

# MANUAL

## Online Turbidity Analyzer

### MS TU 711

# Table

1 Product Configuration.....	2
1.1 Standard Configuration.....	2
1.2 Optional Accessories.....	2
2 Product Introduction.....	3
2.1 Main Features.....	3
3 Technical Indicators.....	4
4 Instrument Installation.....	5
4.1 Installation of Main Unit.....	5
4.2 Installation of Probe.....	5
5. Instrument Panel and Wiring Instructions.....	8
6. Instrument Function Setting.....	11
6.1 Menu Structure.....	11
6.2 Main Interface and Main Menu.....	12
6.3 Turbidity Calibration.....	12
6.3.1 Zero Calibration.....	13
6.3.2 Slope Calibration.....	14
6.4 Compensation Setting.....	14
6.5 Alarm Setting.....	15
6.6 485 Communication Setting.....	17
6.7 Current Output Setting.....	17
6.8 Backlight Setting.....	18
6.9 Range Setting.....	19
6.10 Restore Factory Setting.....	19
7. Daily Maintenance Points.....	20
8. Troubleshooting Steps.....	21
9. Quantity Assurance.....	22

## **Attention**

- Please follow the operating procedures and precautions of this manual when using.
- If you find that the instrument is working abnormally or damaged during use, please contact the dealer, do not repair it yourself..
- In order to make the measurement more accurate, the instrument must be calibrated with the electrode; if your electrode has been purchased for nearly one year or the electrode has quality problems, please pay attention to replace it.
- Before performing the calibration work, please connect the instrument to the electrode and warm it up for 30 minutes.
- Due to product updates, this manual is subject to change without notice.

# 1 Product Configuration

Please confirm the MS-711 detector you purchased, the package is complete, if there is any damage to the package or any shortage of accessories, please contact the dealer as soon as possible. The configuration is as follows.

## 1.1 Standard Configuration

- ◇ Turbidity controller ×1
- ◇ Turbidity sensor ×1
- ◇ Locking bars ×2
- ◇ Manual ×1
- ◇ Cleaning brush ×1(for flow type sensor)
- ◇ Water stopper ×1(for flow type sensor)
- ◇ Water pipe 3m(for flow type sensor)

## 1.2 Optional Accessories

- ◇ Mounting bracket

## 2 Product Introduction

Turbidity is the degree of resistance that occurs when suspended solids in the water pass through light. The soil contains mud, silt, fine organic matter and other microorganisms and colloids to give turbidity in the water. After the light wave transmitted by the transmitter on the sensor is absorbed, reflected and scattered by the measured object during transmission, a part of the transmitted light can be irradiated onto the detector in the 180° direction, and a part of the scattered light is scattered to the detector in the 90° direction. The intensity of the light received on the detectors in the 180° and 90° directions is related to the turbidity of the measured sewage. Therefore, the turbidity of the sewage can be calculated by measuring the intensity of the transmitted and scattered light.

### 2.1 Main Features

- ✧ Waterproof, dust proof, moisture-proof (IP65), high-end design look.
- ✧ high precision, high stability and preferable antijamming ability.
- ✧ Communicate function: RS-485 communication interface with photoelectric isolation (optional, MODBUS protocol partially compatible), photoelectric isolation 4-20mA current output, the corresponding value can be set freely.
- ✧ Watchdog function: make sure the meter doesn't crash.
- ✧ Power off protects > 10 years.
- ✧ Adopting two-point correction method, the instrument measurement range can be modified.
- ✧ The quartz glass lens with high transmittance is used in the optical path of

the sensor, and the infrared wave is more stable to transmit and receive, and the photometric compensation is built in to improve the measuring accuracy

- ✧ Relay lag value can be set freely, avoid frequent action of switch relay. It has the function of setting the switch on and off.
- ✧ The turbidity sensor is not affected by the flow rate and pressure of water.

