OAKTON®

T100WL Portable Turbidity Meter
35635-10
Instruction Manual

CE ISO 9001: 2015 IP67 WATERPROOF

Table of Contents

***Fully charge the battery before first-time use.**

1 INTRODUCTION

Thank you for purchasing Oakton T100WL Portable Turbidity Meter (hereafter referred to as the instrument). The instrument uses tungsten filament lamp as the light source and 90° scattering method, which is compliant with U.S EPA 180.1 method for the determination of turbidity in drinking, ground, surface, and saline waters, domestic and industrial wastes. It is suitable for on-site and laboratory use.

The instrument provides accurate results with simple measurement, calibration, and data management, giving you unparalleled confidence in test results and ease of use.

- Intelligent functions such as automatic calibration, operation navigation, parameter setup, real-time clock display, calibration date check, automatic power off, low voltage indication, and a replaceable tungsten filament lamp.
- Large TFT color screen with blue background for measurement mode, green background for calibration mode.
- Operation guidance and reminders in the process of calibration, measurement and parameter setting.
- TruRead measurement mode automatically takes multiple consecutive readings, and calculate their average, minimum and maximum value, as well as displaying each set of data in a brief test report. TruRead is a much better way to determine the true turbidity of your samples, rather than relying on just one reading. It's especially suitable for sample solutions with rapid settling and continuous measurement changes.
- Zero turbidity error reminder: the instrument has zero-point calibration and zero-point error reminder to ensure measurement accuracy for low turbidity solutions.
- 200 sets of data storage with USB data output to PC (Windows-based).
- 3.7V rechargeable lithium battery can supply power for over 20 hours of continuous measurement. The battery life is 5 times longer compared with tungsten lamp turbidimeter in the market using AA alkaline batteries.
- Multi-language operating system, including English, Spanish & Simplified Chinese.
- The instrument’s structure meets IP67 water-resistant grade and is suitable for use in harsh environments.
- Everything comes in a rugged carrying case, including accessories such as calibration solutions, test vials, USB charger, and more.

2 TECHNICAL SPECIFICATIONS

Specification	Description
Measurement Method	90° scattering measurement, U.S EPA180.1 compliant
Light Source	Tungsten filament lamp
Measuring Range	0 to 1000 NTU (FNU), automatic range switch 0.01 to 19.99 NTU(FNU) 20.0 to 99.9 NTU(FNU) 100 to 1000 NTU(FNU)
Accuracy	≤ ±2% of reading+ stray light
Repeatability	≤ ± 1% of reading or 0.02 NTU(FNU) (the greater of the two)
Resolution	0.01/0.1/1 NTU (FNU)
Stray Light	≤0.02 NTU (FNU)
Calibration Standard	AMCO Polymer or Formazin Solution：0, 20, 100, 400 and 800 NTU (FNU)
Detector	Silicon photovoltaic
Measuring Mode	Normal measurement and TruRead measurement
Data Storage	200 groups
Data Output	USB to PC
Calibration Record	Calibration date and time
Display	TFT color screen
Sample Vial	Φ25×60 mm，high borosilicate glass with lid
Sample Vial Volume	18 ml
Power supply	3.7V Rechargeable lithium battery
Working Condition	Temperature: 0 to 50°C（32°F to 122°F）; Relative humidity: 0 to 90% at 30°C, 0 to 80%at 40°C, 0 to 70% at 50°C, no condensation
Instrument sealing grade	IP67
Certificates	ISO9001:2015 and CE
Limited Warranty	2 years
Dimension and Weight	Meter: (90×203×80) mm/385g Test Kit: (310×295×110) mm/1.5kg

3 INSTRUMENTATION ILLUSTRATION

3.1 Summary

Diagram-1

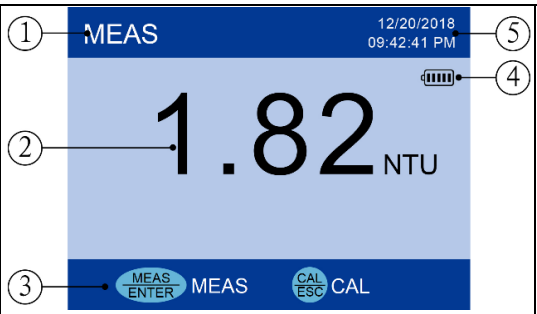
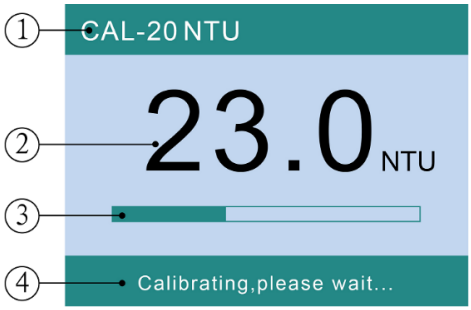
①	Flip cover of the sample vial holder (Close the cover when measuring)	⑦	Dust proof plug (Take off the plug when measuring)
②	Housing	⑧	Sample vial holder
③	Display	⑨	Calibration vials or sample vials
④	Keypad	⑩	Positioning mark (Align the mark with the mark on the calibration vial or sample vial)
⑤	USB Port	⑪	Built-in lithium battery (Rechargeable)
⑥	Lamp cover		

