Version:2020-02

Optical Dissolved Oxygen Controller

6000 Series

800 Series

Content

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.

PDO Instrument application

Widely used in industrial measuring of the temperature and DO, such as wastewater treatment, environmental monitoring, drinking water, sea water, food production process, etc.

PNTU Instrument application

Widely used in industrial measuring of the temperature and turbidity, such as urban wastewater treatment, sanitation network, industrial effluent treatment, surface water monitoring, drinking water etc.

PSS Instrument application

Widely 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.

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

Notic
The PDO means Optical DO
The PNTU means Tirbidity
The PSS means Suspended solid

Specifications

PDO

Functions	% sat.	ppm mg/L
Measuring range	0.0 to 200.0	0.00 to 20.00
Resolution	0.1	0.01
Accuracy	±0.2	±0.02
Temp. compensation	NTU	
Temp. range	-10.0 to +130.0℃	
Temp. compensation range	-10.0 to +130.0℃	
Temp. resolution	0.1℃	
Temp. accuracy	±0.2℃	
Pressure range	0 to 2100 mBar	
Salinity range	0.00 to 50.00 ppt	
Readings refresh	5-60 second	

PNTU

Functions	NTU/FNU	mg/L
Measuring range	0.00 to 4000.0	0.00 to 4500.0
Resolution	0.1	0.01
Accuracy	< 5%	<5%
Temp. compensation	NTU	
Temp. range	0.0 to +50.0 ℃	
Temp. resolution	0.1℃	
Temp. accuracy	±0.2℃	
Data update time	1-60 Second	

PSS

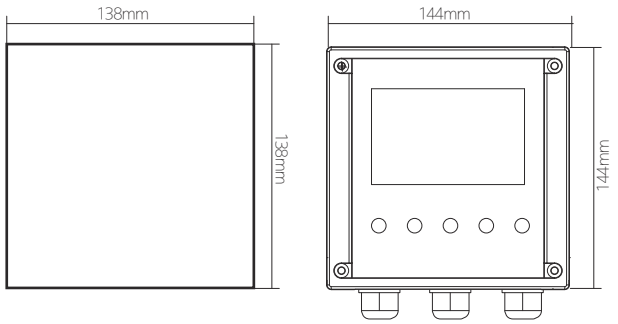
Functions	SS	Sludge blanket	Turbidity
Measuring range	0.00 - 50.00 g/L	0.0 - 100.0%	0.0 - 4000.0
Resolution	0.01	0.1	0.1
Accuracy	< ±5%	< ±5%	±5%
Temp. compensation	NTU		
Temp. range	0.0 to +50.0 ℃		
Temp. resolution	0.1℃		
Temp. accuracy	±0.2℃		
Data update time	1-60 Second		

Specifications

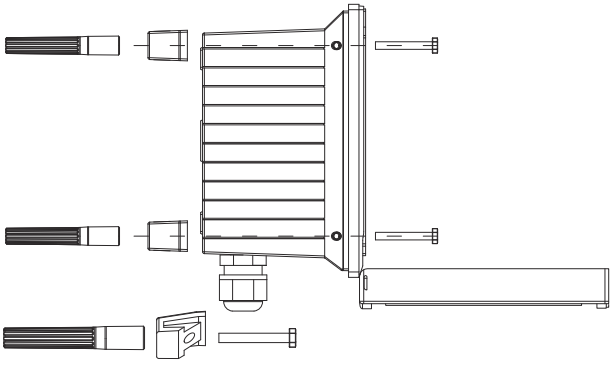
Ambient temperature range	0 to +70℃
Storage temp.	-20 to +70℃
Display	Back light,dot matrix
Current output1	Isolated, 4 to 20mA output , max. load 500Ω
Temp. current output 2	Isolated, 4 to 20mA output , max. load 500Ω
Current output accuracy	±0.05 mA
RS485	Mod bus RTU protocol
Baud rate	9600/19200/38400
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<5watts
Installation	panel/wall/pipe installation
Weight	6000 series:0.85Kg/ 800 series:0.55Kg

Instrument installation

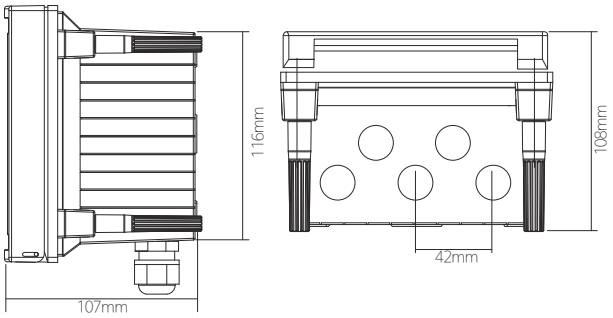
6000 series : The instrument can be panel, wall or pipe mounted installation.
Panel Installation: Make a 138x138 mm square cutout and insert the instrument. Screw in the fixed block with the screws and fixed bar.



