

MANTECH T10 TURBIDITY METER OPERATION MANUAL





GENERAL INFORMATION

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The manufacturer reserves the right to make changes in this manual and the products it describes at any time, without notice or obligation.

NOTICE

The manufacturer is not responsible for any damages due to misapplication or misuse of this product including, without limitation, direct, incidental and consequential damages, and disclaims such damages to the full extent permitted under applicable law. The user is solely responsible to identify critical application risks and install appropriate mechanisms to protect processes during a possible equipment malfunction.

Please read this entire manual before unpacking, setting up or operating this equipment. Pay attention to all danger and caution statements.

Failure to do so could result in serious injury to the operator or damage to the equipment.

Make sure that the protection provided by this equipment is not impaired. Do not use or install this equipment in any manner other than specified in this manual.

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1. TECHNICAL SPECIFICATIONS

Measurement method	Ratio determination using a primary nephelometric light scatter signal (90°) to the transmitted light scatter signal.
Reading units	NTU/ EBC
Lamp Source	Tungsten Lamp (White Light); LED Lamp (IR Light)
Method Conformity	EPA 180.1, ASTM D1889, SM 2130B (White Light); ISO 7027 and EN27027 (IR Light)
Detector	Silicon Photocell
Measuring Range	0 to 1000 NTU / 0 to 250 EBC
Resolution	0.01 on lowest range
Accuracy	± 2% of reading: 0 to 1000 NTU
Repeatability	± 1% of reading or 0.01 NTU
Automatic Reading	With user-defined intervals 0 to 250 seconds
Maximum uncertainty	± 2% of full scale
Display	LCD 2 lines / 16 characters
Response Time	Programmable 6 to 41 sec
Data Logger	Up to 1000 data
Auto ShutOff	Programmable from 1 to 60 min
Fast Cal function	Quick Calibration for single point
Software Functions	Signal averaging, "Fast Settling", results freezing, analyst and sample identification, calibration status, verification and calibration reminder, calibration history, password
Sample Required	15 ml vial with lid
Sample vials	Round borosilicate glass vial with screw and caps (Φ = 24,5 mm)
Power Supply	4 AA batteries or USB power supply cable
Indicator	Low battery indicator / battery exchange
Serial Output	USB
Storage Conditions	0 to 40°C (instrument only)
Dimensions	114 x 198 x 83 mm

2. INSTALLATION

2.1 BENCHTOP SETUP

1. Set the meter on a flat, clean surface.
2. Plug the meter into a wall outlet using the provided USB cable and a USB power adapter. Depending on country, a USB power adapter may be provided as well.
3. Alternatively, plug the meter into a computer USB outlet.