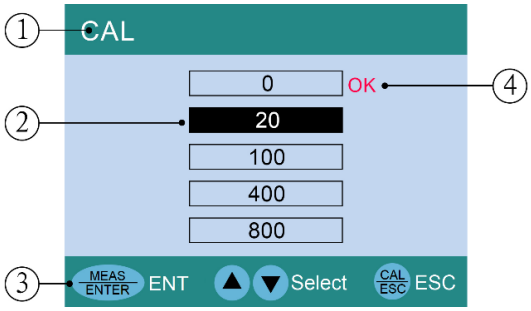
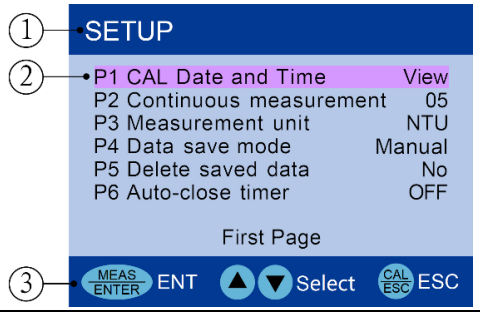
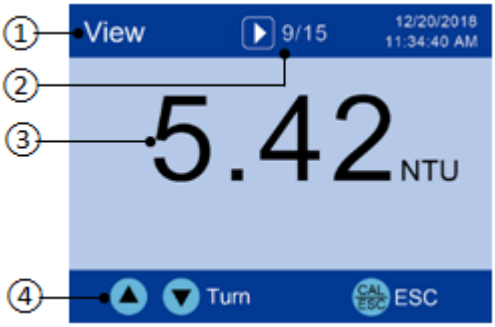
3.2 Configuration

Diagram-2

①	Calibration Solutions: 0.0, 20, 100, 400, 800 NTU
②	Carrying case
③	T100WL Turbidimeter
④	Microfiber cloth
⑤	Power adaptor (5V 1A)
⑥	Software flash drive
⑦	Silicone oil (10 ml)
⑧	Sample vials×6
⑨	USB Cable (under the meter)
⑩	User Manual

3.3 Display Mode

Measuring Mode		① Measurement Mode ② Measurements and unit ③ Operation Guide ④ Battery icon ⑤ Date and time
Calibration Mode		① Calibration solution ② Measurements and unit ③ Progress bar ④ Operation guide

Keypad	Functions	
Calibration Menu		① Calibration Mode ② Standard values ③ Operation guide ④ Finished calibration indicator
Parameter Setup		① Parameter Setup ② Menu ③ Operation guide
Data Recall		① Data Recall ② Saved data numberings ③ Saved data ④ Operation guide

3.4 Keypad

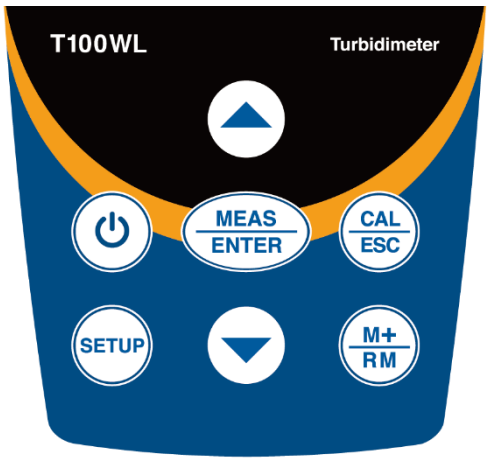


Diagram-3

⏻	● Power on/off
CAL/ESC	● In measurement mode, press to enter or exit calibration mode ● In parameter setup and data recall mode, press to return to measurement mode
MEAS/ENTER	● In measurement mode, short press to perform single measurement; long press (>3s) to perform continuous measurement. ● In calibration mode, press to confirm calibration. ● In parameter setup mode, press to confirm change.
▲ ▼	● In calibration mode, press to select which standard to calibrate. ● In parameter setup mode, press to scroll on the menu options. ● In recall mode, press to view store number
SETUP	● Press to enter parameter setup mode
M+/RM	● Short press to save measured data; long press (>3s) to enter data recall mode

3.5 Power supply

The instrument adopts 3.7V rechargeable lithium battery.

a) Charging mode

· Charge via Power adaptor: connect instrument and power adaptor with a USB cable. Adaptor specification: AC110 to 240V, 50/60Hz, output: 5V/1A.

· Charge via Computer: connect instrument and a computer with a USB cable.

Under normal circumstances, it is recommended to use the power adapter to charge the lithium battery to ensure its performance. When the lithium battery voltage is lower than 3V, the instrument will shut down, and it's time to recharge it.

b) Battery capacity indication

· Battery capacity icon:  please recharge the battery when  icon displays to ensure measuring accuracy; when  icon displays, the battery must be recharged, otherwise the instrument can't work properly.