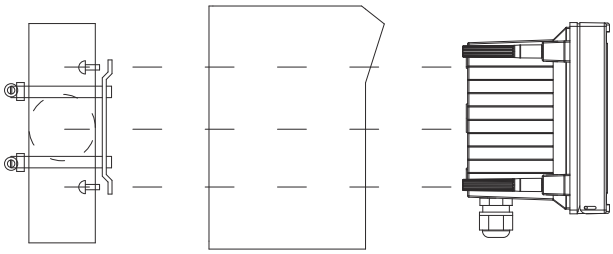
Cutout size - 6000 series　　Front view – 6000 Series



Exploded view – 6000 Series



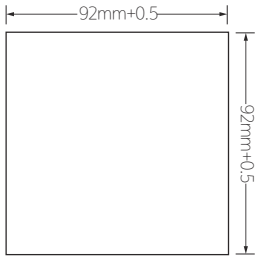
Side and bottom view – 6000 Series



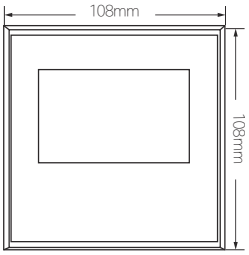
Wall and pipe installation – 6000 Series

Instrument installation

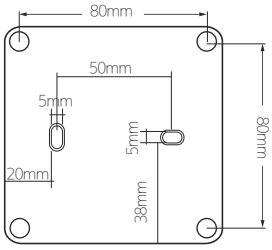
800 Series:The instrument can be panel, wall or pipe mounted installation.
To install 800 series on panel, make a 92x92 mm square cutout and insert the instrument then screw in the fixed HOLDER.



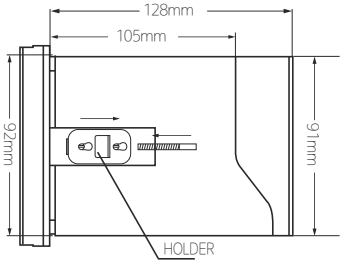
Cutout size - 800 series



Front view – 800 Series

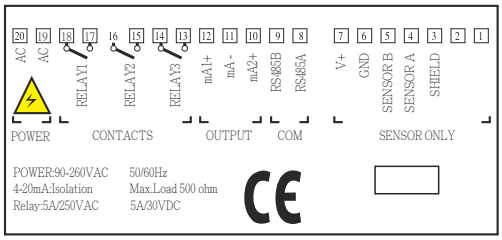


Back view – 800 series

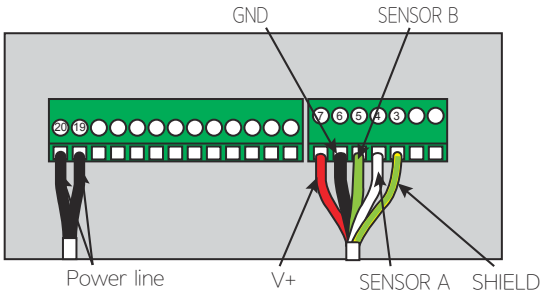


Side view – 800 series

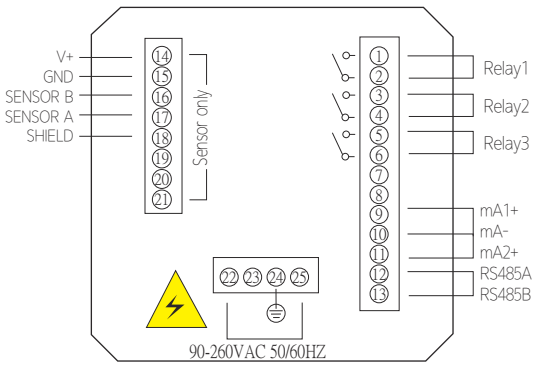
Connection label
6000 Series



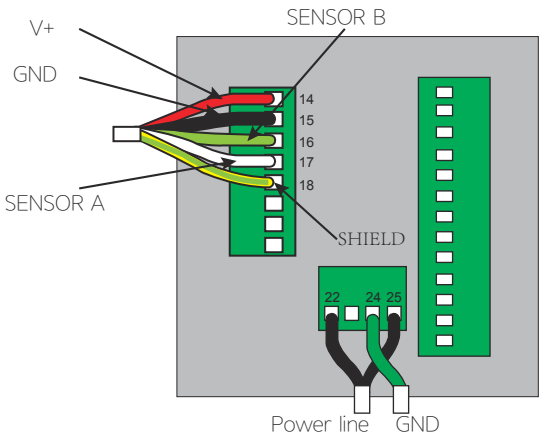
Electrode connection figure



Connection label (800 series)

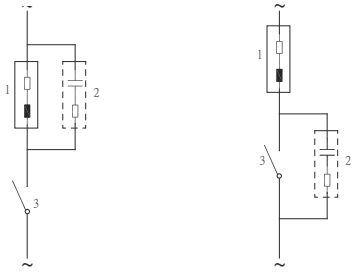


Electrode connection figure (800 series)

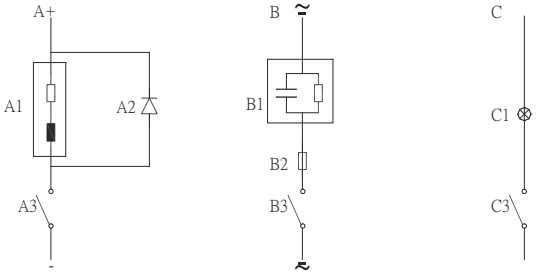


Relay contact protection

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.



