Low Turbidity Controller

6000 Series

800 Series

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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 drinking water, clean water, low turbidity water application 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 though a maximum of 5 Amps at 250 VAC or 5 Amps at 30VDC.

Product content

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

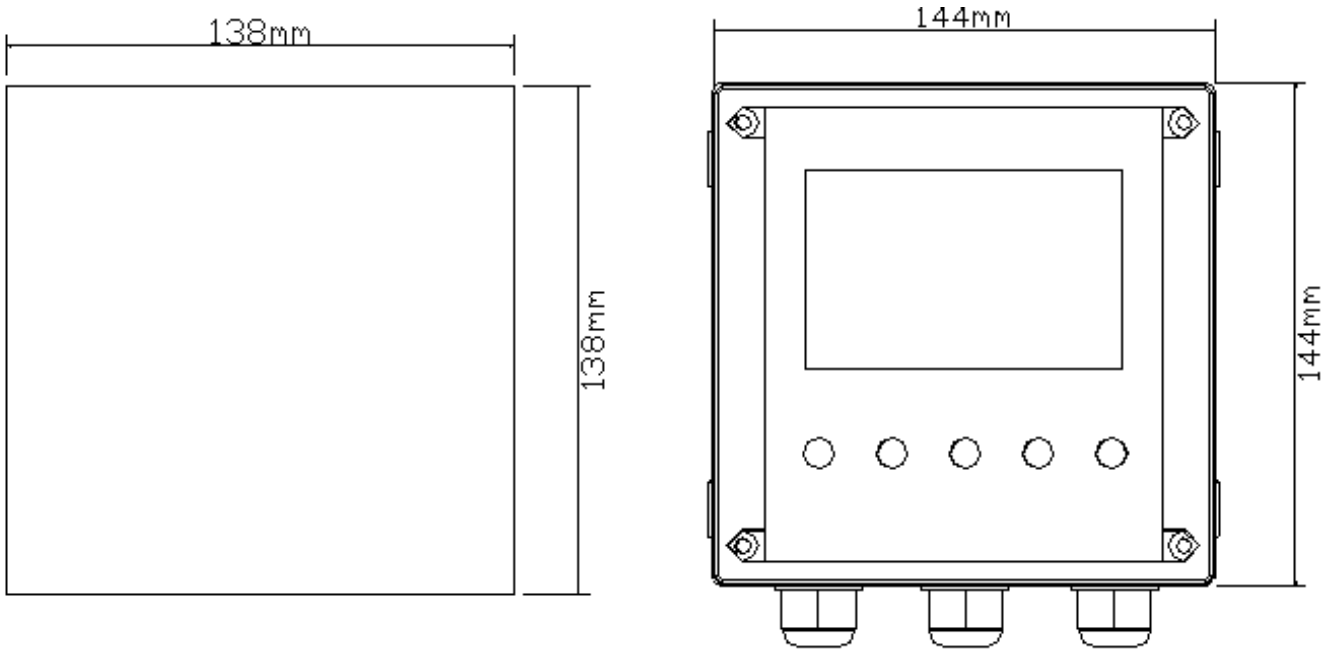
For 800 series, the product package contains 1 instrument, the printed manual, 2 holders

Specifications

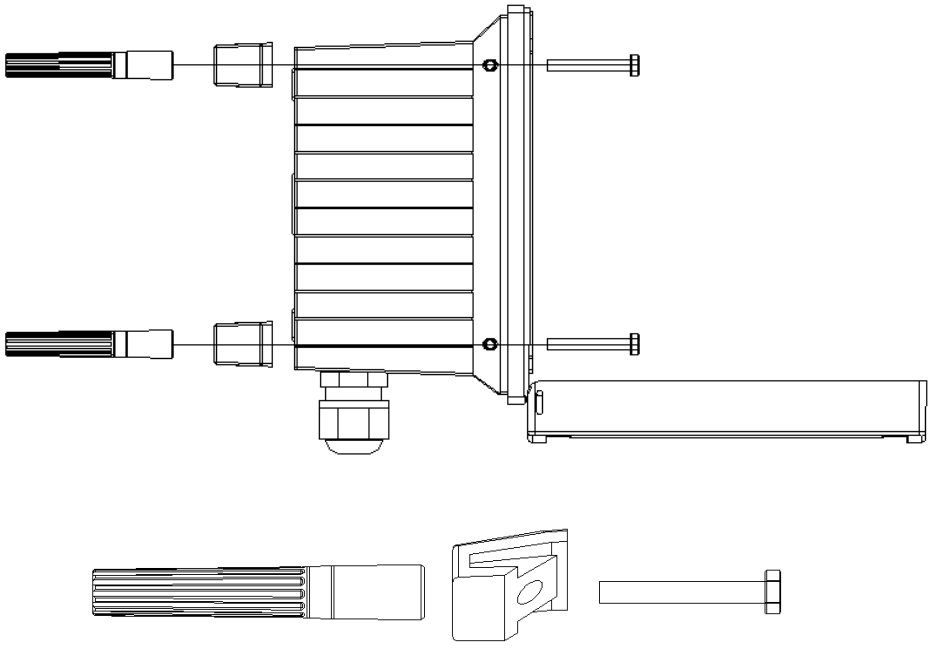
Functions	NTU	ppm
Measuring range	0.00 0-100.0	0.000-300.0
Resolution	0.001 / 0.01 / 0.1	0.001 / 0.01 / 0.1
Accuracy	<±1% 0-10 NTU <±2% 0-50 NTU <±5% 0-100 NTU	<±1% 0-30 ppm <±2% 0-150 ppm <±5% 0-300 ppm
Temp. compensation	Pt1000	
Temp. range	0.0 to +50.0℃	
Temp. resolution	0.1℃	
Temp. accuracy	±0.2℃	
Ambient temperature range	0 to +70℃	
Storage temp.	-20 to +70℃	
Display	Back light, dot matrix	
NTU current output 1	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	Modbus 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

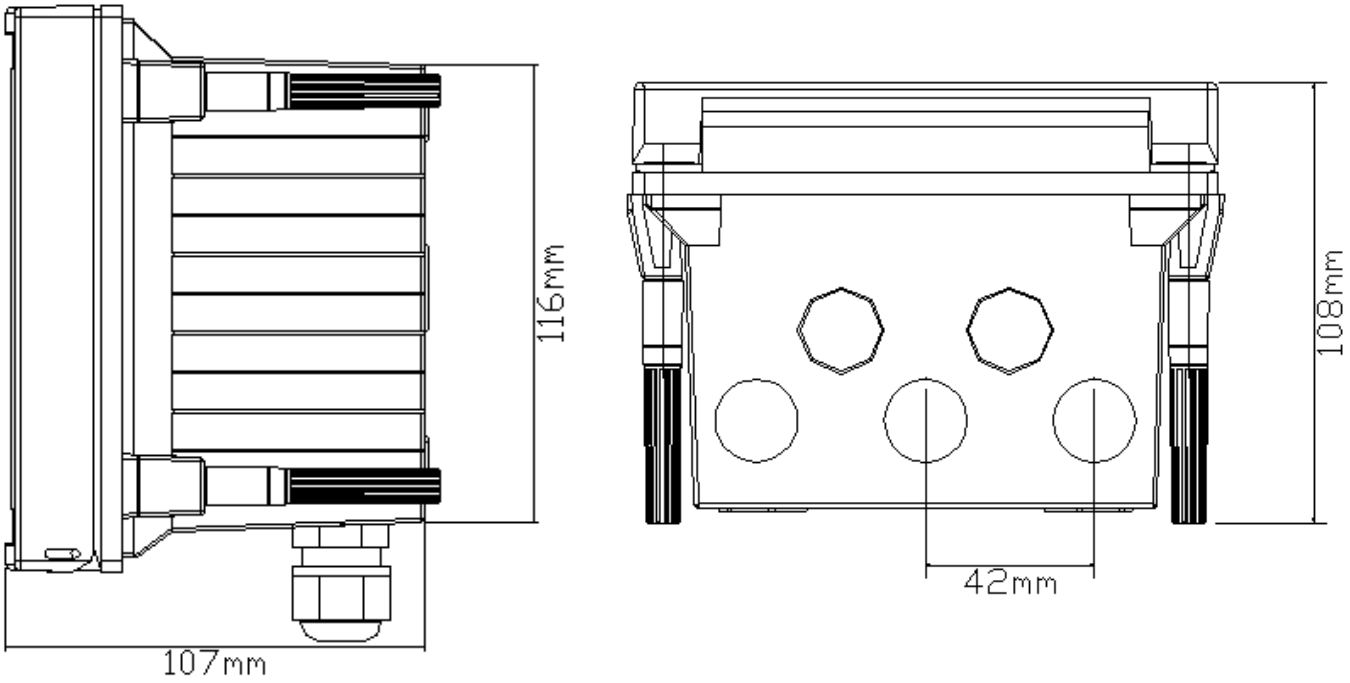
6000 series ： The instrument can be panel, wall or pipe mounted installation.
Panel Installation: Make a 138x138 mm square cutout and insert the instrument. Screw in the fixed block with the screws and fixed bar.



