calibration

NTU ZERO CALIBRATION	
Cal. Value	= 0.0 NTU
Reading	= 0001.3 NTU
Wait stable and press ENTER	

1. Put the electrode to the deionized water.
2. Waiting for the reading is stable and then press ENTER to go to next or press MODE to exit.

Slope calibration

NTU SLOPE CALIBRATION	
Cal. Value	= 2000.0 NTU
Reading	= 2010.0 NTU
Input standard data	

NTU SLOPE CALIBRATION	
Cal. Value	= 2000.0 NTU
Reading	= 2010.0 NTU
Wait stable and press ENTER	

Put the electrode to the standard buffer ,input the standard data then press ENTER and wait for the reading is stable and then press ENTER to finish the calibration or press MODE to exit.

Turbidity working mode

NTU WORKING MODE	
<input checked="" type="checkbox"/>	Factory Default
<input type="checkbox"/>	User Calibration

1. Factory default, restore to the default parameters.
2. User calibration, using the user calibration parameters

Sludge blanket calibration

SB CALIBRATION	
Cal. Value	= 100.0 %
Reading	= 090.0 %
Input standard data	

SB CALIBRATION	
Cal. Value	= 100.0 %
Reading	= 090.0 %
Wait stable and press ENTER	

Put the electrode to the known sludge blanket ,input the standard data then press ENTER and wait for the reading is stable and then press ENTER to finish the calibration or press MODE to exit.

Sludge blanket working mode

SB WORKING MODE
<input checked="" type="checkbox"/> Factory Default <input type="checkbox"/> User Calibration

1. Factory default, restore to the default parameters.
2. User calibration, using the user calibration parameters

Suspended solid calibration

Zero calibration

SS ZERO CALIBRATION	
Cal. Value	= 0.00 g/L
Reading	= 00.03 g/L
Wait stable and press ENTER	

1. Put the electrode to the deionized water.
2. Waiting for the reading is stable and then press ENTER to go to next or press MODE to exit.

Slope calibration

SS SLOPE CALIBRATION	
Cal. Value	= 2000.0 g/L
Reading	= 2010.0 g/L
Input standard data	

SS SLOPE CALIBRATION	
Cal. Value	= 2000.0 g/L
Reading	= 2010.0 g/L
Wait stable and press ENTER	

Put the electrode to the standard SS buffer, input the standard data then press ENTER and wait for the reading is stable and then press ENTER to finish the calibration or press MODE to exit.

Suspended solid working mode

SS WORKING MODE	
<input checked="" type="checkbox"/>	Factory Default
<input type="checkbox"/>	User Calibration

1. Factory default, restore to the default parameters.
2. User calibration, using the user calibration parameters

Default

NTU	20.00mA corresponding	100.0	NTU	range: 10.0 - 4000.0
NTU	4.00mA corresponding	0.0	NTU	range: 0.0 - 3990.0
				difference : 10.0
SB	20.00mA corresponding	100.0	%	range: 10.0 - 100.0
SB	4.00mA corresponding	0.00	%	range: 0.0 - 90.0
				difference : 10.0
SS	20.00mA corresponding	50.00	g/L	range: 1.00 - 50.00
SS	4.00mA corresponding	0.00	g/L	range: 0.00 - 49.00
				difference : 1.00
Temp.	20.00mA corresponding	50.0	°C	range: 10.0 - 50.0
Temp.	4.00mA corresponding	0.0	°C	range:-0.0 - 40.0
				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 NTU close S.P.		100.0	NTU	range: 0.0 - 4000.0

Relay 1 NTU open S.P.	0.0	NTU	range: 0.0 - 4000.0 difference : 0.1
Relay 1 SB close S.P.	100.0	%	range: 0.0 - 100.0
Relay 1 SB open S.P.	0.0	%	range: 0.0 - 100.0 difference : 0.1
Relay 1 SS close S.P.	50.00	g/L	range: 0.00 - 50.00
Relay 1 SS open S.P.	0.00	g/L	range: 0.00 - 50.00 difference : 0.1
Relay 1 delay time	0	second	range: 0-120
Relay 2 NTU close S.P.	100.0	NTU	range: 0.0 - 4000.0
Relay 2 NTU open S.P.	0.0	NTU	range: 0.0 - 4000.0 difference : 0.1
Relay 2 SB close S.P.	100.0	%	range: 0.0 - 100.0
Relay 2 SB open S.P.	0.0	%	range: 0.0 - 100.0 difference : 0.1
Relay 2 SS close S.P.	50.00	g/L	range: 0.00 - 50.00
Relay 2 SS open S.P.	0.00	g/L	range: 0.00 - 50.00 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
Saving period	60	second	range: 5 - 120
ID address	1		range: 1 - 255
Baud rate	9600		range: 9600,19200,38400
NTU offset	0.0	NTU	range: +/- 100.0
SB offset	0.0	%	range: +/- 10.0
SS offset	0.0	g/L	range: +/- 5.00
Mode	NTU		range: 0=NTU,1=SB,2=SS
Temp. Offset	0.0	°C	range: +/- 5.0
Language	English		range: English/ traditional Chinese /simple Chinese
Filter	0		range: 0 - 10
Record type	record		range: record/XY chart
Measuring period	1	Second	range: 1 - 60