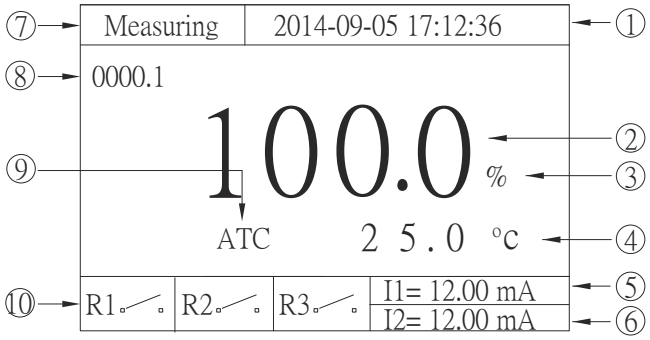
AC protection, use for inductive load
1. Load
2. RC eliminate spark, using in 220VAC, R=100 ohm1W,
3. Relay contact



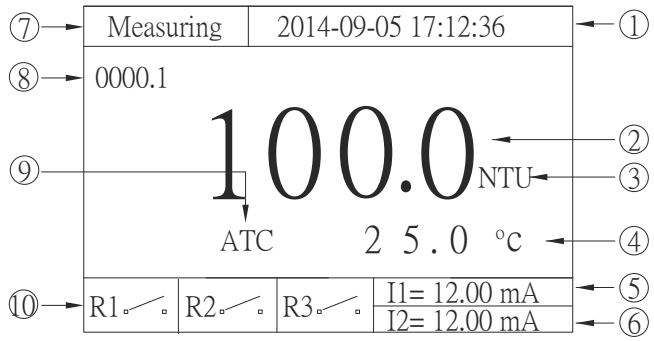
DC protection: A1 - Inductive load || A2 - 1N4007 || A3 - Relay contact
AC/DC protection: B1 - Capacitive load || B2: 0.8 Ohm/1W（DC24V）||B3 - Relay contact
Resistive load: C1 - Lamp bulb ||C3 - Relay contact

Measurement display

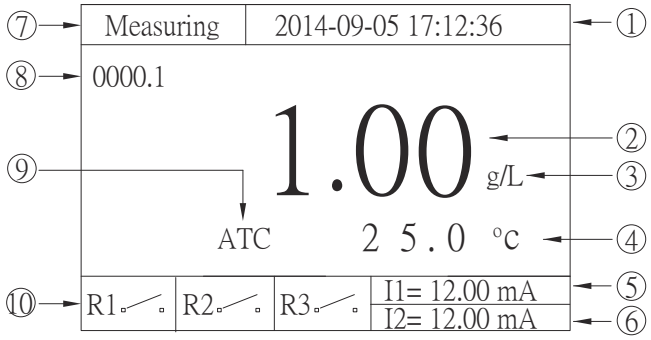
PDO



PNTU



PSS



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

Buttons

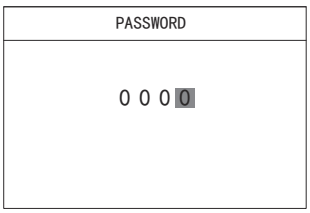
Key name	Meas. status	Setting status	Cal. status	Record status
MODE	Enter password	Exit	Exit	Exit
SHIFT	none	Move digit	Mode digit	Mode digit
UP	Enter record	Inc	Inc	Inc
DOWN	None	Dec	Dec	Dec
ENTER	ON/OFFback light	Enter	Enter	Enter

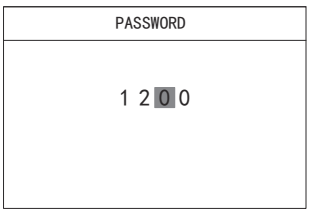
Keeping mode

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.

Setting

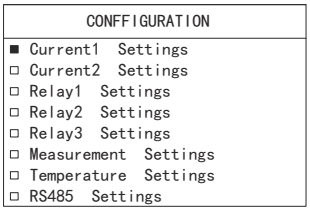
Press MODE key to enter the password menu and then press UP/DOWN/SHIFT key to input password 1200 then press ENTER will enter to setting mode or press MODE key to exit. Controller will return to measurement mode after 10 minutes of inactivity.



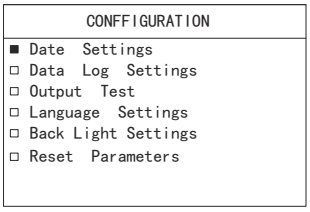


Main display

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



Page1



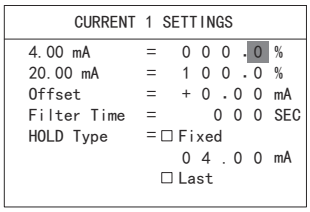
Page2

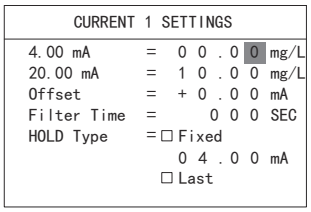
Note:

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.