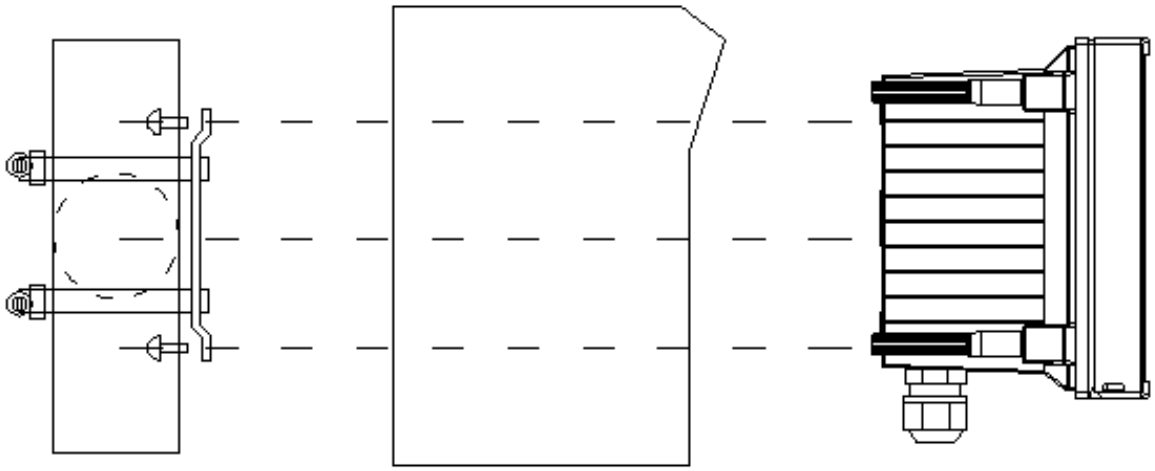
6000 series cutout size



6000 series installation figure

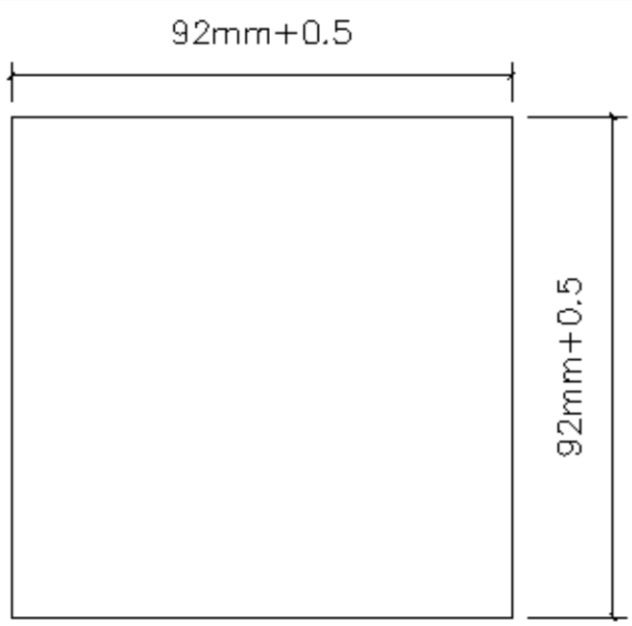


6000 series dimension

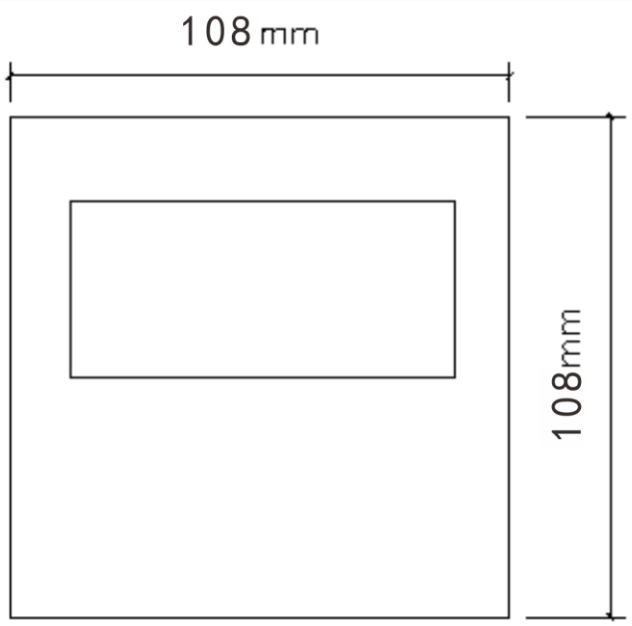


6000 series wall and pipe installation

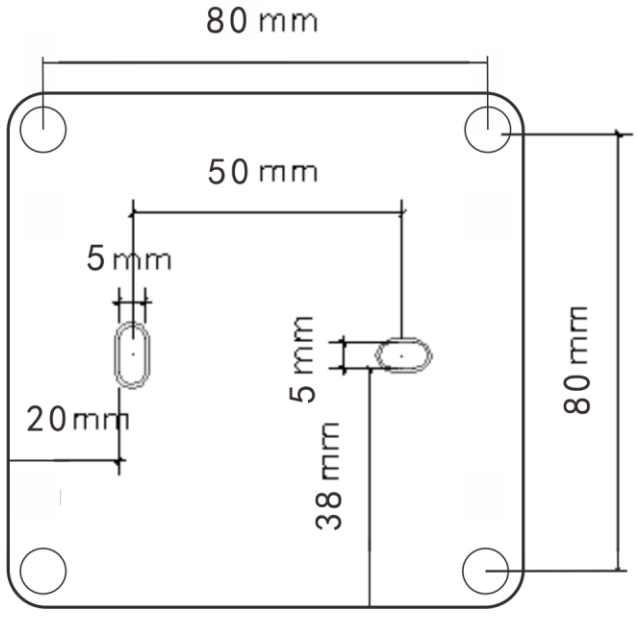
800 series : The instrument can be panel, wall or pipe mounted installation.
Panel Installation: Make a 92x92 mm square cutout and insert the instrument then screw in the fixed HOLDER.