### 3 Technical Indicators

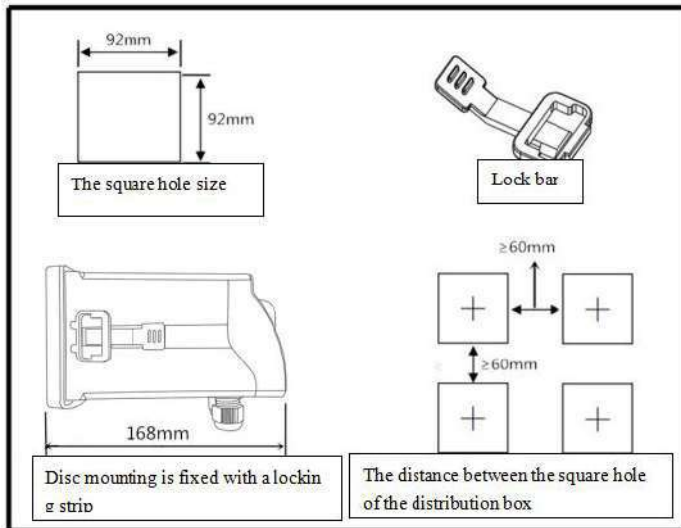
- ✧ Measuring Range: 0-500NTU(flow type sensor), 0-10000NTU(submerged type sensor), measurement range can be customizable
- ✧ Resolution: 0.01%, 0.1℃
- ✧ Accuracy:  $\pm 1.0\%FS$ ,  $\pm 0.5^\circ C$
- ✧ Control interface: two groups of ON/OFF contact individual high and low alarm signal photoelectric isolation output
- ✧ Signal isolation output: photocoupler isolation protection 4-20mA analog output.
- ✧ Relay: relay lag value can be set freely , relay load 3A 220VAC/24VDC
- ✧ Working conditions: Ambient temperature is 0~60℃, relative humidity  $\leq 90\%$ .
- ✧ Output load:  $< 750\Omega$  (4-20mA)
- ✧ Working voltage: AC 220V10%、50/60Hz, sensor: DC 12V
- ✧ Size: 96×96×168mm(controller), 380\*270\*80mm (flow type sensor), 237\*64mm(submerged type sensor)
- ✧ Hole-cutting Size: 92×92mm
- ✧ Weight: 0.9Kg(instrument), 4.6kg (flow type sensor), 4.1kg(submerged type sensor)

- ◇ Protection level: IP65(controller), IP67(flow type sensor), IP68(submerged type sensor)

## 4 Instrument Installation

### 4.1 Installation of Main Unit

The instrument should be installed in a clean, dry, well-ventilated and vibration-free position, with no corrosive gas around.



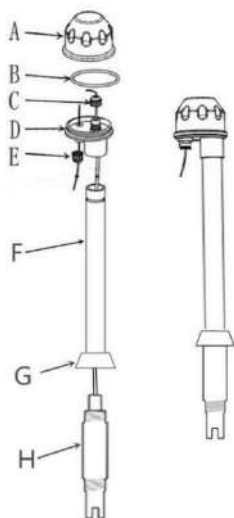
### 4.2 Installation of Probe

1. The sensor must be installed in a cool, dry and ventilative place.(flow type

sensor)

2. No bubble, steady flow rate and pressure is inquired for water point.(flow type sensor)
3. After cleaning the connection of the water outlet of the bottom of the sensor, in order to avoid it from permeating, please use raw material belts to twine on the thread of outlet connection.(flow type sensor)
4. The sensor is required to be installed indoors or some places where sunlight can not reach, because the strong infrared rays of sunlight will seriously affect the sensor measurement results.(submerged type sensor)
5. Because the sensor is make by 316L stainless steel, it is very heavy, please install it with a mounting bracket.(submerged type sensor)