Current 1 settings

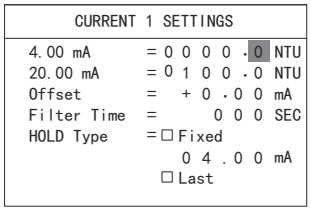
PDO

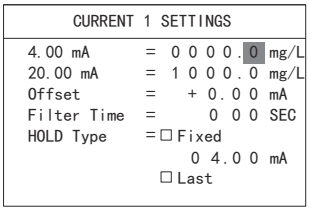




1. Set the DO value to the corresponding 4.00mA and 20.00mA point.
2. The minimum range between 4.00mA and 20.00 mA at least is 10.00 %.
3. Set the offset current of %, the range is±1.00mA.
4. The filter time range is 0-120 seconds, the low pass filter of software will active when the current from one 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.

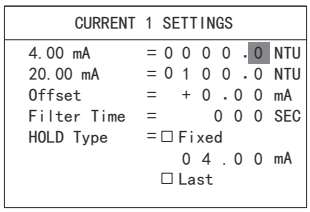
PNTU

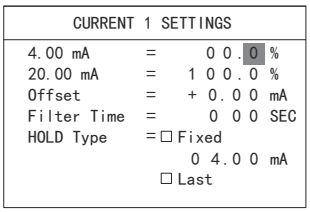


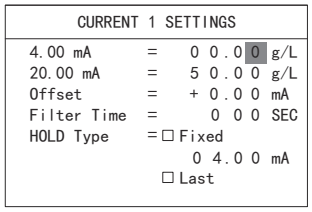


1. Set the turbidity value to the corresponding 4.00mA and 20.00mA point.
2. The minimum range between 4.00mA and 20.00 mA at least is 10.00 NTU.
3. Set the offset current of NTU, the range is±1.00mA.
4. The filter time range is 0-120 seconds, the low pass filter of software will active when the current 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.

PSS

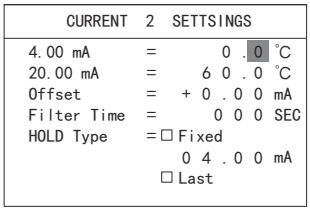






1. Set the tuebidity, sludge blanked, suspended soild value to the corresponding 4.00mA and 20.00mA point.
2. The minimum range between 4.00mA and 20.00 mA at least is 10.00 NTU/mg/L.
3. Set the offset current of NTU, the range is±1.00mA.
4. The filter time range is 0-120 seconds, the low pass filter 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.

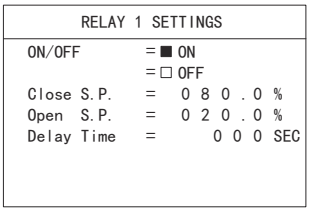
Current 2 settings

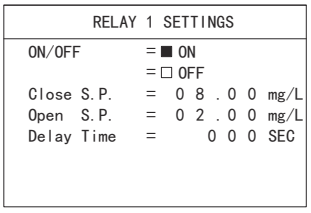


1. Set the temperature value to the corresponding 4.00mA and 20.00mA point.
2. The minimum range between 4.00mA and 20.00 mA is 10.0℃.
3. Set the offset current of temperature (The maximum range is±1.00mA).
4. The filter time range is 0-120 seconds, the low pass filter of software will active when the current from one point to another point if user sets the filter time.

Relay 1 settings

PDO

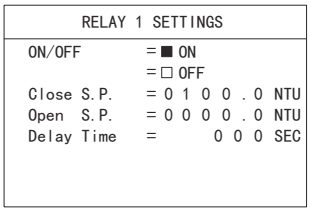


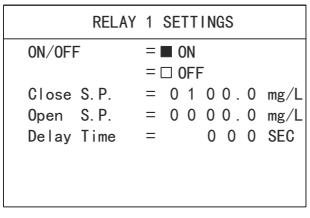


1. Press UP/DOWN key to ON/OFF (enable/disable) relay1.
2. Close set point: Target value to activate relay.
3. Open set point: Target value to deactivate relay.
4. Delay time: Relay will only be activated when this timer time out. Timer range from 0 to 120 seconds.

Ex: User targets to switch on the pump at 80% and switch off at 20%. Set close S.P. to 80% and open S.P. to 20%.

PNTU





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 100.0 NTU and switch off at 0.0 NTU. Set close S.P. to 100.0 NTU and open S.P. to 0.0 NTU.

PSS

RELAY 1 SETTINGS	
ON/OFF	= ■ ON
	= □ 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

RELAY 1 SETTINGS	
ON/OFF	= ■ ON
	= □ OFF
Close S.P.	= 1 0 0 . 0 %
Open S.P.	= 0 0 0 . 0 %
Delay Time	= 0 0 0 SEC

RELAY 1 SETTINGS	
ON/OFF	= ■ ON
	= □ 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: 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 100.0 NTU and switch off at 0.0 NTU.
Set close S.P. to 100.0 NTU and open S.P. to 0.0 NTU.

Relay 2 settings

PDO

RELAY 2 SETTINGS	
ON/OFF	= ■ ON
	= □ OFF
Close S.P.	= 0 2 0 . 0 %
Open S.P.	= 0 8 0 . 0 %
Delay Time	= 0 0 0 SEC

RELAY 2 SETTINGS	
ON/OFF	= ■ ON
	= □ OFF
Close S.P.	= 0 2 . 0 0 mg/L
Open S.P.	= 0 8 . 0 0 mg/L
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 20% NTU and switch off at 80%.
Set close S.P. to 20% NTU and open S.P. to 80% NTU.