· If charging the instrument when it is turned on,  icon will be displayed. Users can continue to use the instrument while it is being charged.

· If charging the instrument when it is turned off, "Charging**.....**" will be displayed, and "Charging is completed" will be displayed after a full charge.

3.6 Data Log, Recall, and Deletion

a) Manual date logging and Automatic data logging

In parameter setup P4, users can select manual or automatic data logging mode. In the manual mode, after measurement is finished, press M+/RM to save the data (also the measurement interface); In

automatic mode, the data (also the measurement interface) will be automatically saved after each measurement. The instrument has two types of measurement mode: normal measurement (as in Diagram 4) and TruRead measurement (Diagram 5). 12 in Diagram 4 means that 12 sets of data has been saved. The storage number only indicates the number of measurement interfaces, which is not equal to the number of actual stored data. In normal measurement mode, one serial number corresponds to one measurement data. In TruRead measurement mode, one serial number corresponds to multiple measurements (according to user's setting) in the measurement interface. The data, as shown in Figure 5, has 10 measurements. Obviously, for one measurement interface, the memory storage of the normal measurement is different with that of TruRead measurement. The below table shows the amount of storage for each measurement mode.

Measurement Mode	Storage Capacity
Normal	200 sets
TruRead (5 times measurement)	100 sets
TruRead (10 times measurement)	61 sets
TruRead (15 times measurement)	44 sets
TruRead (20 times measurement)	34 sets

Therefore, when the instrument is stored in a mixture of measurement mode, The storage capacity of measurement interface is different, and it's between 34 to 200. If the stored value is full, FULL will flash to remind you that the storage is full and you need to delete it before saving new data.

b) Data Recall

In measurement mode, long press M+ RM (>3s), the instrument will display the saved measurement interface. As shown in Diagram 6, 9/15 means there are 15 saved measurement interfaces and it's currently showing the 9th one. Press ▲ or ▼ to check other data. Hold ▲ or ▼ to quickly check other data. Press CAL ESC to return to measurement mode.

Diagram 4

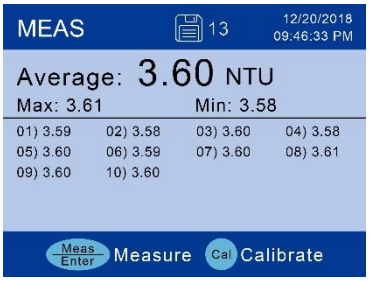


Diagram 5

Diagram 6

c) Data Deletion

Once the data storage is full, users need to delete the data in order to save new data. Select Yes in P5 in parameter setup and press MEAS ENTER to confirm the deletion (will delete all of the saved data, non-reversible).

3.7 Setting for first-time use.

The instrument should be fully charged before first-time use. Check and adjust settings for the following items: date, time, system language, etc. See the detail in Section 6 Parameter setup.

4 CALIBRATION

4.1 Preparation for Calibration

a) Calibration point

The instrument has 5 calibration points: 0 NTU, 20 NTU, 100 NTU, 400 NTU, and 800 NTU. Among them, 0 NTU point uses AMCO 0.0 NTU calibration solution or laboratory distilled water, and the remaining 4 calibration points use AMCO polymer solutions. Note that the cap of the 0.0 NTU solution vial can be unscrewed. After the solution is invalidated, users can replace the 0.0 NTU calibration solution or laboratory distilled water. The 0.0 NTU calibration solution can be purchased from the supplier; For the remaining 4 calibration solutions, their vial caps cannot be opened. Simply dispose the solutions after they are expired and buy new ones from your supplier to replace.

b) Replace zero turbidity solution

- Replace 0.0 NTU calibration solution: open the vial cap, pour out the original solution, add 1/2 distilled water, cover the cap and shake the vial to rinse it and pour out the water. Repeat it 3 times. Shake off the distilled water in the vial. Pour in new 0.0 NTU calibration solution and close the vial cap.
- Replace laboratory distilled water: open the vial cap, pour out the original solution, add 1/2 distilled water, cover the cap and shake the vial to rinse it and pour out the water. Repeat it 3 times. Shake off the distilled water in the vial. Pour in new laboratory distilled water and close the vial cap.
- The accuracy of 0.0 NTU calibration solution and laboratory distilled water is same. But 0.0 NTU calibration solution has 6 to 12 months of shelf-life, distilled water can only be used for several days.

c) Clean vial surface

Apply a small drop of silicone oil on the surface of the vial and wipe it off with a micro-fiber cloth to evenly distribute the silicone oil on the surface so as to cover smudges or scratches, which helps light scattering. But please pay special attention to the following points:

① The silicone oil applied should not be too much. After wiping with micro-fiber cloth, please wipe with filter paper or high-quality tissue paper to clean off. Excessive residual silicon oil on the vial surface will affect the measurement accuracy.