**Installation method:**



A--The top lid of Junction box

B--O-rings

C--fastener of wire of sensor

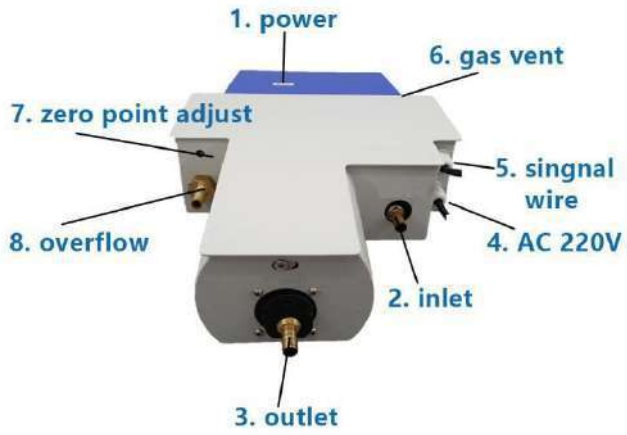
D--bottom lid of Junction box

E--Guard tube of wire of sensor

G-G1” thread connection

H-Sensor

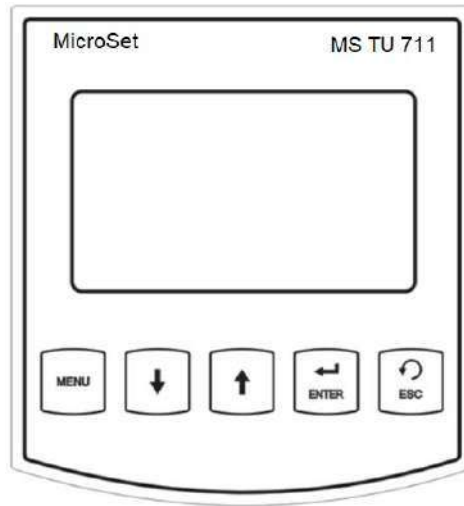




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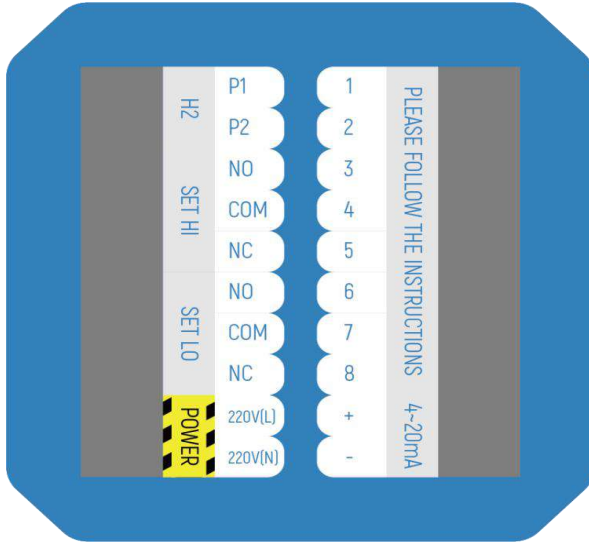
## 5. Instrument Panel and Wiring Instructions

The buttons of front side



1. Menu
2. DOWN: numerical reduction
3. UP: numerical increase
4. ENTER: Confirmation
5. ESC: return key

## Wiring instructions of the rear panel



P1: H2 Automatic cleaning normally open port	1. No Connection
P2: H2 Automatic cleaning common port	2. No Connection
HI NO: High point relay normally open port	3.RS 485 A of Sensor
HI COM: High point relay common port	4.RS 485 B of Sensor
HI NC: High point relay normally	5.empty