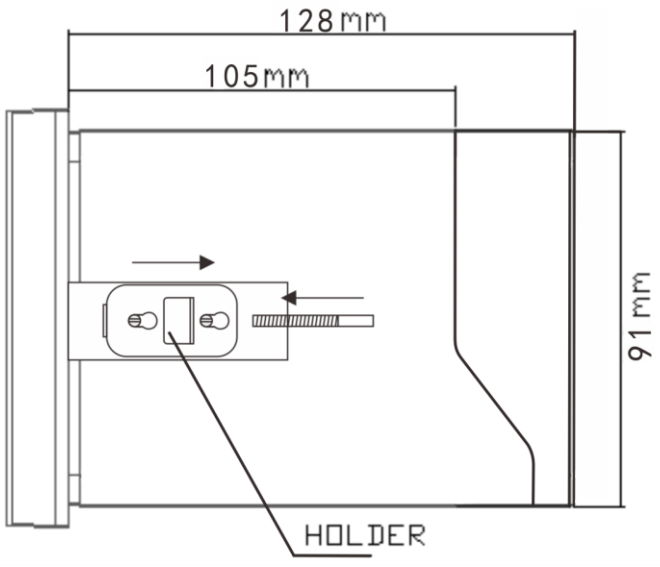
800 series panel cutout size



800 series front

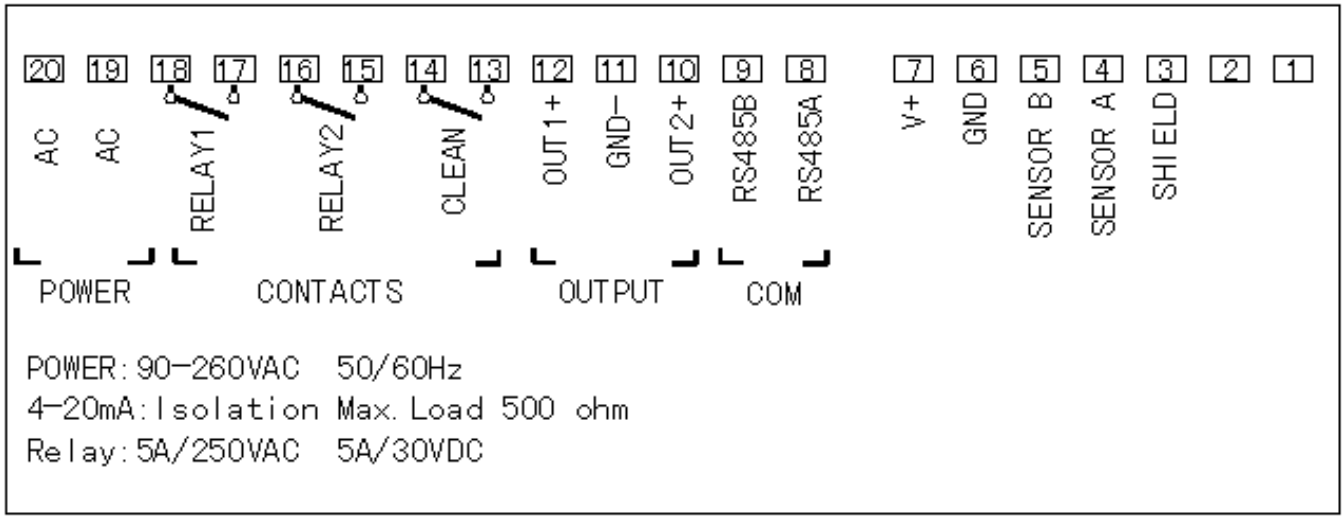


800 series back (for wall/pipe mounting)