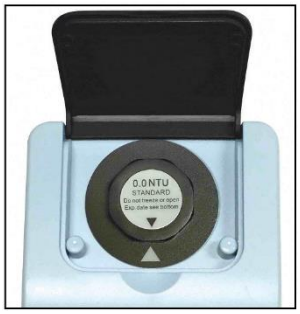
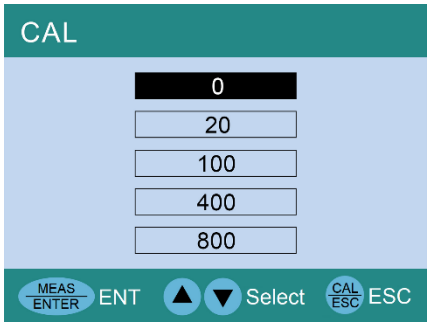
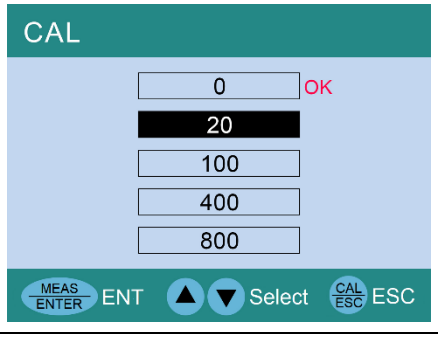
② It's not necessary to use silicone oil for each calibration and measurement. Apply silicone oil every several days or once a week. In between, just clean the surface with filter paper or high-quality tissue paper.

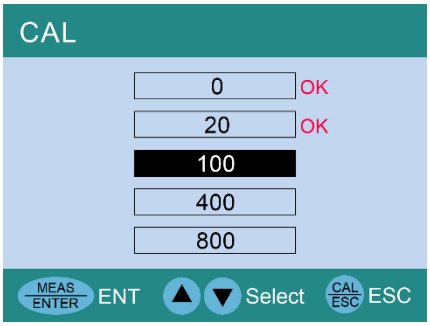
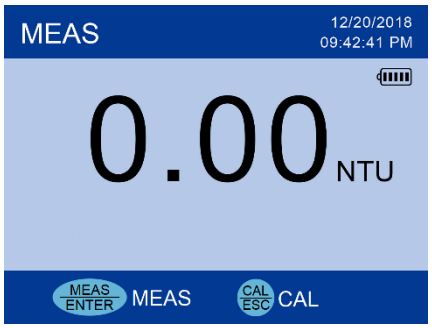
③ Clean the calibration vial and sample vial together and keep the steps and actions consistent to achieve same degree of cleanliness.

④ Stability of calibration solutions

The U.S EPA approved AMCO polymer standard calibration solution is very uniform and stable. It does not precipitate, drift or condense. It can be used directly without shaking or fliping the vial (to make the solution even). For polymer calibration solutions that have not been used for a long time, slowly flip the vial twice and let it stand for 2 minutes. Be careful not to shake the solution vigorously, as this will create air bubbles which destabilize the measurement; For 0.0 NTU calibration solution, do NOT shake or flip. If using Formazin calibration solution, as it tends to precipitate easily, each time users must flip and shake the vial to make the solution even. But sediment can still occur during tests and make the measurement unstable. Users need to have rich experience with Formazin calibration solutions.

4.2 Calibration Procedure (Take 0 NTU and 20 NTU as an example)

<table>
<tr><td colspan="2">1) Instrument warm up: Power on the instrument, set parameter P2 (continuous measurement time) to 5 times. Long press MEAS ENTER to start continuous measurement (don't insert the vial), then wait for 3 to 5 minutes.</td></tr>
<tr><td>2) Open the flip cover and place the 0.0 NTU calibration vial. Align the arrow on the vial lid with the one on the sample vial holder and close the flip cover.</td><td>  </td></tr>
<tr><td>3) Press CAL ESC to enter the calibration menu, the cursor is at 0 NTU. Press MEAS ENTER to start calibration.</td><td> 
</td></tr>
<tr><td>4) After calibration is done, press MEAS ENTER to confirm. The instrument will return to the calibration menu (see Diagram on the right side). The OK sign indicates that 0 NTU has been calibrated and prompt to calibrate 20 NTU.</td><td> 
</td></tr>
</table>

5) Place the 20.0 NTU calibration vial in the sample vial holder, press MEAS ENTER to start 20 NTU calibration. After calibration is done, press MEAS ENTER to confirm. The instrument will return to the calibration menu (see diagram on the right side). The OK sign indicates that 20 NTU has been calibrated	
6) If you want to continue to calibrate 100, 400 and 800 NTU, place the 100 NTU calibration vial in the sample vial holder and press MEAS ENTER to calibrate. After calibration is done, press MEAS ENTER to confirm; repeat the steps to calibrate 400 NTU and 800 NTU. After calibration is done, press CAL ESC to return to measurement mode.	
7) Press CAL ESC to exit calibration mode, the instrument will return to measurement mode as shown in Diagram on the right side.	