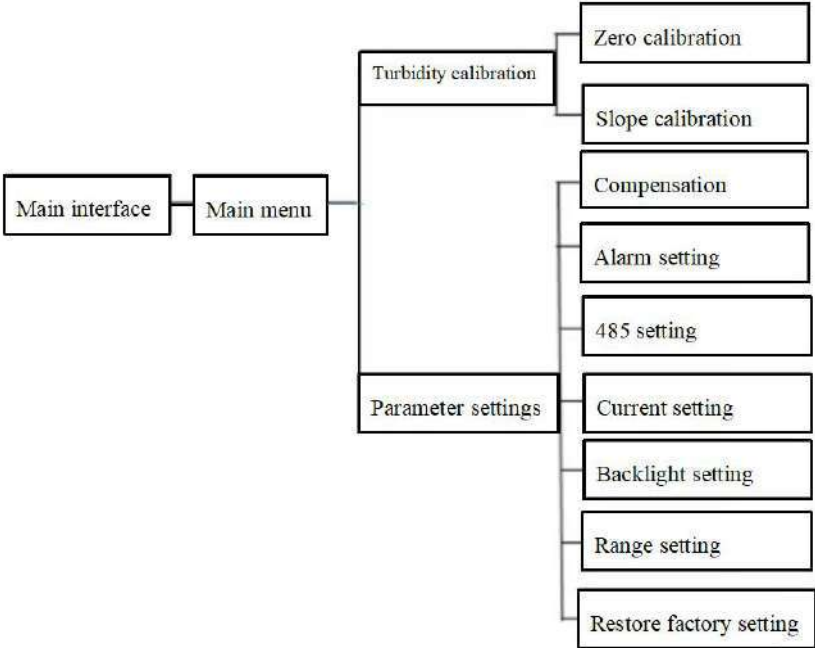
closed port	
LO NO: Low point relay normally open port	6. empty
LO COM: Low point relay common port	7. RS485 A Output
LO NC: Low point relay normally closed port	8. RS485 B Output
Power: 220V (L)	9. 4~20mA+ Output
Power: 220V (N)	10. 4~20mA-Output

Note: If you want RS-232 function, please select the appropriate RS-485 to RS-232 device. The RS-485 interface part of this instrument is compatible with MODBUS protocol. Please consult the manufacturer or dealer for details.

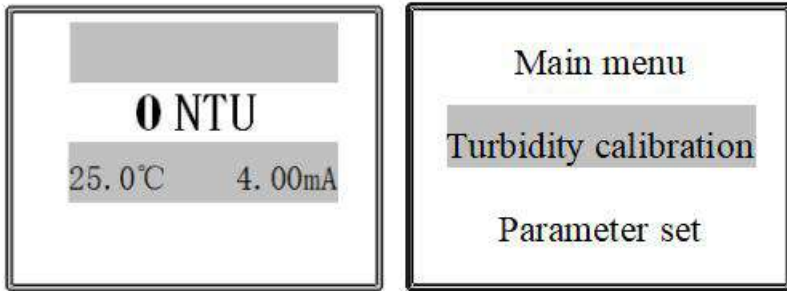
- 1) Make sure the wiring is correct before turning on the power. Incorrect wiring may cause damage to the meter
- 2) The Power Cannot be bypassed from high-power equipment, and the power line and signal line should be separated when wiring

# 6. Instrument Function Setting.

## 6.1 Menu Structure



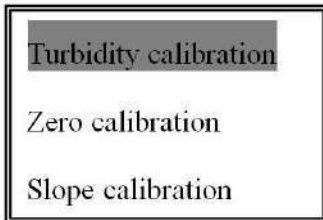
## 6.2 Main Interface and Main Menu



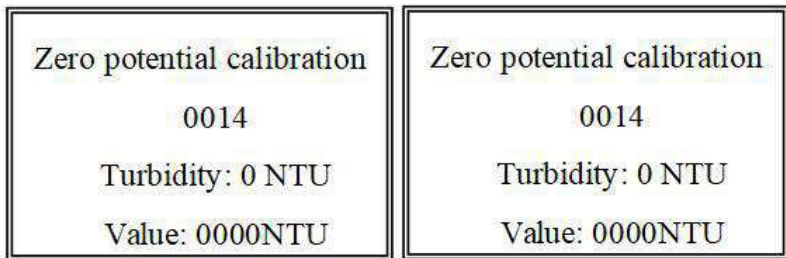
Turbidity value is the main display, temperature value, current value are the secondary display. The middle value is the turbidity measured value, 25.0 °C is the current temperature value, and 4.00mA is the current output value.

## 6.3 Turbidity Calibration

Because the zero potential and slope of the turbidity electrode are basically consistent. However, with the use process of electrode that will gradually change and perished. You need to calibration in this time so that protect accuracy of measuring. As following: Press the up and down keys in the main menu to select the turbidity setting and press ENTER.