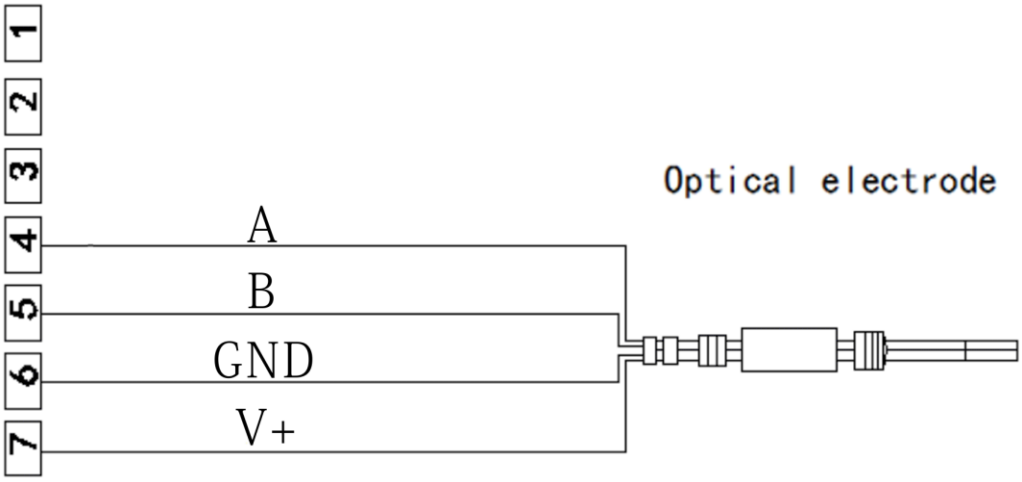


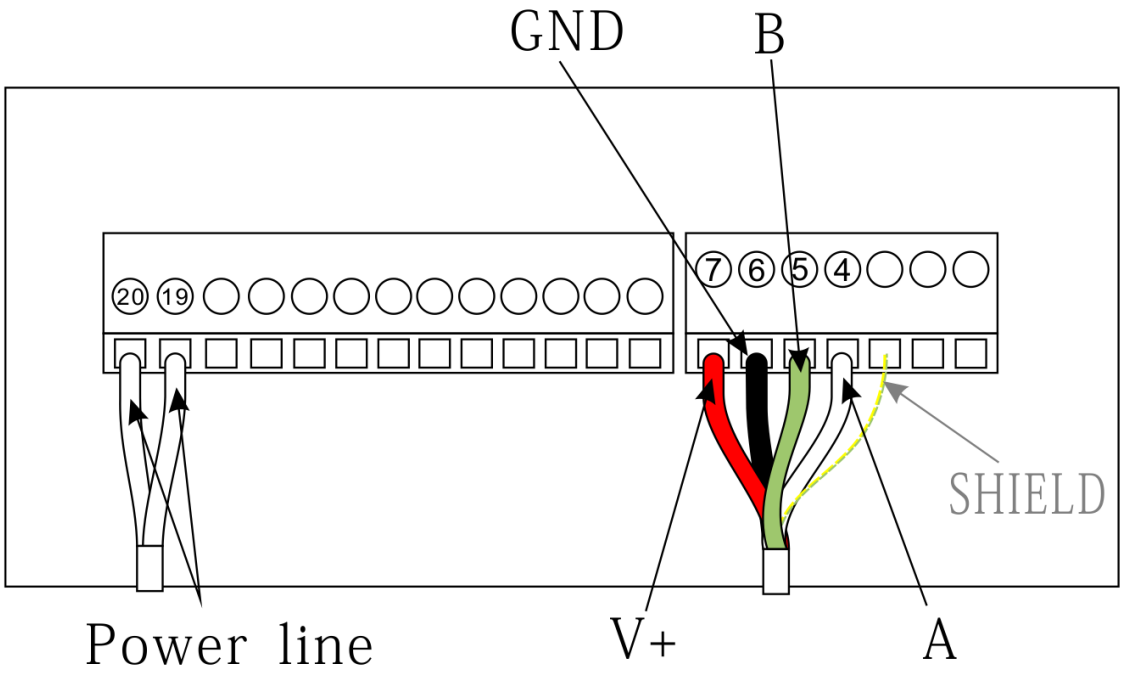
800 series dimension

Connection label
6000 Series

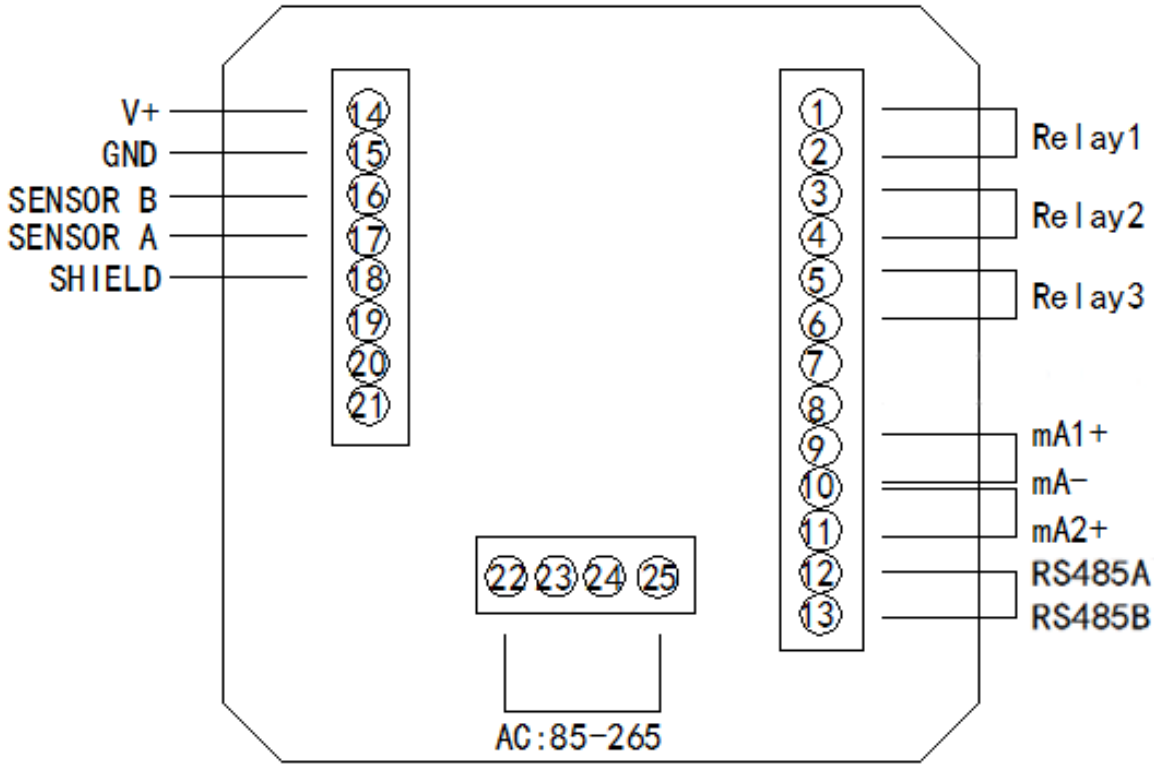


Electrode connection figure

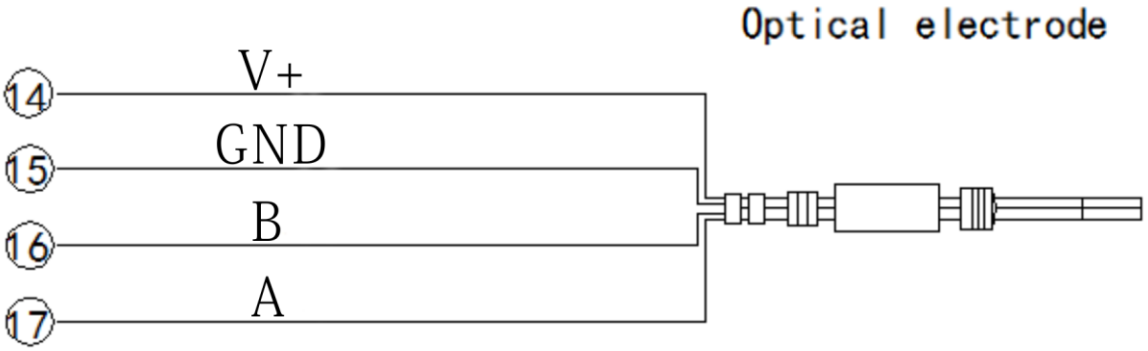


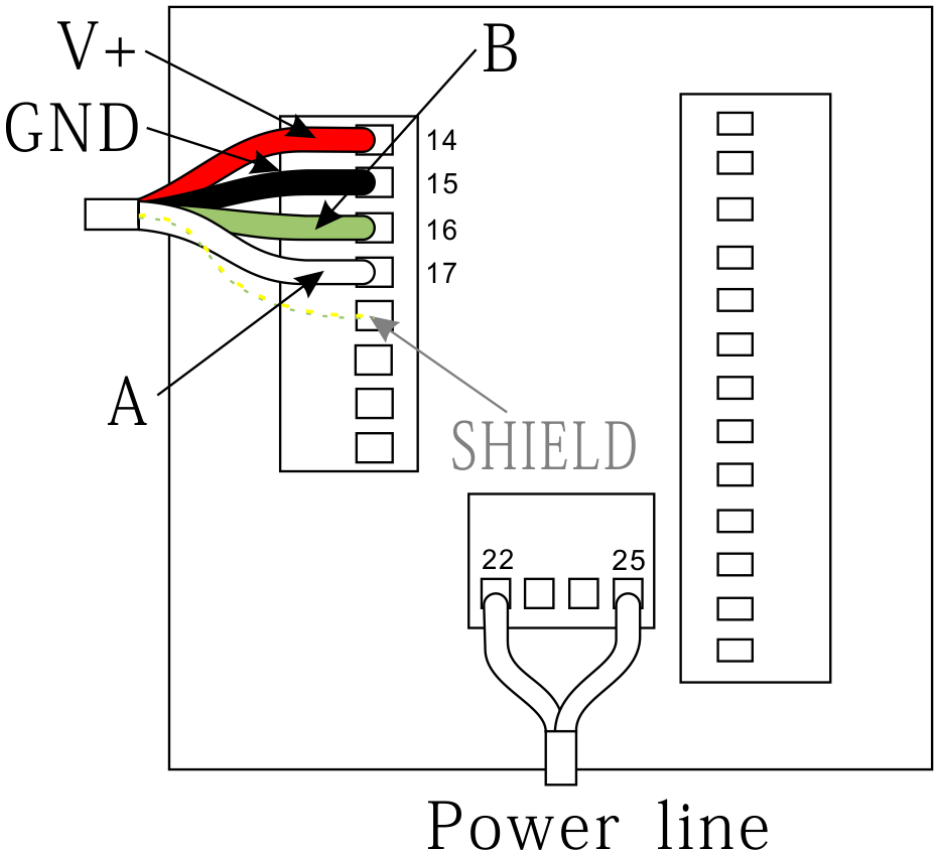

GND
B
⑳ ⑲
⑦ ⑥ ⑤ ④
SHIELD
Power line
V+
A

800 Series


V+
GND
SENSOR B
SENSOR A
SHIELD
14
15
16
17
18
19
20
21
1
2
3
4
5
6
7
8
9
10
11
12
13
Relay1
Relay2
Relay3
mA1+
mA−
mA2+
RS485A
RS485B
22 23 24 25
AC:85-265

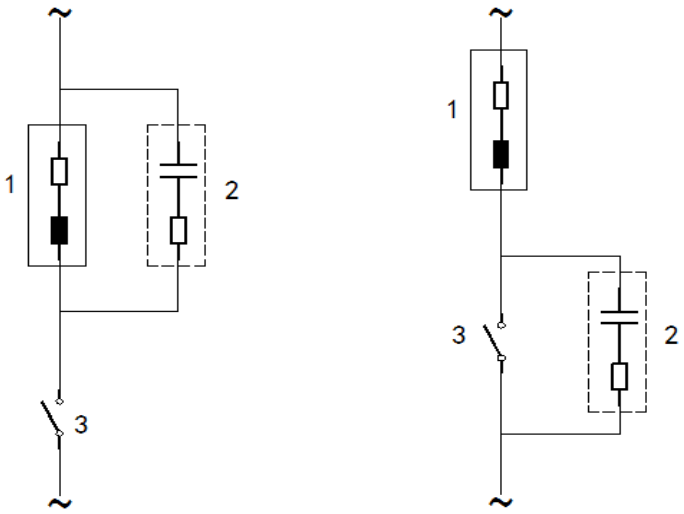
Electrode connection figure





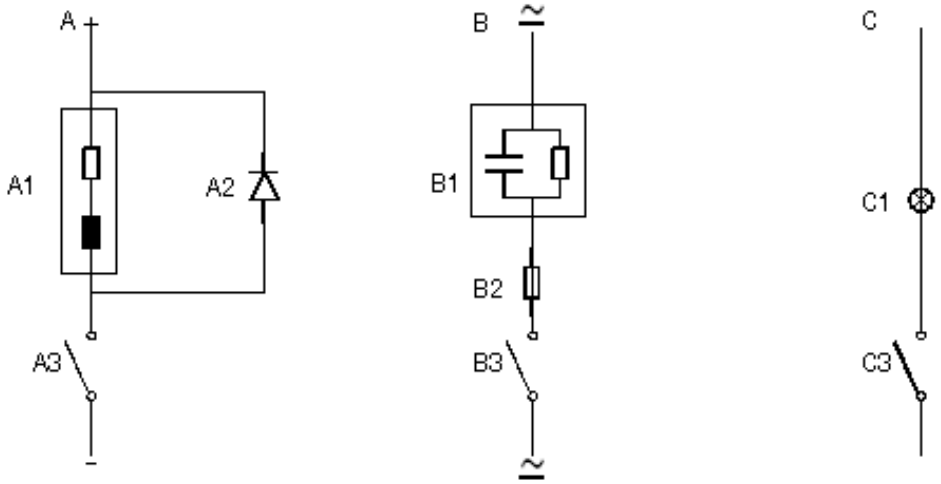
Relay contact protection

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.