PNTU

RELAY 2 SETTINGS	
ON/OFF	= ■ ON
	= □ 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

RELAY 2 SETTINGS	
ON/OFF	= ■ ON
	= □ OFF
Close S.P.	= 0 0 0 0 . 0 mg/L
Open S.P.	= 0 1 0 0 . 0 mg/L
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 0.0 NTU and switch off at 100.0 NTU.
Set close S.P. to 0.0 NTU and open S.P. to 100.0 NTU.

PSS

RELAY 2 SETTINGS	
ON/OFF	= ■ ON
	= □ 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

RELAY 2 SETTINGS	
ON/OFF	= ■ ON
	= □ OFF
Close S.P.	= 0 0 0 . 0 %
Open S.P.	= 1 0 0 . 0 %
Delay Time	= 0 0 0 SEC

RELAY 2 SETTINGS	
ON/OFF	= ■ ON
	= □ 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

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 0.0 NTU and switch off at 100.0 NTU.
Set close S.P. to 0.0 NTU and open S.P. to 100.0 NTU.

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.

Measurement settings

PDO

MEASUREMENT SETTINGS	
Unit	= ■ %
	□ ppm
	□ mg/L
Offset	= + 0 0 . 0 %
Filter	= 0 0
Meas. Peri	= 0 5 SEC

1. Unit: select the display unit.
2. Offset: offset for the readings.
3. Filter: average the readings.
4. Measurement period : sensor reading update cycle.

PNTU

MEASUREMENT SETTINGS	
Unit	= ■ NTU
	□ mg/L
Offset	= + 0 0 0 . 0 NTU
Filter	= 0 1
Meas. Peri.	= 0 5 SEC

1. Unit: select the display unit.
2. Offset: offset for the readings.
3. Filter: average the readings.
4. Measurement period: sensor reading update cycle.

PSS

MEASUREMENT SETTINGS	
Unit	= □ NTU
	□ %
	□ mg/L
	■ g/L
Offset	= + 0 . 0 g/L
Filter	= 0 1
Meas. Peri.	= 0 5 SEC

1. Unit: select the display unit.
2. Offset: offset for the readings.
3. Filter: average the readings.
4. Measurement period: sensor reading update cycle.

Temperature setting

TEMPERATURE SETTSINGS	
Offset	= + 0 . 0 ℃
Display	= □ YES
	■ NO

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

RS485 settings

RS485 SETTSINGS	
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.

Date settings

DATE SETTSINGS	
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 SETTSINGS	
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.

Language settings

LANGUAGE SETTSINGS	
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.

Record query

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

INPUT RECORD START NUMBER
0 1 0 3 0 0

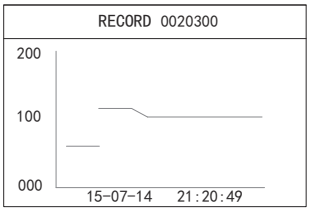
Press UP/DOWN and SHIFT key to input record number then press ENTER key to confirm record number or press MODE key to exit.

PDO

Display (DO) data in detail view

RECORD 0020300		
15-08-14 21:20:49	100.0 025.0	% °C
15-08-14 21:20:59	100.0 025.0	% °C
15-08-14 21:21:09	099.9 025.0	% °C
15-08-14 21:21:19	099.9 025.0	% °C
15-08-14 21:21:29	100.0 025.0	% °C

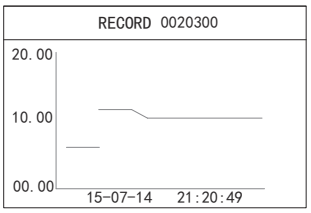
Display (DO) data in XY chart view



Display (ppm) data in detail view

RECORD 0020300		
15-08-14 21:20:49	10.00 025.0	ppm °C
15-08-14 21:20:59	10.00 025.0	ppm °C
15-08-14 21:21:09	09.99 025.0	mg/L °C
15-08-14 21:21:19	09.99 025.0	mg/L °C
15-08-14 21:21:29	10.00 025.0	mg/L °C

Display (ppm) data in XY chart

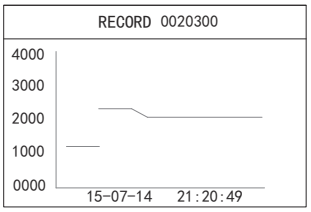


PNTU

Display (NTU) data in detail view

RECORD 0020300		
15-08-14 21:20:49	0010.0 25.0	NTU °C
15-08-14 21:20:59	0010.0 25.0	mg/L °C
15-08-14 21:21:09	0010.0 25.0	NTU °C
15-08-14 21:21:19	0010.0 25.0	NTU °C
15-08-14 21:21:29	0010.0 25.0	NTU °C