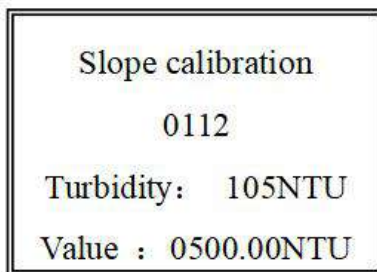
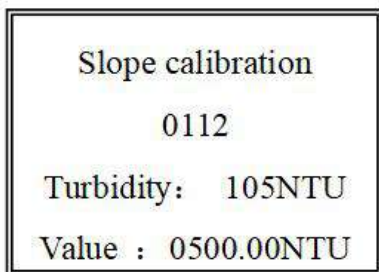


### 6.3.1 Zero Calibration



Zero calibration of turbidity, put the electrode in (such as distilled water, purified water, etc.), use the meter and press the ENTER, then press the MENU to pop up the cursor, press the up and down keys to modify, the default value is 0, usually not required Change, waiting the figure is stable, press ENTER. If there is a “saved” interface that the calibration is complete, and this dialog box will be similar in the future. press ESC return to the previous menu.

## 6.3.2 Slope Calibration



Enter the turbidity slope calibration menu. Before calibration, place the turbidity electrode in the turbidity standard solution of known concentration, press the ENTER key to enter the instrument, and then Press ENTER to pop up the cursor, move the cursor. The default value is 500NTU. Press the up and down keys to change to Know the concentration value, such as 25NTU, and wait for the turbidity value to stabilize and press ENTER to save the data. After the turbidity value is stable ( $\pm 1$  NTU), it indicates that it has been marked. Press the ESC return to the main menu.

## 6.4 Compensation Setting

Press the up and down keys in the main menu to select the parameter setting, press ENTER to enter the parameter setting menu, as shown below, the left picture is the first page, and the right picture is the second page. Press the up and down keys to select each setting. The first item is selected in this section.



1. Compensation setting
2. Alarm setting
3. 485 communication
4. Current output

5. Time of backlight
6. measure range setting
7. Restore factory setting

Press ENTER to the compensation setting. Press the MENU to pop up the cursor and move the cursor. Press the up and down keys to modify. Temperature compensation is divided into manual or automatic mode. Both modes cannot take effect at the same time. Press ENTER to save the data, press ESC return to the previous menu.

Compensation method: manual  
Temperature: 5.0°C

Compensation method: automatic  
Temperature: 5.0°C

## 6.5 Alarm Setting

Select the alarm setting in the parameter setting menu and press the ENTER. Press the MENU to pop up the cursor and move the cursor. You can press the UP and DOWN keys to modify it.

Upper limit alarm H:	1000
Delayed figure H:	0010
lower limit alarm L:	0000
Delayed figure L:	0000

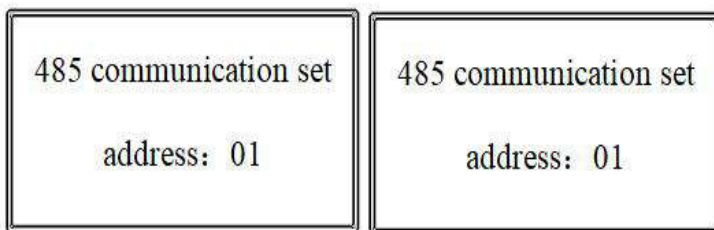
Upper limit H: Upper limit setting of warmer; Delay “H”: Delayed alarm of upper limit; lower limit L: Lower limit setting of warmer; Delay “L”: Delayed alarm of lower limit.(Note: Delayed figure was set between upper limit~lower limit.)

In order to avoid the relay from fluctuation or controlling the turbidity value of the solution, the instrument sets this function. The specific operation is as follows: Press the up and down keys adjust to delayed figure

Upper limit relay: It will be activated when the actual measured value is higher than the upper limit alarm setting value HIGH value, and the actual measured value will fall again below (Upper limit H value - Delayed figure H value).