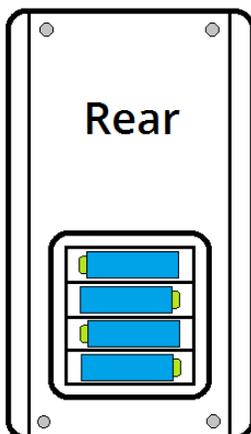


2.2 PORTABLE SETUP

1. With a Philips-head screw driver, remove the battery cover on the rear of the meter.



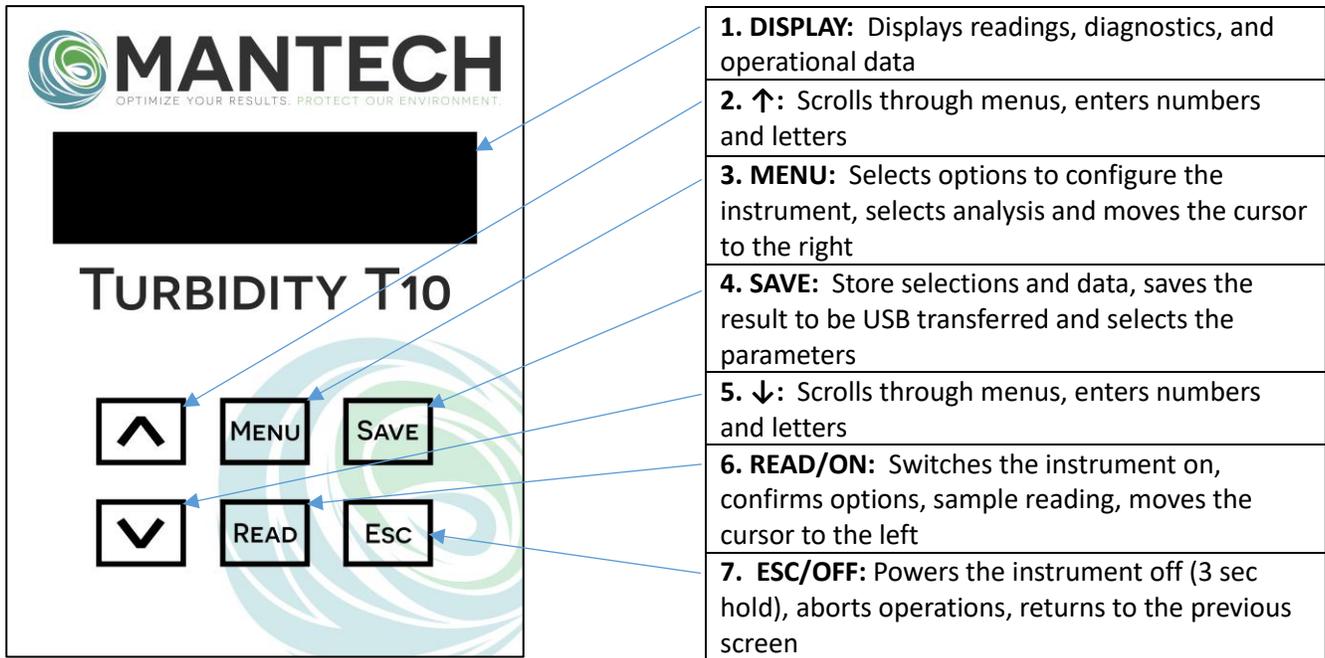
2. Install x4 AA batteries in the compartment, matching the orientation of the batteries to the diagram below.



3. Replace the battery cover, ensuring the screws are tight.
4. Place the meter face-up in the provided carry case.

3. USER INTERFACE AND NAVIGATION

3.1 INTERFACE DESCRIPTION



1. DISPLAY: Displays readings, diagnostics, and operational data
2. ↑: Scrolls through menus, enters numbers and letters
3. MENU: Selects options to configure the instrument, selects analysis and moves the cursor to the right
4. SAVE: Store selections and data, saves the result to be USB transferred and selects the parameters
5. ↓: Scrolls through menus, enters numbers and letters
6. READ/ON: Switches the instrument on, confirms options, sample reading, moves the cursor to the left
7. ESC/OFF: Powers the instrument off (3 sec hold), aborts operations, returns to the previous screen

3.2 MENU NAVIGATION

To access the instrument menu, hold the **MENU** key for 3 seconds. The T10 instrument menu is divided into 4 main functions with sub-menus:

- ID – Access the user ID functions
- Calibrate – Access the calibration functions
- Config – Access the configuration functions
- Service – Access the service functions (only for certified technicians)

When in the instrument menu, use the ↑ and ↓ keys to select the desired function, then press **READ** to enter it. You can move back up a level in the menu structure using the **ESC** key, or by navigating to the 'BACK' option displayed in many of the menu levels and pressing **READ**.

When typing out letters or numbers, use the ↑ and ↓ keys to scroll through letters/numbers, the **MENU** key to move the cursor to the right, and the **READ** key to move the cursor to the left. Press **ESC** to erase an entered number or letter.

To save any settings, options, or entered numbers/letters, hold the **SAVE** key for 3 seconds.

The full menu structure is listed below, with descriptions:

- **ID** – Access the user ID functions
 - **Sample**
 - **User**
- **Calibrate** – Access the calibration functions
 - **Guided Cal**
 - **Free Cal**
- **Config** – Access the configuration functions
 - **Time/Date** – Update the date and time
 - **Time**
 - **Date**
 - **Display** – Change the display settings
 - **Contrast**
 - **Backlight Time**
 - **Backlight Level**
 - **Instrument** – Access the instrument configuration options
 - **Auto Off**
 - **Auto Reading**
 - **Color Compensation**
 - **Hab. Tests**
 - **Fast Settling**
 - **Sample**
 - **ID**
 - **User ID**
 - **Sample ID**
 - **Schedule Cal**
 - **F Scale**
 - **Instrument ID**
 - **Part Number**
 - **Language**
 - **US**
 - **ES**
 - **BR**
 - **Communication** – Communication configuration options
 - **Eco Result**
 - **New Mark**
 - **All Mark**
 - **New**
 - **All**
 - **Log Transmit**
 - **New Mark**
 - **All Mark**
 - **New**
 - **All**