4.3 Notes for Calibration

a) **Calibration point verification:** The calibration point can be verified after the calibration is completed. If the calibration point has a large error, enter the calibration mode and repeat the calibration. For calibration point accuracy, users can refer to the following standards:

Calibration point	Accuracy for reference
0 NTU	≤0.05 NTU
20 NTU	≤±0.2 NTU
100 NTU	≤±2 NTU
400 NTU and 800 NTU	≤±5 NTU

b) **Calibration point selection:** The instrument has been calibrated at full range before leaving the factory. For subsequent use, you can select 2 or more points as needed, as long as the estimated measurement range is between the two calibration points. In calibration setup mode, press ▲ or ▼ to select the calibration point.

c) **Low turbidity calibration requirement**

- For low turbidity measurements (measurement less than 2 NTU), please test 0.0 NTU calibration solution. If the accuracy is not meeting requirements, calibrate the instrument at 0.0 NTU and 20.0 NTU before test; then use 1# or 2# vial for measurement.

- Using the same sample vial to calibrate and measure can eliminate the error caused by different vials, thus reaching higher accuracy. For example, add distilled water to 1# vial for calibration and then add sample solution to 1# vial for measurement. Note that the solution vial should be rinsed thoroughly when changing solutions.

d) **Zero Turbidity Error Reminder:** 0 NTU is the reference point for low-turbidity measurement. Due to the complexity of turbidity measurement, various inaccuracies resulting from instruments, solutions, vials, and operations can cause large errors at the 0 NTU point, which has a great impact on the measurement accuracy of low turbidity solutions. When the reading is displayed as 0.00 NTU, if a positive error occurs, a 0.0 NTU calibration solution can be used for verification test. If a negative error occurs, it cannot be verified. For this instrument, there is a Zero Turbidity Error Reminder function. If the negative error at the zero point exceeds the preset value, it will prompt users to recalibrate 0.0 NTU. At this time, users can press MEAS/ENTER to measure 1 or 2 more times. If the prompt appears continuously, please recalibrate 0.0 NTU. In addition, compared with other calibration solutions, The 0.0 NTU solution is more prone to deterioration and error. When the 0.0 NTU solution is found to be turbid or flocculent, or if it is judged that it may be out of tolerance based on the experience of sample tests, please replace the 0.0 NTU solution in time according to the requirements in Section 4.1b.

e) **High turbidity calibration requirement:** For turbidity measurement greater than 2 NTU, it is recommended to calibrate once a week, or to test a calibration solution close to the sample solution. If the error is large, the instrument needs to be recalibrated.

f) The instrument does not automatically recognize the calibration solution. If the wrong solution is selected for calibration, the measurement will be completely wrong. In this case, it can be restored by recalibrating with the correct calibration solutions.

g) Place the instrument on a flat and level surface. Do not hold the instrument in your hands while operating.

h) If using Formazin standards for calibration, please note that the diluted Formazin standard is unstable. Please make sure to use the freshly made Formazin standard to ensure calibration accuracy.

5 TURBIDITY MEASUREMENT

5.1 Sample Vial Handling

a) 6 sample vials are included in the test kit. The cap is marked with 1# to 6#, and the bottom of the vial also has the same number. The number of the vial and the cap should always be the same. *Pay attention that 1# and 2# vials are only for low turbidity solution measurement. (< 2 NTU)

b) The vial has been rigorously cleaned and sterilized. They can be used directly for the first time. For subsequent uses, follow the steps below to perform a thorough cleaning.

- Clean the inside and outside of the sample vial holder with detergent → rinse with distilled water or deionized water multiple times → Rinse the vial twice with the sample solution → Pour the sample solution into the vial → Close the cap.

5.2 Measurement Preparation

a) Collect the sample solution with a clean container and add the solution to the 4/5 of the vial (about 18ml), see Diagram 7. Then close the lid.

b) Before the measurement, users can slowly flip the sample vial a few times and let it stand for 2 to 5 minutes to eliminate potential air bubbles (see Diagram 8).

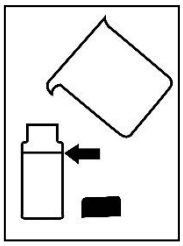


Diagram 7

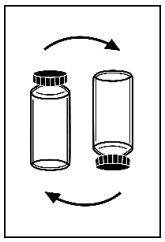


Diagram 8

c) Clean off the surface of the vial to ensure it is dry, clean and free of stains. Apply a small drop of silicone oil on the surface of the vial and wipe it off with a micro-fiber cloth. Then wipe again with filter paper or high-quality tissue paper. See section 4.1(c) for details.

5.3 Measurement Mode

a) Normal Measurement Mode

Press MEAS ENTER , the screen will display the progress bar, and the measured value will be displayed in 20 seconds. To take the next measurement, press MEAS ENTER again.

b) TruRead Measurement Mode

Long press MEAS ENTER and release the key when you hear a beep (see Diagram 9.1), then enter TruRead mode. For example, if the number of continuous measurements is set to 20 times in parameter setting P2, a measured value will be displayed every 20 seconds. Diagram 9.2 is the third measurement. Diagram 9.3 is the display interface at the end of TruRead measurement. The average, maximum and minimum values will be displayed along with a list of 20 measured values. TruRead measurement mode can be used for observing the stabilizing process of turbidity, and can also be used for testing rapid-settling solutions.