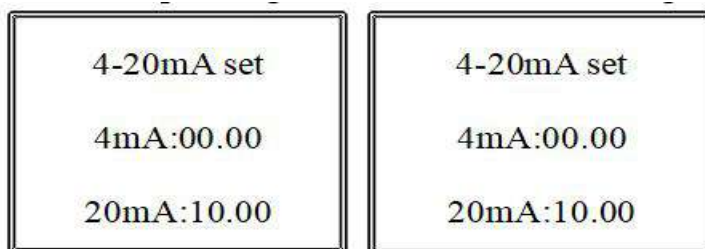
Lower limit relay: It will be operated when the actual measured value is lower than the lower limit alarm setting value LOW value, and the actual measured value will rise again when it rises above (lower limit L value + Delayed figure L value). Useful to extend the life of the relay or AC contactor. Therefore, the user must set the high, low and hysteresis according to the actual situation.

## 6.6 485 Communication Setting



Select the 485 communication setting in the parameter setting menu and press the ENTER. Press MENU to pop up the cursor, you can press the UP and DOWN keys to adjust. Communication address (hexadecimal), press ENTER to save the data, press ESC return to the previous menu. (Note: Please consult the manufacturer or distributor for specific protocol specifications)

## 6.7 Current Output Setting



The factory value of the 4-20mA output is corresponds to default measurement range of meter, but the user can arbitrarily set the corresponding value according to his own requirements to meet the industrial control needs.

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Press ENTER to pop up the cursor, move the cursor. You can press the up and down keys to modify. Press ENTER to save the data, press ESC return to the previous menu. Press the ESC return to previous menu.

Note: Output current (mA)

Forward control:  $I=16 \times (C-A)/(B-A)+4$        $4\text{mA} \leq I \leq 20\text{mA}$

Reverse control:  $I=16 \times (A-C)/(A-B)+4$        $4\text{mA} \geq I \geq 20\text{mA}$

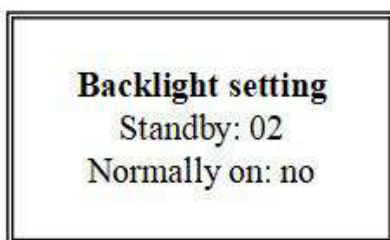
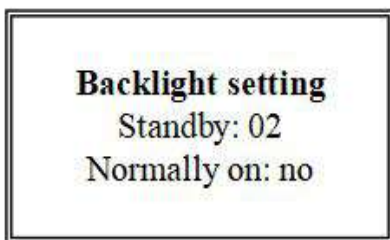
I is the output current value

C is the current measured PH value of the meter,  $0.00 \leq C \leq 14.00$ .

A is the value corresponding to 4 mA in the setting

B is the value corresponding to 20mA in the setting

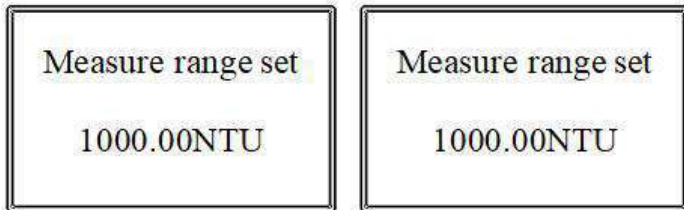
## 6.8 Backlight Setting



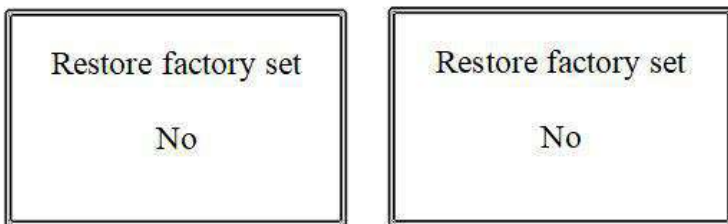
Select backlight setting in the parameter settings menu and press ENTER. Press MENU to pop up the cursor, move the cursor. You can press the up and down keys to modify. Press ENTER to save the data, press ESC return to the previous menu. Press the ESC return to previous menu. Backlight control allows the meter to save power, protect the display and extend life.