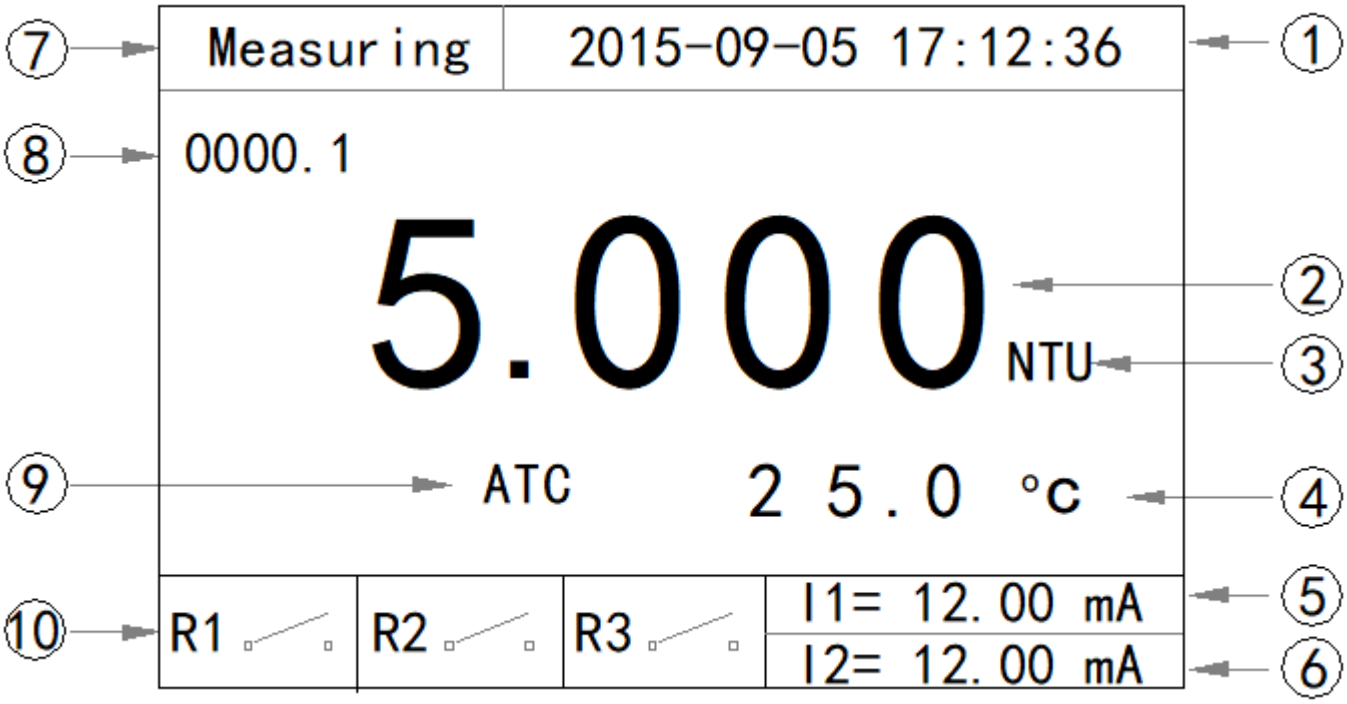
AC protection, use for inductive load

1. load
2. RC eliminate spark, using in 220VAC, R=100 ohm1W,
3. Relay contact



A. DC protection ,A1: inductive load A2: 1N4007, A3: relay contact
B. AC/DC protection ,B1: capacitive load ,B2: 0.8 Ohm/1W（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

MODE SHIFT UP DOWN ENTER

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 mode 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.

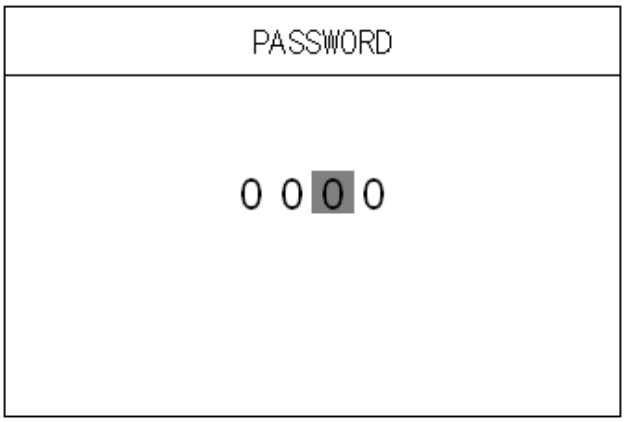
Fixed current: User can set the output current from 4.00 to 20.00mA when instrument goes into keeping mode.

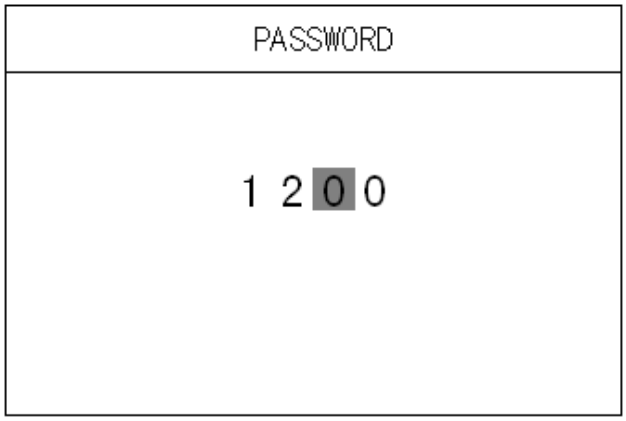
Last current: User can set the output current keep at the last current when instrument goes into keeping mode.

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

Setting

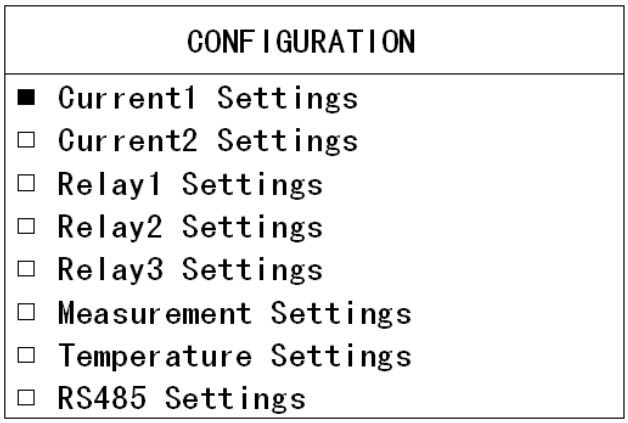
Press MODE key to enter the password menu and then press UP/DOWN/SHIFT key to input password 1200 then press ENTER will enter to setting mode or press MODE key to exit. If no key is be pressed and over 10 minutes then it will go back to measurement mode.



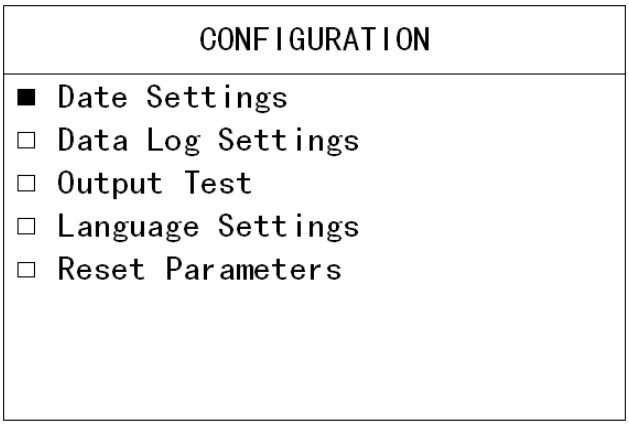


Main display

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



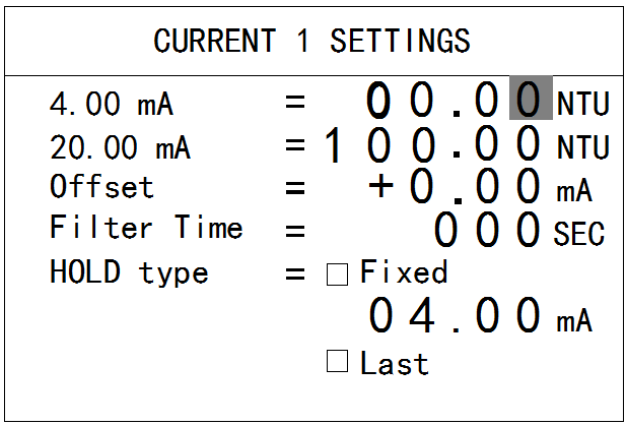
Page1



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.



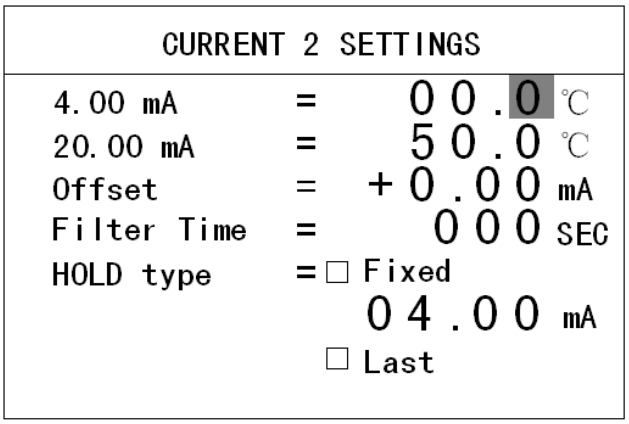
Current 1 settings

1. Set the corresponding 4.00mA to NTU.
2. Set the corresponding 20.00mA to NTU, the difference between 4.00mA and 20.00 mA at least is 10.00 NTU.
3. Set the offset current of NTU, the range is

±1.00mA.