Display (NTU) data in XY chart

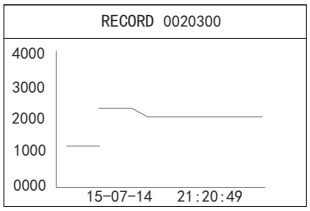


PSS

Display (ss) data in detail view

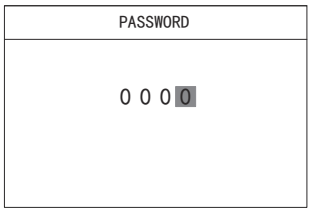
RECORD 0020300		
15-08-14 21:20:49	0100.0 25.0	NTU °C
15-08-14 21:20:59	10.00 25.0	g/L °C
15-08-14 21:21:09	10.00 25.0	g/L °C
15-08-14 21:21:19	100.0 25.0	% °C
15-08-14 21:21:29	100.0 25.0	% °C

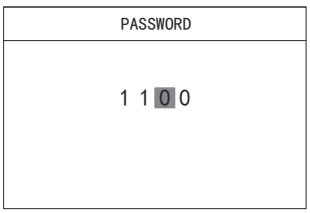
Display (ss) data in XY chart



Calibration

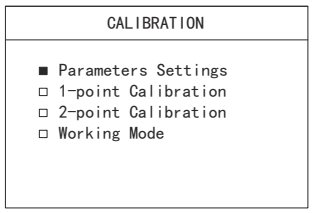
Press MODE key to enter the password menu. Then, press UP/DOWN/SHIFT key to input password 1100. Pressing ENTER will proceed to calibration mode or press MODE to exit. If no key is pressed for over 10 minute, then it will go back to measurement mode.





PDO

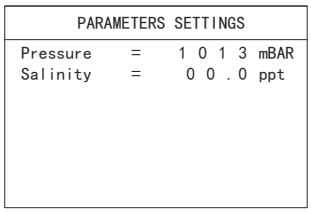
Main display



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

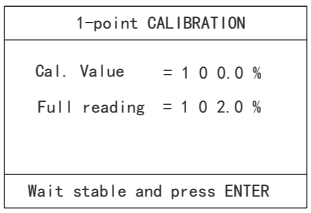
1. Parameters settings: Set the parameters
2. 1-point calibration: calibrate the 100%.
3. 2-point calibration: calibrate the 0% and 100%.
4. Set the working mode.

Parameters settings



1. Pressure range is from 0 to 2100 mbar.
2. Press UP/DOWN key to input the salinity. The range is from 0.0 to 50.0 ppt

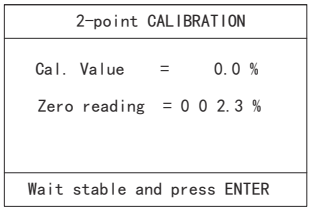
1-point calibration



1. Use the calibration bottle(with sponge and water) to calibrate DO in 100%. You can also calibrate in air as your 100% calibration.
2. Waiting for the current is stable then press ENTER to finish the calibration or Press MODE to exit

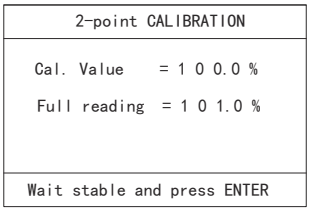
2-point calibration

0% calibration



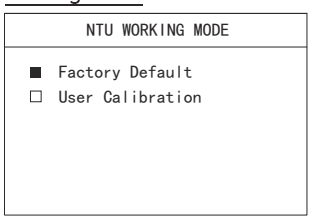
1. Put the DO electrode into the nitrogen or saturated solution of anhydrous sodium sulfite.
2. Waiting for the reading is stable then press ENTER to finish the calibration.

100% calibration



1. Use the calibration bottle(with sponge and water) to calibrate DO in 100%. You can also calibrate in air as your 100% calibration.
2. Waiting for the current is stable then press ENTER to finish the calibration or Press MODE to exit

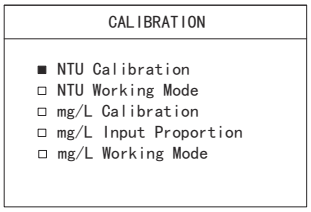
Working mode



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

PNTU

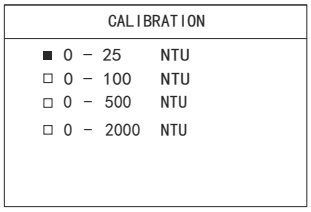
Main display



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

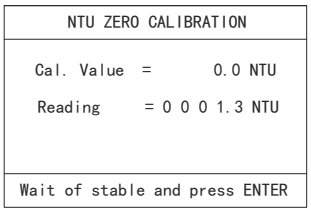
1. NTU calibration and working mode.
2. mg/L calibration and working mode.

NTU calibration



1. Put the electrode to the deionized water.
2. Press UP/DOWN key to select the range. press ENTER to go to next or press MODE to exit.

Zero calibration



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 = 2 0 0 0.0 NTU
Reading = 2 0 1 0.0 NTU
Wait of stable and press ENTER

1. Put the electrode to the standard buffer.
2. Waiting for the reading is stable and then press ENTER to finish the calibration or press MODE to exit.