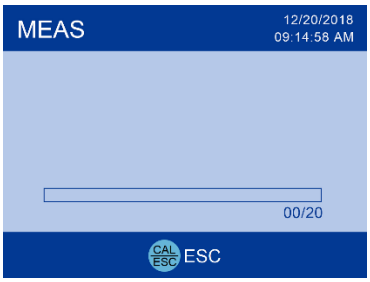


Diagram 9.1

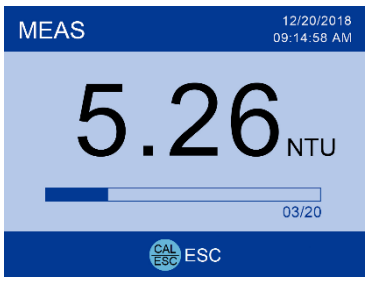


Diagram 9.2

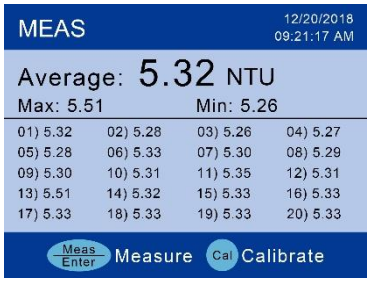


Diagram 9.3

c) We Recommend using TruRead Measurement Mode

Turbidity measurement is a complex analytical measurement. Its error and stability are related not only to the design of the instrument, but also many other factors such as solution uniformity and precipitation, stray light, air bubble interference, sample vial contamination, optical errors, operation technology and more. Therefore, using normal measurement mode will obviously result in a larger error. For this reason, we recommend using TruRead measurement mode with 5 times continuous measurement for regular tests, that is, set the continuous measurement to 5

times in parameter setting P2, and read the average value each time to improve the measurement accuracy. Compare the maximum and minimum values at the same time. If the difference is too large, it means that the measured value is not reliable, the solution may be unstable or there might be other factors affecting the measurement. You need to check the root-cause and measure again. For rapid-settling or continuously changing solutions, set continuous measurement for 10, 15 or 20 times.

5.4 Notes for Measurement

a) **Keep the sample stable**: After the vial is placed into the sample cell, it is recommended to wait for 1 to 2 minutes before calibration, as the solution will experience some shaking when the vial moves, which may result in inaccurate measurements.

b) **Sample Vial cleaning requirement**: Sample vial must be rigorously cleaned and free from smudges and scratches. When wiping, user should grip the cap and bottom to avoid leaving fingerprints on the surface of the vial. Its surface should be applied with a drop of silicone oil be wiped with a micro-fiber cloth. After that, please clean with filter paper or high-quality tissue paper. See section 4.1(c) for details.

c) **Mixing and Degassing**: Samples should not be vigorously shaken or vibrated. It is recommended that users gently shake the sample vial to make solution evenly distributed. Air bubbles in solution will cause big error to turbidity measurement. So the vial should be left stand still for 2 to 5 minutes to eliminate potential air bubbles before measuring. But mixing and degassing simultaneously is a difficult process to handle, especially for solution with precipitates, which requires some operating experience or make some limits in test conditions. For example, limit the mixing condition and waiting time for degassing to be the same before comparing measurements.

d) **Other Requirements**

- On the premise of ensuring evenly distributed samples, sample solution should be measured immediately to prevent temperature changing and precipitates from affecting measurements.
- Avoid sample dilution for measurement as much as possible.
- Avoid operating under direct sunlight.
- Do not pour solution into the sample vial holder. Sample vials must be used for measurement.
- Please do not wash the sample vial holder as this may damage its optical structure.

6 PARAMETER SETUP

6.1 Operation

Press (SETUP) to enter parameter setup mode → press (▲) or (▼) to switch P1-P2-...P9 → press (MEAS ENTER) to enter each parameter → press (▲) or (▼) to make changes → press (MEAS ENTER) to confirm → press (CAL ESC) to return to measurement mode.

6.2 Parameter Setup Reference Table

Symbol	Parameter	Content
P1	Last calibration data and time	View
P2	Continuous measurement	5-10-15-20
P3	Measurement unit	NTU-FTU
P4	Data logging mode	manual-automatic
P5	Delete saved data	No-Yes
P6	Auto-power off timer	10-20-30-OFF
P7	Select language	English-Spanish-Chinese
P8	Date setting	/
P9	Time setting	/

6.3 Parameters Description

P1 ─ calibration date and time: users can check the date and time of last calibration

P2 ─ Continuous measurement: users can select the number of times for continuous measurements (5, 10, 15 or 20 times).

P3 ─ Measurement Unit: users can select which unit to use: NTU or FTU

P4 ─ Data logging mode: users can select automatic data logging mode or manual data logging mode (see section 3.6 for details)

P5 ─ Delete saved data: select Yes to delete all the saved data (non-reversible)

P6 ─ Auto. close timer: users can select in how soon the instrument will turn off automatically if there is no operation: 10 minutes, 20 minutes, 30 minutes, or off; when selecting off, the instrument can only be turned off by pressing the power button.