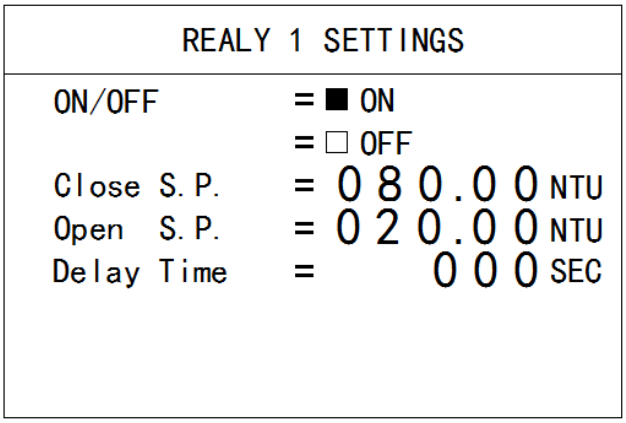
4. The filter time range is 0-120 seconds, the low pass filter of software will active when the current from one point to another point if user sets the filter time.
5. Set the current 1 output mode(fixed / last) when instrument enter into keeping mode.

Current 2 settings



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℃.
3. Set the offset current of temperature, the range is±1.00mA.
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.

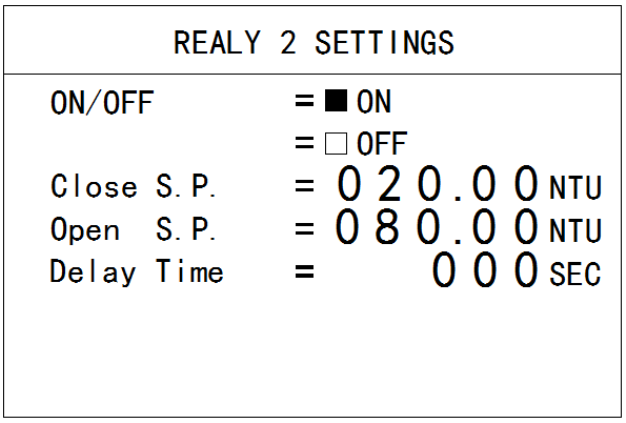
Relay 1 settings



1. Press UP/DOWN key to ON/OFF (enable/disable) relay1.
2. Close set point: active point for NTU.
3. Open set point: inactive point for 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 80.00 NTU and turn off it at 20.00 NTU, then the close S.P. needs to set to 80.00 NTU, Open S.P. sets to 20.00 NTU.

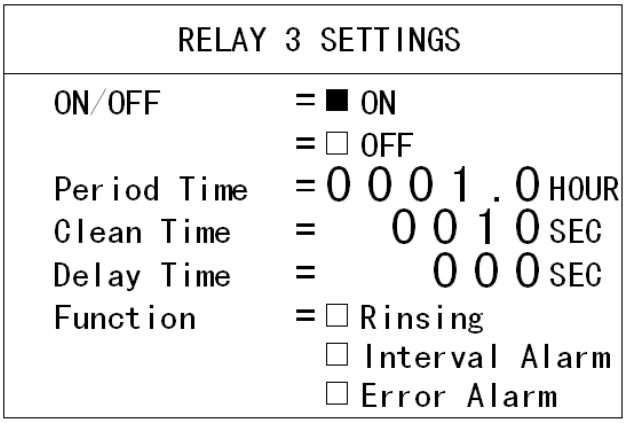
Relay 2 settings



1. Press UP/DOWN key to ON/OFF (enable/ disable) relay2.
2. Close set point: active point for NTU.
3. Open set point: inactive point for 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 20.00 NTU and turn off it at 80.00 NTU, then the close S.P. needs to set to 20.00 NTU, Open S.P. sets to 80.00 NTU.

Relay 3 settings

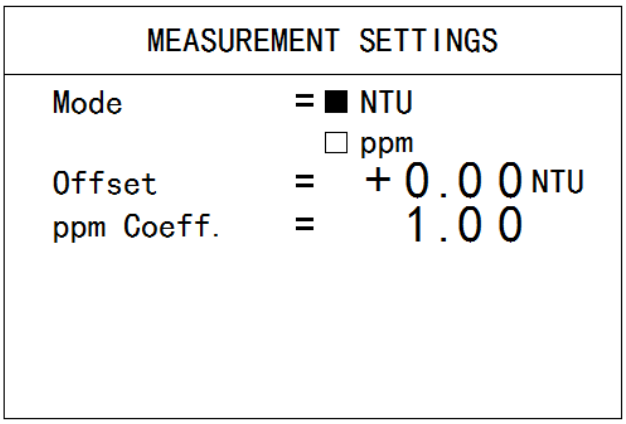


1. Press UP/DOWN key to ON/OFF (enable/disable) relay3.
2. Period time: The period for Rinsing or interval function.
3. Clean time: When period is timeout then relay active.
4. Delay time: the range is 0-120 seconds. Relay needs to delay first then active if the period is timeout.
5. Function: press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

Notice:

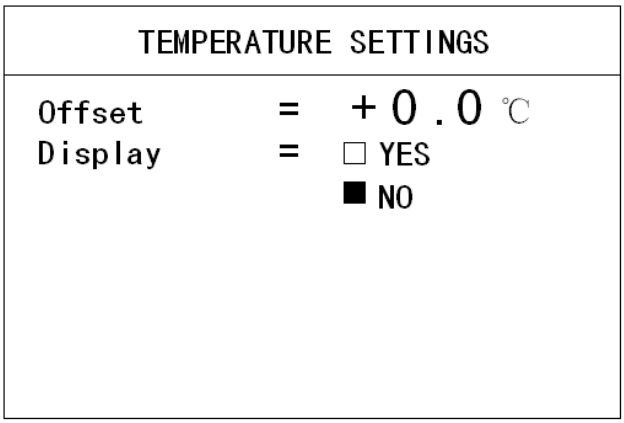
1. Rinsing: when period timeout then clean-relay will active, when clean time is timeout the repeat count for the period.
2. Interval alarm: When period timeout then clean-relay active until user resets the interval then the clean-relay inactive and repeat count for the period.
3. Error alarm: The clean-relay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

Measurement settings



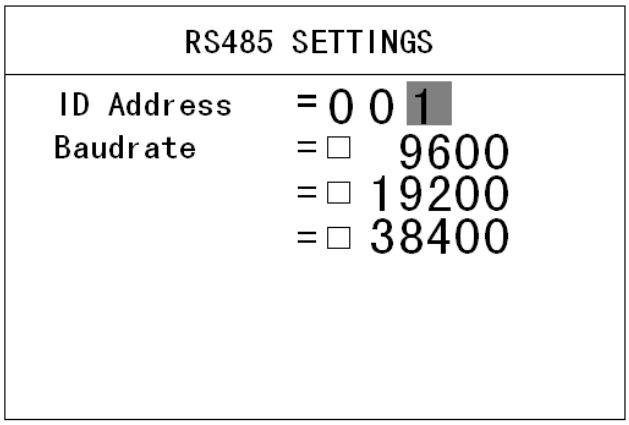
1. Choose the mode for measuring, press UP/DOWN key to choose.
2. Offset , range is ±9.99 NTU.
3. ppm coefficient : range is from 0.01 to 3.00, this is for ppm only. ppm=NTU * ppm coefficient.

Temperature settings



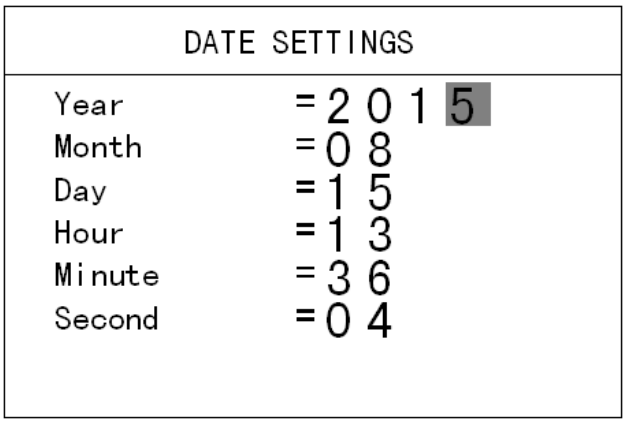
1. Temperature offset ,the range is±5.0℃.
2. Temperature display: display the temperature on measurement mode or not.