NTU working mode

NTU WORKING MODE
■ Factory Default
□ User Calibration

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

mg/L calibration

mg/L ZERO CALIBRATION
Cal. Value = 0.0 mg/L
Reading = 0 0 0 1.3 mg/L
Wait of stable and press ENTER

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

Slope calibration

mg/L SLOPE CALIBRATION
Cal. Value = 0 1 0 0.0 mg/L
Reading = 0 1 0 8.0 mg/L
Input standard data

mg/L SLOPE CALIBRATION
Cal. Value = 0 1 0 0.0 mg/L
Reading = 0 1 0 8.0 mg/L
Wait of stable and press ENTER

1. Input slope standard buffer. The range is from 0.1 to 4500.0 mg/L.
2. Put the electrode to the standard buffer. Waiting for the reading is stable and then press ENTER to finish the calibration or press MODE to exit.

Proportion input

mg/L PROPORTING INPUT
Proportion = 1.0 0

Input the proportion. The range is 0.01 to 5.00

Notice:
When user chooses the mg/L and uses the proportion then the display is the reading of mg/L X proportion.

mg/L working mode

mg/L WORKING MODE
■ Factory Default
□ User Calibration
□ Proportion

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

PSS
Main display

CALIBRATION
■ NTU Calibration
□ NTU Working Mode
□ SB Calibration
□ SB Working Mode
□ SS Calibration
□ SS Working Mode

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

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 = 0 0 0 1.3 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 = 2 0 0 0.0 NTU
Reading = 2 0 1 0.0 NTU
Input standard data

NTU SLOPE CALIBRATION
Cal. Value = 2 0 0 0.0 NTU
Reading = 2 0 1 0.0 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
■ Factory Default
□ 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 = 1 0 0.0 %
Reading = 0 9 0.0 %
Input standard data

SB CALIBRATION
Cal. Value = 1 0 0.0 %
Reading = 0 9 0.0 %
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
■ Factory Default
□ 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 = 0.0 0 g/L Reading = 0 0.0 3 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 = 2 0 0 0.0 g/L Reading = 2 0 1 0.0 g/L
Input standard data

SS SLOPE CALIBRATION
Cal. Value = 2 0 0 0.0 g/L Reading = 2 0 1 0.0 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
■ Factory Default □ User Calibration

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

USB function

Press MODE key to enter the password menu. Press UP/DOWN/SHIFTkey to input password (1300). Press ENTER will proceed to USB setting or press MODE key to exit. If no key is be 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.

PDO Default settings

DO 20.00mA corresponding	100.0	%	range: 10.0 - 200.0
DO 4.00mA corresponding	0.0	%	range: 0.0 - 190.0 difference : 10.0
ppm 20.00mA corresponding	10.00	ppm	range: 1.00 - 20.00
ppm 4.00mA corresponding	0.00	ppm	range: 0.00 - 19.00 difference : 1.00
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 DO close S.P.	80.0	%	range: 0.0 - 200.0
Relay 1 DO open S.P.	20.0	%	range: 0.0 - 200.0 difference : 0.1
Relay 1 ppm close S.P.	8.00	ppm	range: 0.00 - 20.00
Relay 1 ppm open S.P.	2.00	ppm	range: 0.00 - 20.00 difference : 0.01
Relay 1 delay time	0	second	range: 0 - 120
Relay 2 DO close S.P.	20.0	%	range: 0.0 - 200.0
Relay 2 DO open S.P.	80.0	%	range: 0.0 - 200.0 difference : 0.1
Relay 2 ppm close S.P.	2.00	ppm	range: 0.00 - 20.00
Relay 2 ppm open S.P.	8.00	ppm	range: 0.00 - 20.00 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
DO offset	0.0	%	range: +/- 10.0
ppm offset	0.00	ppm	range: +/-1.00
Mode	%		range: %,ppm,mg/L
Temp. Offset	0.0	℃	range: +/- 5.0
Language	English		range: English/ traditional Chinese /simple Chinese

Filter	0		range: 0 - 10
Record type	record		range: record/XY chart
Pressure	1013	mBar	range: 0 - 2100
Salinity	0.0	ppt	range: 0.00 - 50.00
Measuring period	5	Second	range: 5 - 60

PNTU Default settings

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
mg/L 20.00mA corresponding	100.0	mg/L	range: 10.0 - 4500.0
mg/L 4.00mA corresponding	0.0	mg/L	range: 0.0 - 4490.0 difference : 10.0
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.	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 mg/L close S.P.	100.0	mg/L	range: 0.0 - 4500.0
Relay 1 mg/L open S.P.	0.0	mg/L	range: 0.0 - 4500.0 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 mg/L close S.P.	100.0	mg/L	range: 0.0 - 4500.0
Relay 2 mg/L open S.P.	0.0	mg/L	range: 0.0 - 4500.0 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
NTU offset	0.0	NTU	range: +/- 100.0
mg/L offset	0.0	mg/L	range: +/- 100.0
Mode	NTU		range: 0=NTU,1=mg/L
Temp. Offset	0.0	℃	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

PSS Default settings

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	℃	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.	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	℃	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
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

PDO 04:definition

address		
(00) 0x00	% / ppm reading	reading:%X 0.1, ppm X 0.01
(01) 0x01	%/ ppm 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 9