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- **Config** – Access the configuration functions
 - **User Test** – Not applicable
 - **User Test 1**
 - **User Test 2**
 - **Security** – Set the security levels for each menu option
 - **ID**
 - **Security Level**
 - **Password**
 - **Calibration**
 - **Security Level**
 - **Password**
 - **Config**
 - **Security Level**
 - **Password**
 - **Service**
 - **Security Level**
 - **Password**
- **Service** – Access the service functions (only for certified technicians)
 - **Datalog**
 - **Visualize**
 - **Log Transmit**
 - **Diagnostic**
 - **Signal**
 - **Sensor**
 - **Battery**
 - **Duty**
 - **Current (mA)**
 - **Light**
 - **Temperature**
 - **Blank**
 - **NL Blank**
 - **F Scale**
 - **NL F Scale**
 - **Readings**
 - **Reset Calibration**
 - **Default**
 - **Activate Default**
 - **Save Default**
 - **Light Calibration**
 - **Set Time**
 - **Recover Password**

4. CALIBRATION

The T10 Turbidimeter is programmed with two internal calibration options:

- Guided Calibration
- Free Calibration

A full guided calibration of the T10 is recommended once every 3 months at a minimum, to compensate for changes in light bulb intensity. This calibration is not to be confused with the 'software calibration' performed through PC-Titrate when using the Automated Turbidity setup. This calibration is accessed by navigating through the T10 meter menus and is only applied internally to the meter.

The Free Calibration can be used to fine tune the measurements by adjusting the internal calibration curve to match a single point. You also have the option to perform a Free Calibration on multiple points, but this is only recommended when using the T10 in the Benchtop or Portable setup. When using the Automated setup, the Free Calibration is only recommended for 'Zeroing' the instrument.

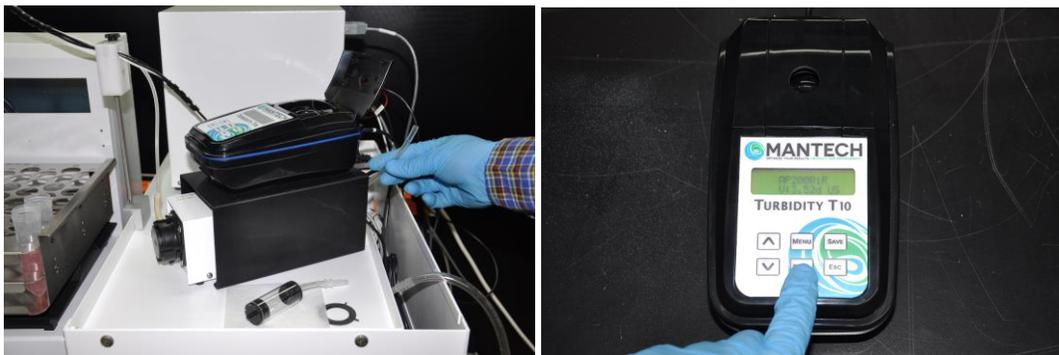
4.1 GUIDED CALIBRATION

The Guided Calibration option is to be performed with cuvette inserts provided with the meter, or in a separate kit. It is imperative that the proper cuvettes are used for the calibration, and that the proper standards are used. The standards for the guided calibration are listed below:

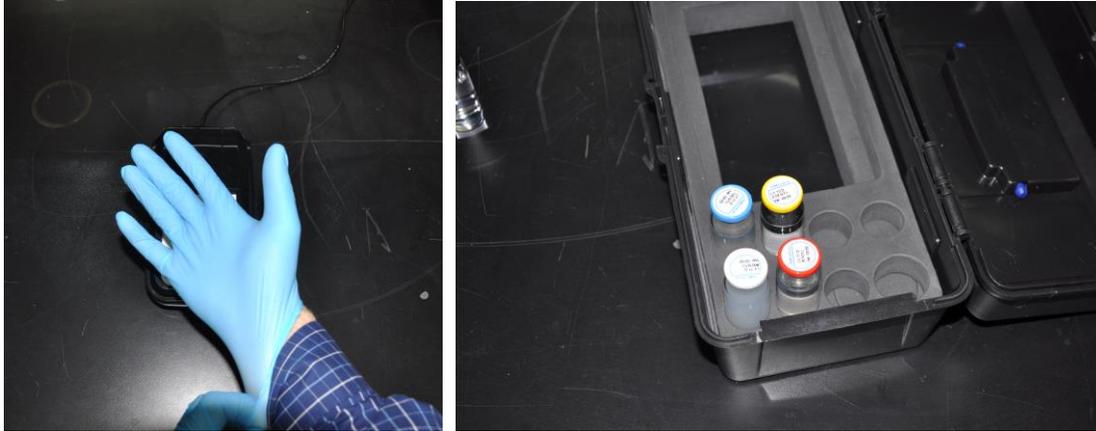
1. 0.02 NTU
2. 20 NTU
3. 100 NTU
4. 800 NTU

To perform the Guided Calibration, follow the procedure below:

1. Ensure the T10 turbidity meter is turned on. If calibrating on an Automated T10 system, empty the turbidity line of storage water, and remove the flow cell. Refer to Technical Bulletin 2020-008 for instructions on removing the flow cell from an Automated T10 Turbidity meter.



2. Wear Gloves *IMPORTANT* and retrieve the T10 Sealed Standard Calibration Kit.



3. Hold the MENU button for 3 seconds, until you see 'Menu' appear on screen.



4. Press the DOWN button to show 'Calibrate' on screen, then press READ. You will see 'Guided Cal.' on screen, press READ again to start the calibration.



- Using a lint-free wipe, wipe down the sides of the sealed 0.02 NTU standard cuvette, then place it in the measuring chamber with the alignment mark facing toward the user and close the lid. Press READ to start the measurement.



- You will see 'Reading Standard' appear on screen as the meter takes the 0.02 NTU reading. At this time, gently invert the 20 NTU standard 10 times, and also wipe the sides of the cuvette down with the lint-free wipe.



- When the screen prompts you to insert the 20 NTU standard, remove the 0.02 NTU standard cuvette and place it back in the carry case, then insert the 20 NTU standard into the measuring chamber and close the lid. Press READ to start the measurement.



- Repeat steps 6 and 7 for the 100 NTU and 800 NTU standards. NOTE a passing calibration will not show any notification after reading the 800 NTU standard and will simply return to the calibration menu. If the calibration is determined to be out of spec (slope between expected NTU and recorded NTU is <0.25 or >4.0), a message will appear saying 'Calibration Fail – Check the Blank and Standards'.



- Press the ESC button until the NTU reading appears back on screen.



NOTE 1: At any point, the user can hold the **ESC** key for 3 seconds to abort the guided calibration.

NOTE 2: Do NOT store standards in high temperature, or in direct sunlight.

NOTE 3: If two standard readings are too similar, it will display **Same Standard?** and wait for re-read.

4.2 FREE CALIBRATION

The T10 turbidity meter Free Calibration is a quick, 1-point adjustment to the T10 meter’s internal calibration curve. For end-users operating a Manual T10 Turbidity meter, the Free Calibration is performed with one of the screw-cap cuvettes, filled with the desired standard for free calibration. MANTECH recommends performing the free calibration with an NTU standard around the mid-point for expected sample results. Multiple free calibrations can also be performed, in succession.

The Free Calibration is to be used mainly for ‘Zeroing’ the instrument with the MANTECH flow-cell, when using the Automated Turbidity setup.