P7 ─ select language: users can select English, Spanish, or Chinese as the system language.

P8 and P9 ─ set up date and time: in the setting process icon ◆▶ indicates to switch between date and time, icon ▲▼ indicates to change the digit of date and time.

7 DATA OUTPUT VIA USB PORT

7.1 Display Interface

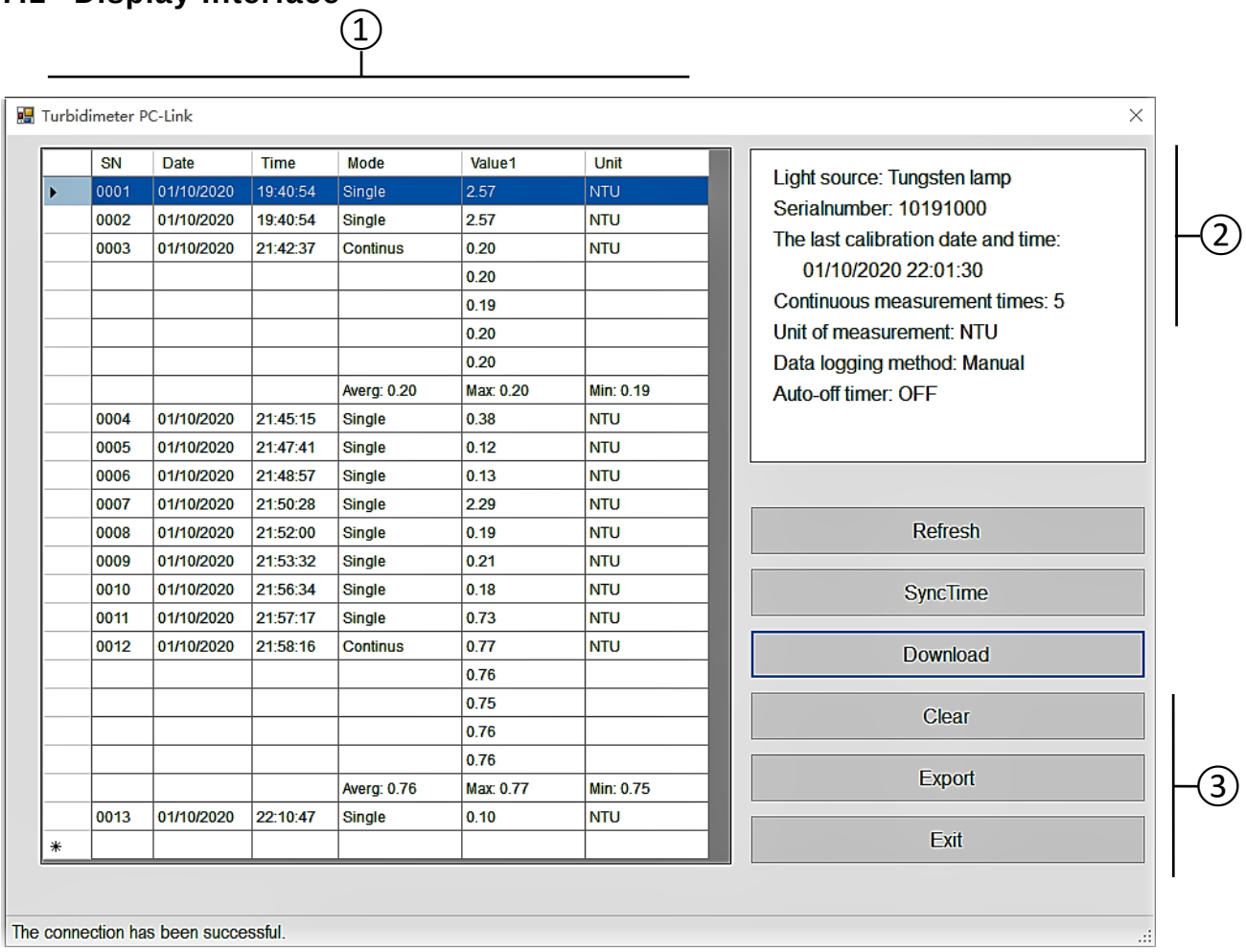


Diagram 10

①— Display area for saved data

To display numberings, date, time, measurement method (normal measurement or continuous measurement), measured values, and measurement unit. For continuous measurement, average, maximum, and minimum values will also be displayed.

②— Instrument serial number, last calibration information and parameter setting information.

③— Function buttons

7.2 Operation Key in Software Interface

Refresh — Port reset key. When the instrument and computer are not connected, click to connect.

SyncTime — Sync time key, click to sync computer time with instrument time.

Download — Download key, click to send data from instrument memory to computer.

Clear — Clear key, click to delete data saved in computer (data saved in instrument will not be deleted).

Export — Export key, click to export the saved data to computer in a Microsoft Excel document.