PDO 03:definition

Address		
(00) 0x00	DO 20.00mA corresponding	reading:X0.1
(01) 0x01	DO 4.00mA corresponding	reading:X0.1
(02) 0x02	ppm 20.00mA corresponding	reading:X0.01
(03) 0x03	ppm 4.00mA corresponding	reading:X0.01
(04) 0x04	Temp. 20.00mA corresponding	reading:X0.1
(05) 0x05	Temp. 4.00mA corresponding	reading:X0.1
(06) 0x06	Current 1 offset	reading:X0.01
(07) 0x07	Current 2 offset	reading:X0.01

(08) 0x08	Current 1 filter	reading:X1
(09) 0x09	Current 2 filter	reading:X1
(10) 0x0A	Current 1 fixed current	reading:X0.01
(11) 0x0B	Current 2 fixed current	reading:X0.01
(12) 0x0C	Current 1 HOLD type	reading:X1 0=fixed,1=last
(13) 0x0D	Current 2 HOLD type	reading:X1 0=fixed,1=last
(14) 0x0E	Relay1 DO close S.P.	reading:X0.1
(15) 0x0F	Relay1 DO open S.P.	reading:X0.1
(16) 0x10	Relay1 ppm close S.P.	reading:X0.01
(17) 0x11	Relay1 ppm open S.P.	reading:X0.01
(18) 0x12	Relay1 delay time	reading:X1
(19) 0x13	Relay2 DO close S.P.	reading:X0.1
(20) 0x14	Relay2 DO open S.P.	reading:X0.1
(21) 0x15	Relay2 ppm close S.P.	reading:X0.01
(22) 0x16	Relay2 ppm open S.P.	reading:X0.01
(23) 0x17	Relay2 delay time	reading:X1
(24) 0x18	Relay3 clean period	reading:X0.1
(25) 0x19	Relay3 clean time	reading:X1
(26) 0x1A	Relay3 delay time	reading:X1
(27) 0x1B	Relay3 function	reading:X1 0:clean,1:period alarm ,2:Error alarm
(28) 0x1C	Record period	reading:X1
(29) 0x1D	Mode	reading:X1 0=%,1=ppm,2=mg/L
(30) 0x1E	DO offset	reading:X0.1
(31) 0x1F	ppm offset	reading:X0.01
(32) 0x20	Temp. offset	reading:X0.1
(33) 0x21	Language	reading:X1 0=English ,1=traditional Chinese,2=simple Chinese
(34) 0x22	Filter	reading:X1
(35) 0x23	Pressure	reading:X1
(36) 0x24	Salinity	reading:X0.1

PNTU 04:definition

address

(00) 0x00	NTU,mg/L reading	reading : X 0.1
(01) 0x01	NTU,mg/L 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 10

PNTU 03:definition

Address

(00) 0x00	NTU 20.00mA corresponding	reading:X0.1
(01) 0x01	NTU 4.00mA corresponding	reading:X0.1
(02) 0x02	mg/L 20.00mA corresponding	reading:X0.1
(03) 0x03	mg/L 4.00mA corresponding	reading:X0.1
(04) 0x04	Temp. 20.00mA corresponding	reading:X0.1
(05) 0x05	Temp. 4.00mA corresponding	reading:X0.1
(06) 0x06	Current 1 offset	reading:X0.01
(07) 0x07	Current 2 offset	reading:X0.01
(08) 0x08	Current 1 filter	reading:X1
(09) 0x09	Current 2 filter	reading:X1
(10) 0x0A	Current 1 fixed current	reading:X0.01
(11) 0x0B	Current 2 fixed current	reading:X0.01
(12) 0x0C	Current 1 HOLD type	reading:X1 0=fixed,1=last
(13) 0x0D	Current 2 HOLD type	reading:X1 0=fixed,1=last
(14) 0x0E	Relay1 NTU close S.P.	reading:X0.1
(15) 0x0F	Relay1 NTU open S.P.	reading:X0.1
(16) 0x10	Relay1 mg/L close S.P.	reading:X0.1
(17) 0x11	Relay1 mg/L open S.P.	reading:X0.1
(18) 0x12	Relay1 delay time	reading:X1
(19) 0x13	Relay2 NTU close S.P.	reading:X0.1
(20) 0x14	Relay2 NTU open S.P.	reading:X0.1
(21) 0x15	Relay2 mg/L close S.P.	reading:X0.1
(22) 0x16	Relay2 mg/L open S.P.	reading:X0.1
(23) 0x17	Relay2 delay time	reading:X1
(24) 0x18	Relay3 clean period	reading:X0.1
(25) 0x19	Relay3 clean time	reading:X1
(26) 0x1A	Relay3 delay time	reading:X1
(27) 0x1B	Relay3 function	reading:X1 0:clean,1:period alarm ,2:Error alarm

(28) 0x1C	Record saving time	reading:X1
(29) 0x1D	Mode	reading:X1
(30) 0x1E	NTU offset	reading:X0.1
(31) 0x1F	mg/L offset	reading:X0.1
(32) 0x20	Temp. offset	reading:X0.1
(33) 0x21	Language	reading:X1 0=English ,1= traditional Chinese,2=simple Chinese
(34) 0x22	Filter	reading:X1

PSS 04:definition

address

(00) 0x00	NTU/ SB/mgL/SS reading	reading : NTU&SBx 0.1, mg/Lx1,SSx0.01
(01) 0x01	NTU/ SB/mgL/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

PSS 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