RS485 settings



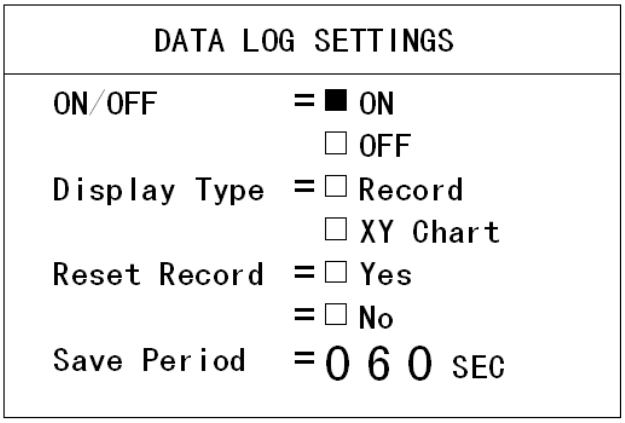
1. ID address:1-255.
2. Baud rate , press UP/DOWN key to choose.

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

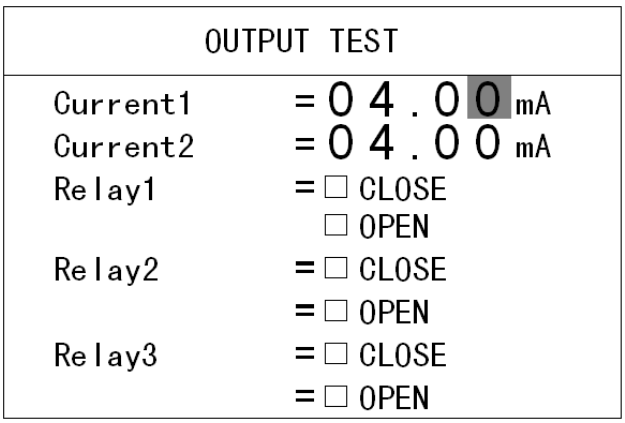


1. Press UP/DOWN key to ON/OFF (enable/disable) this function.
2. Display type, press UP/DOWN key to choose
3. Erase all the records.
4. Saving period from 5 to 120 second.

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.

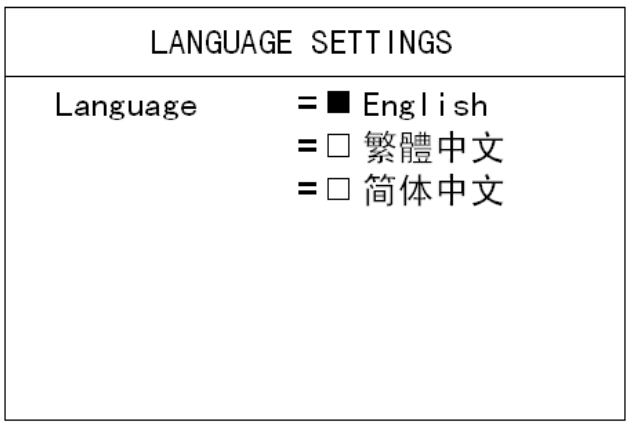
Output test



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.

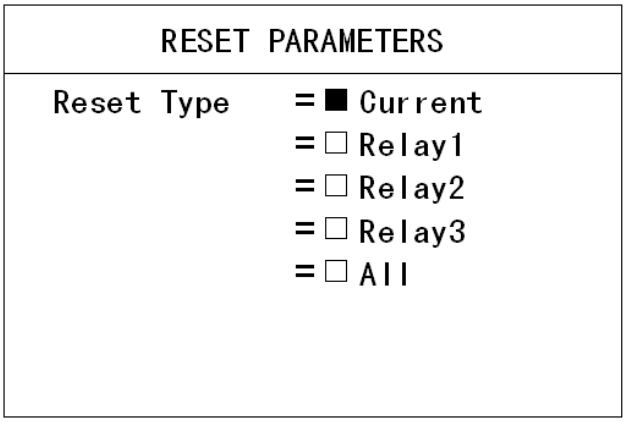
Notice: This function for testing the output only.

Language settings



Press UP/DOWN key to choose the language.

Reset parameters

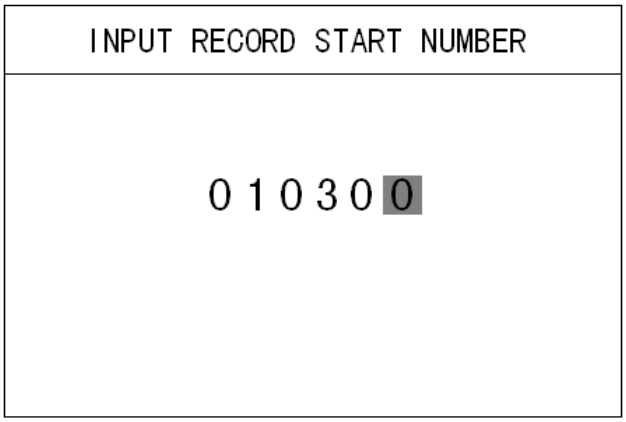


Press UP/DOWN key to choose the reset.

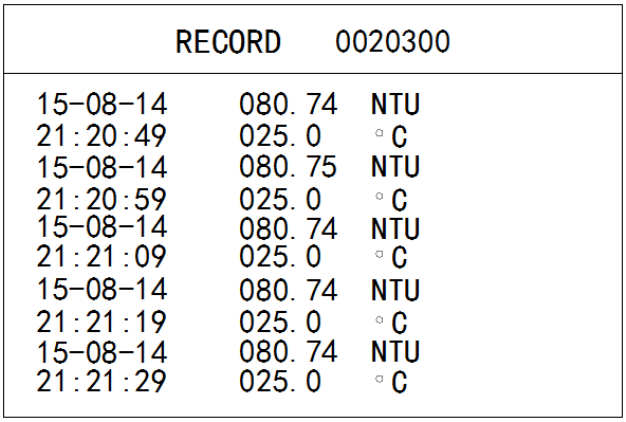
Notice: The reset will not affect the calibrated parameters.

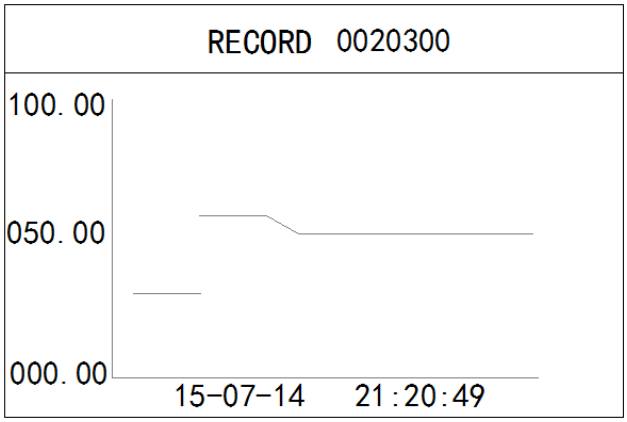
Record query

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



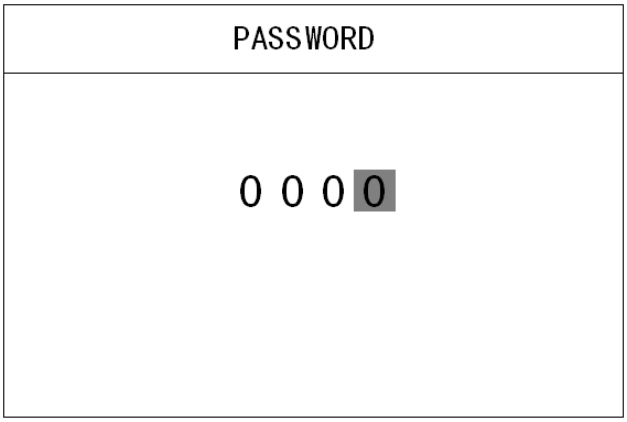
Press UP/DOWN and SHIFT key to input record number then press ENTER key enter or press MODE key exit.

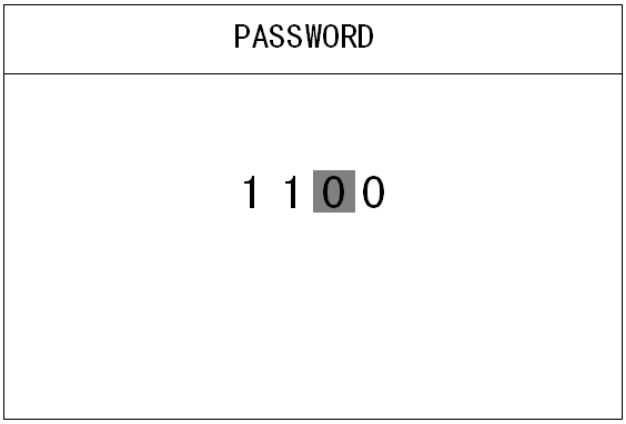




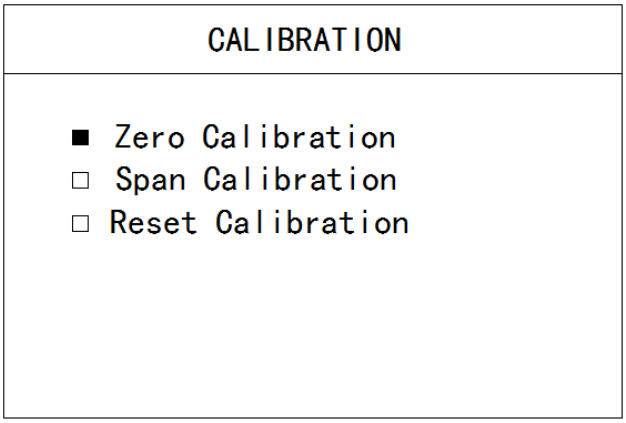
Calibration

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.