Exit — Exit key, press to exit PC-Link program.

7.3 Install Software

The instrument uses Turbidimeter PC-Link communication software. It is only compatible with Windows-based operating system. The communication port is USB. Copy and paste the program files from the USB drive to the computer. Connect USB cable to the instrument and computer, open Turbidimeter PC-Link.exe, the instrument will connect with computer automatically.  icon will be displayed at the top of LCD screen. If the instrument cannot connect with computer, please click "Refresh" key or install the relevant software driver included in the USB drive.

7.4 Run Software

Click Download key, all data in the instrument memory will be sent to the computer. When the program is running, all measurement information will be sent to the computer via USB. There is no data storage limit and the data will not be saved in the instrument. In Manual data logging mode, press 

key after measurement is completed to save data in the computer; in Auto. data logging mode, data will be automatically saved in the computer after each measurement is completed. For TruRead measurement mode, it will save all the measured values along with maximum, minimum and average values.

7.5 Data Processing

Click Export key to export saved data to a Microsoft Excel document. The data can be further analyzed, and printed.

8 LAMP REPLACEMENT

8.1 Light source check

Observe the light source on the left side of the sample vial holder as in Diagram 11. Turn on the instrument, and press MEAS ENTER. The light source will light up for 5 seconds. If it's not lighting up or it's flashing, please replace the lamp.

8.2 Lamp Replacement

The tungsten filament lamp module (sold separately) is shown as in Diagram 12. The lamp hole and socket are as in Diagram 13. Diagram 14 shows you how to replace the lamp.

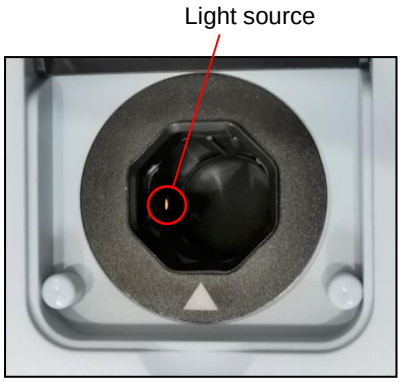


Diagram 11
Check light source

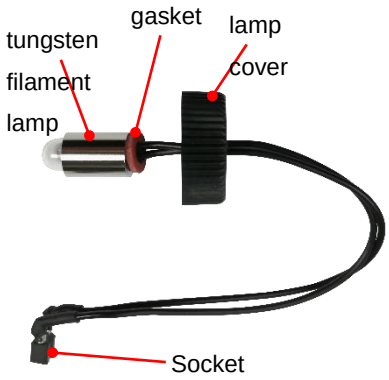


Diagram 12
Tungsten filament lamp module

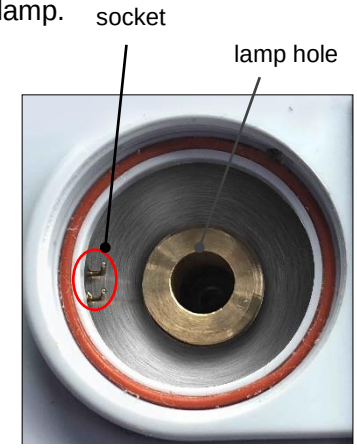
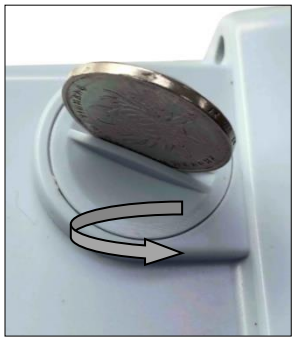
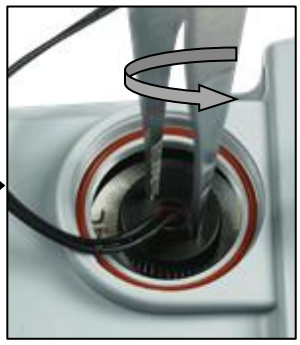


Diagram 13
lamp hole and socket



Unscrew the lamp cover with a coin

Use a tweezer to unplug the socket



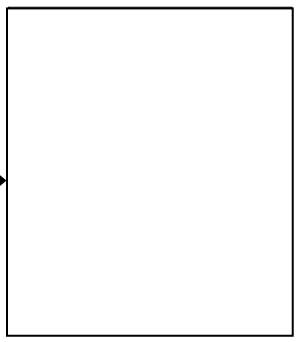
Use a tweezer to unscrew the lamp cover.

Take out the old tungsten filament lamp module

Install the new tungsten filament lamp module.

Close the lamp cover and screw tight with a tweezer.

Use a tweezer to plug wire into the gap and plug in the socket



Screw on the lamp cover tightly

9 WARRANTY

9.1 From the date of purchase, the instrument is covered with a 2-year limited warranty and the calibration standards is covered with a 6-month limited warranty. Within the warranty period, repair, parts or product replacement will be made without charge due to malfunctions caused by manufacturing defects.

9.2 The above limited warranty shall not cover problems caused by improper use, accidental damage, and unauthorized repairs.