Password

Press MODE key

1100:Calibration mode

1200:Setting mode

If no key is be pressed and over 10 minutes then it will go back 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 use the standard Modbus-RTU protocol, all of the data are word type(2 bytes), the range is -32767~32767 ,16 system.

PC command:

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

Instrument response:

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

- If response is 01,the command is wrong.
- If response is 02,the address is not correct.
- If response is 03,data number is not correct.

command 03: read the settings

command 04: read the readings

04:definition

address

(00)	0x00	NTU/ SB/SS reading	reading : NTU/SBX 0.1, SSX0.01
(01)	0x01	NTU/ SB/SS 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	fix to 11

03:definition

Address

(00)	0x00	NTU 20.00mA corresponding	reading:X0.1
(01)	0x01	NTU 4.00mA corresponding	reading:X0.1
(02)	0x02	SB 20.00mA corresponding	reading:X0.1
(03)	0x03	SB 4.00mA corresponding	reading:X0.1
(04)	0x04	SS 20.00mA corresponding	reading:X0.01
(05)	0x05	SS 4.00mA corresponding	reading:X0.01
(06)	0x06	Temp. 20.00mA corresponding	reading:X0.1
(07)	0x07	Temp. 4.00mA corresponding	reading:X0.1
(08)	0x08	Current 1 offset	reading:X0.01
(09)	0x09	Current 2 offset	reading:X0.01
(10)	0x0A	Current 1 filter	reading:X1
(11)	0x0B	Current 2 filter	reading:X1
(12)	0x0C	Current 1 fixed current	reading:X0.01
(13)	0x0D	Current 2 fixed current	reading:X0.01
(14)	0x0E	Current 1 HOLD type	reading:X1 0=fixed,1=last
(15)	0x0F	Current 2 HOLD type	reading:X1 0=fixed,1=last
(16)	0x10	Relay1 NTU close S.P.	reading:X0.1
(17)	0x11	Relay1 NTU open S.P.	reading:X0.1
(18)	0x12	Relay1 SB close S.P.	reading:X0.1
(19)	0x13	Relay1 SB open S.P.	reading:X0.1
(20)	0x14	Relay1 SS close S.P.	reading:X0.01
(21)	0x15	Relay1 SS open S.P.	reading:X0.01
(22)	0x16	Relay1 delay time	reading:X1
(23)	0x17	Relay2 NTU close S.P.	reading:X0.1
(24)	0x18	Relay2 NTU open S.P.	reading:X0.1

(25)	0x19	Relay2 SB close S.P.	reading:X0.1	
(26)	0x1A	Relay2 SB open S.P.	reading:X0.1	
(27)	0x1B	Relay2 SS close S.P.	reading:X0.01	
(28)	0x1C	Relay2 SS open S.P.	reading:X0.01	
(29)	0x1D	Relay2 delay time	reading:X1	
(30)	0x1E	Relay3 clean period	reading:X0.1	
(31)	0x1F	Relay3 clean time	reading:X1	
(32)	0x20	Relay3 delay time	reading:X1	
(33)	0x21	Relay3 function	reading:X1	0:clean,1:period alarm ,2:Error alarm
(34)	0x22	Record saving time	reading:X1	
(35)	0x23	Mode	reading:X1	
(36)	0x24	NTU offset	reading:X0.1	
(37)	0x25	SB offset	reading:X0.1	
(38)	0x26	SS offset	reading:X0.01	
(39)	0x27	Temp. offset	reading:X0.1	
(40)	0x28	Language	reading:X1	0=English ,1= traditional Chinese,2=simple Chinese
(41)	0x29	Filter	reading:X1	