To perform the Free Calibration, follow the procedure below:

1. Ensure the Turbidity Meter is turned on.



2. Wear Gloves *IMPORTANT* and retrieve a T10 Turbidity screw cap cuvette.



3. Prepare a Turbidity standard that is around the mid-point of expected sample results. Use the dilution chart below for preparing 40mL of various NTU standards from 100NTU stock solution:

NTU Standard	mL 100NTU Stock	mL DI Water	NTU Standard	mL 100NTU Stock	mL DI Water
0.5 NTU	0.2 mL	39.8 mL	10.0 NTU	4.0 mL	36.0 mL
1.0 NTU	0.4 mL	39.6 mL	20.0 NTU	8.0 mL	32.0 mL
5.0 NTU	2.0 mL	38.0 mL	50.0 NTU	20.0 mL	20.0 mL

4. Hold the MENU button for 3 seconds, until you see 'Menu' appear on screen.



5. Press the DOWN button to show 'Calibrate' on screen, then press READ. You will see 'Guided Cal.' on screen. Press the down arrow to show 'Free Cal.' on screen instead. Press READ again to start the free calibration.



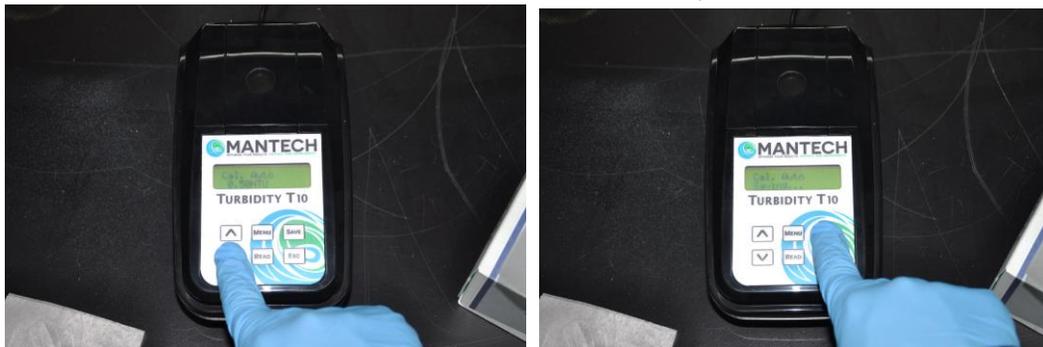
6. Using a lint-free wipe and DI water, clean and thoroughly wipe down the screw cap cuvette. Hold it up to a light to ensure there are no smudges or residues on the glass before proceeding.
7. Without shaking the solution, ensure the prepared standard is well-mixed, then pour the standard into the glass cuvette, filling to the point where the glass starts narrowing. Screw the cap tightly onto the cuvette.
8. Once more ensure there are no smudges or residue on the cuvette, then insert into the T10 meter with the alignment mark on the cuvette facing towards the keypad. Close the measuring chamber lid.



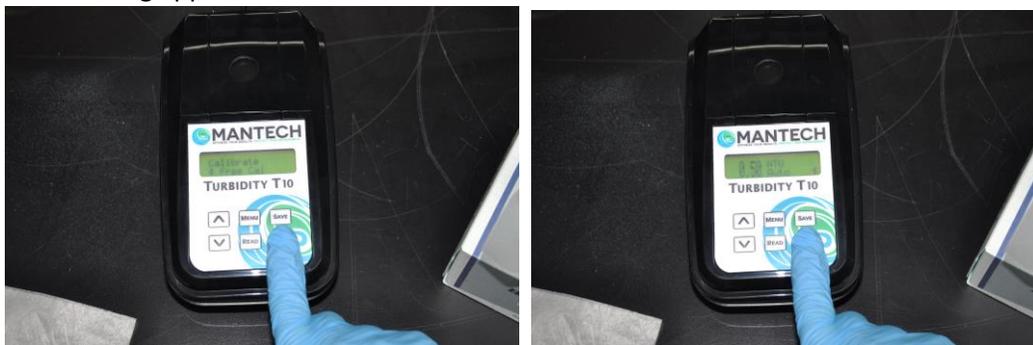
9. Press the READ button and the meter will start the measurement of the standard. You will see the measurement result appear on-screen once done.



10. Use the arrow buttons to adjust the measured NTU to the expected NTU value of the standard. Hold the SAVE button for 3 seconds to save the free calibration point.



11. Repeat steps 6-10 for additional standards, if desired. Once finished, press the ESC button until the NTU reading appears back on screen.



12. Perform readbacks of standards to confirm legitimacy of the adjustment.

NOTE 1: If you find readbacks of low-end standards are inconsistent for Automated Turbidity, you may need to perform a cleaning procedure on the flow cell. There is typically an automated rinsing schedule in place for Automated Turbidity.