## 6.9 Range Setting

Select range settings in the parameter settings menu and press ENTER. Press the MENU to pop up the cursor and move the cursor. You can press the up and down keys to modify. Press ENTER to save the data, press ESC return to the previous menu. The user can modify the range of the meter display as needed. This function is only valid for the meter, and the sensor range cannot be modified on the meter.



## 6.10 Restore Factory Setting



If the instrument has misoperation, miscalibration or incorrect data detection during use, the instrument can be resaved to factory settings. Press ENTER to pop up the cursor, move the cursor, change “No” to “Yes” and press ENTER to resave the factory settings. At this point, the meter needs to be

matched with the electrodes for calibration and other settings.

## 7. Daily Maintenance Points

- ✧ The instrument is generally calibrated before leaving the factory and can be used directly by user.
- ✧ On normal circumstances, the instrument has a low failure rate.

### **Maintainance:**

- ✧ If the instrument is used by first time, please let it electrified for 24H before testing.
- ✧ After the sensor is operationally, value of the 4-20mA output is corresponds to default measurement range of meter.
- ✧ Zero adjustment: Gyrating the zero adjustment potentiometer of the flow type sensor, make the value of the controller show a same number as the sample water.
- ✧ After the instrument has been used for some time, the optics lens of sensor may stick to dirt, and it will have a big influence to measuring value, so we need to clean it at a regular time.
- ✧ submerged type sensor: Clean the optical path lens with a tweezers with an alcohol cotton ball until it is clean.
- ✧ Flow type sensor: First of all, the sensor need to be cut off power and turn off water. Second, After the water is drained, twist the outlet connector module at the bottom of the sensor, illuminate the inside of sensor, and clean the optical path lens with a tweezers with an alcohol cotton ball, use brush cleaning the deposit on the inside of the flow cell until it is clean. Last, when the joint module is replaced, the raw material tape should be re-added at the thread to avoid leakage.

- ✧ After finished cleaning, please re-calibrate the sensor.
- ✧ Do not disassemble the instrument to avoid affecting or damaging the performance of the instrument.

## 8. Troubleshooting Steps

<b>phenomenon</b>	<b>reasons</b>	<b>Elimination methods</b>
The indicator light is not on	The power is not connected, and the power plug is not in good contact with the outlet.	Plug in the power cord and check the plug and socket
Digital wave	There are bubbles in the water tank or the water level is too low	Turn the water inlet small, give some space to venting. And make sure overflow have water blow out.
Measurement error	Zero is not calibrated, or the calibration potentiometer is malfunctioning	Re-calibration







# TEST / CALIBRATION CERTIFICATE

Calibration Date: \_\_\_ / \_\_\_ / 20\_\_\_

## ITEM DETAILS

Name : Turbidity analyzer

Make : MicroSet

Model : MS TU 711

Serial No : \_\_\_\_\_

## READING

Standard Solution NTU	Observed Reading Before Calibration NTU	Observed Reading After Calibration NTU

RS 485 MODBUS Working OK

Relay 1 Working OK

Relay 2 Working OK

Calibrated By,

*Sign*

*Seal*

*Initials*





## WARRANTY CERTIFICATE

MicroSet warrants each instrument to be free from defects in material & workmanship. This obligation to servicing or part returned to the company for that purpose & making good any parts thereof which shall be within warranty period, returned to the company under a written intimation & which to the company's satisfaction to be found defective. The company reserves the right to decide the workplace for the repair work. The freight for defective material will have to be borne by the buyer, & the transit risk for such material will rest with the buyer. The warranty is applicable only if the instrument is used within its specification.

**THIS WARRANTY IS VALID UP TO 12 months from date of Tax Invoice (Sensors Carry No Warranty since Consumables)**

### ITEM DETAILS

Name : Turbidity analyzer  
Make : MicroSet  
Model : MS TU 711  
Serial No : \_\_\_\_\_

*Seal*