Manu

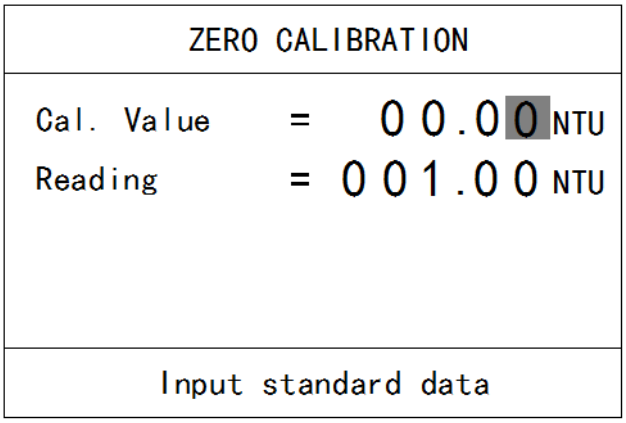


Press UP/DOWN key to select the functions and then press ENTER key to enter.

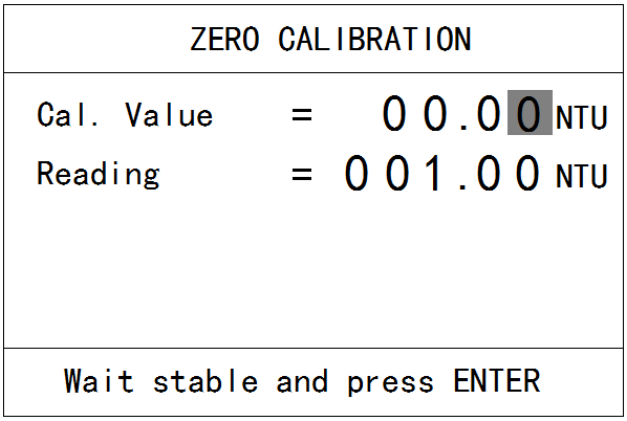
1. Zero calibration: Calibrate the low point from 0.00 to 1.00 NTU
2. Span calibration : Calibrate the high point. The solution should be closed to the working point.
3. Reset the calibration parameters.

Turbidity calibration

Zero calibration

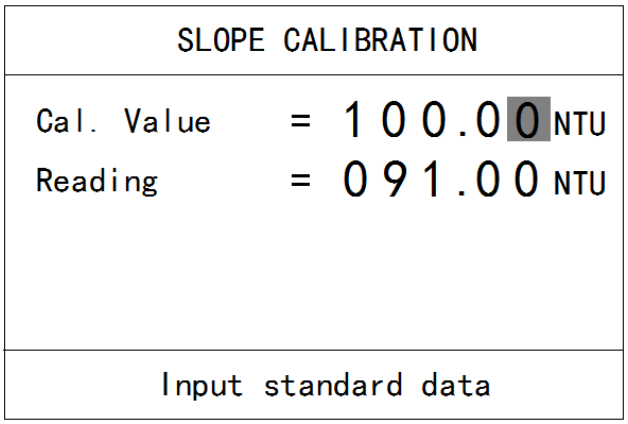


1. Put the electrode to the low NTU solution.
2. Input the data of solution.
3. Press ENTER to go to next or press MODE to exit

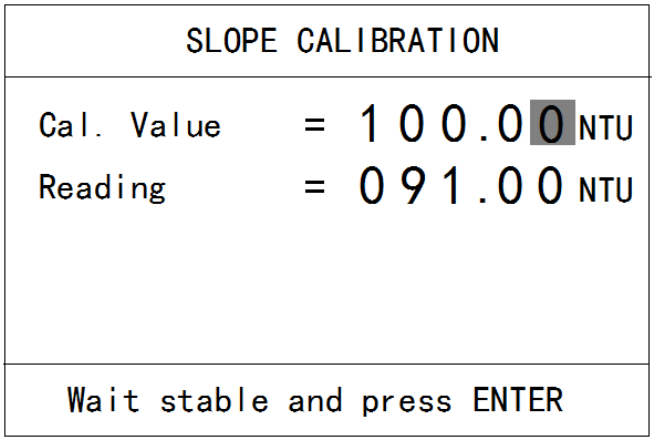


1.Wait the reading is stable then press ENTER to save the zero calibration.

Slope calibration

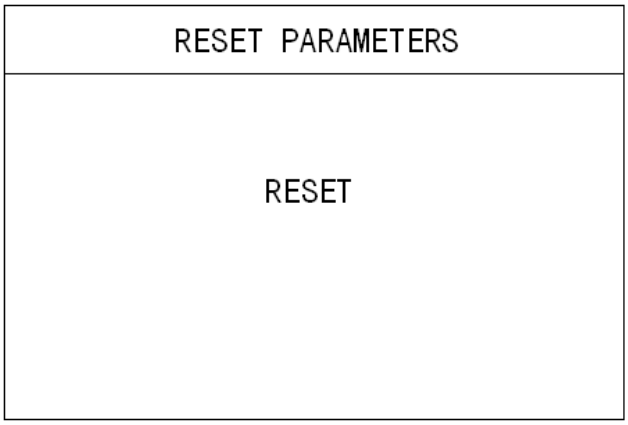


1. Put the electrode to the standard NTU solution.
2. Input the data of solution.
3. Press ENTER to go to next or press MODE to exit



1.Wait the reading is stable then press ENTER to save the slope calibration.

Reset parameters



This will reset all of the calibrated parameters to default.

Default

NTU 20.00mA corresponding	100.00	NTU	range: 10.00 -100.00
NTU 4.00mA corresponding	0.00	NTU	range: 0.00 - 90.00 difference : 10.00
Temp. 20.00mA corresponding	50.0	℃	range: 10.0 - 50.0
Temp. 4.00mA corresponding	0.0	℃	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.	80.00	NTU	range: 0.00 - 100.00
Relay 1 NTU open S.P.	20.00	NTU	range: 0.00 - 100.00 difference : 0.01
Relay 1 delay time	0	second	range: 0-120
Relay 2 NTU close S.P.	20.00	NTU	range: 0.00 - 100.00
Relay 2 NTU open S.P.	80.00	NTU	range: 0.00 - 100.00 difference : 0.01
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
NTU offset	0.0	NTU	range: +/- 9.99
Mode	NTU		range: 0=NTU,1=ppm
ppm Coefficient	1.00		range:0.01 - 3.00
Temp. Offset	0.0	℃	range: +/- 5.0
Language	English		range: English/traditional Chinese /simple Chinese
Record type	record		range: record/XY chart

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 Mod bus-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 reading1	reading: float(0x00 & 0x01)
(01)	0x01	NTU reading2	
(02)	0x02	NTU current	reading :X 0.01
(03)	0x03	Temperature	reading :X 0.1
(04)	0x04	Temperature current	reading :X 0.01
(05)	0x05	Error code	reading :X 1
(06)	0x06		
(07)	0x07		
(08)	0x08		
(09)	0x09	Model type	fix to 8

03:definition

Address			
(00)	0x00	NTU 20.00mA corresponding	reading:X0.01
(01)	0x01	NTU 4.00mA corresponding	reading:X0.01
(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 NTU close S.P.	reading:X0.01	
(13)	0x0D	Relay1 NTU open S.P.	reading:X0.01	
(14)	0x0E	Relay1 delay time	reading:X1	
(15)	0x0F	Relay2 NTU close S.P.	reading:X0.01	
(16)	0x10	Relay2 NTU open S.P.	reading:X0.01	
(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 saving time	reading:X1	
(23)	0x17	Mode	reading:X1	
(24)	0x18	NTU offset	reading:X0.01	
(25)	0x19	ppm coefficient	reading:X0.01	
(26)	0x1A	Temp. offset	reading:X0.1	
(27)	0x1B	Language	reading:X1	0=English ,1=traditional Chinese,2=simple Chinese