NOTE 2: If the above is not successful in cleaning the cell, the next step would be to remove the cell from the unit and clean manually with IPA, DI Water, and Lint-free wipes. Refer to the 'Turbidity Operation Manual' for more specific information on cell cleaning.

5. OPERATION

5.1 POWER ON/OFF

Push the **READ** key to power on the unit. The display will show the instrument version, data log, and date/time. If the meter does not turn on, ensure that the USB cable is properly connected to the port, and either a computer or electrical outlet adapter. If using the Portable version, check that the batteries are oriented the correct way.

If the meter loses power at any point, it **MUST** be powered on again manually via the **READ** key. It will not turn back on automatically.



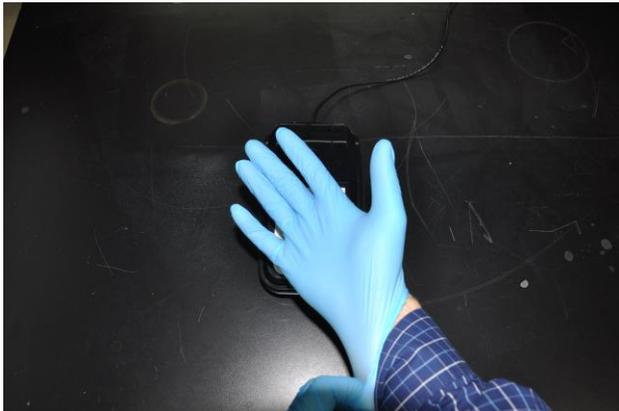
To power off the meter, hold the **ESC** key for 3 seconds until you see **OFF** appear on the screen. Note that the Auto-Shutoff feature can be used to turn off the meter after a period of inactivity.

5.2 OPERATION WITH BENCHTOP OR PORTABLE SETUP

Sample analysis with the Benchtop or Portable T10 is performed using cuvette inserts in a similar manner to the Guided Calibration. The T10 meter is able to store up to 1000 data points internally, each with an associated Sample ID and User. To perform sample analysis, follow these steps:

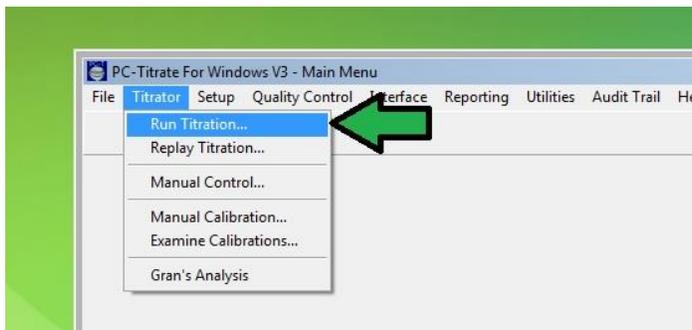
1. Ensure the meter has a valid calibration by performing readbacks of the sealed calibration standards. If the standards read back outside the acceptable range, it is recommended to recalibrate using the Guided Calibration procedure before attempting sample analysis.
2. Prepare your samples for transfer to the glass cuvette vessels. It is important to use a transfer vessel that is easy to pour out of, to avoid spilling sample on the outside of the glassware.
3. Put on laboratory powder-free gloves.
4. Ensure your cuvette glass vessels are as clean as possible before proceeding. If there is dirt, residue, or smudges present, use a lint-free wipe to remove them from the cuvette.
5. Use your sample transfer vessel to pour sample into the glass cuvette, filling to the point just below the cuvette neck where the diameter of the cuvette gets smaller. Screw the cuvette cap on to seal.
6. Wipe down the outside of the cuvette with a lint-free wipe once more.
7. Insert the cuvette into the measurement chamber, then press the **READ** key. The meter will turn the lamp on and begin measuring. The measurement will display on the meter screen after a few seconds.
8. To save the measurement, hold the **SAVE** key for 3 seconds.
9. See pictures of this operation on the next page.

NOTE: The meter can be configured to prompt for a Sample ID to be entered with each sample, with every saved result, or not at all. See Section 6 for information on configuring Sample ID entry.



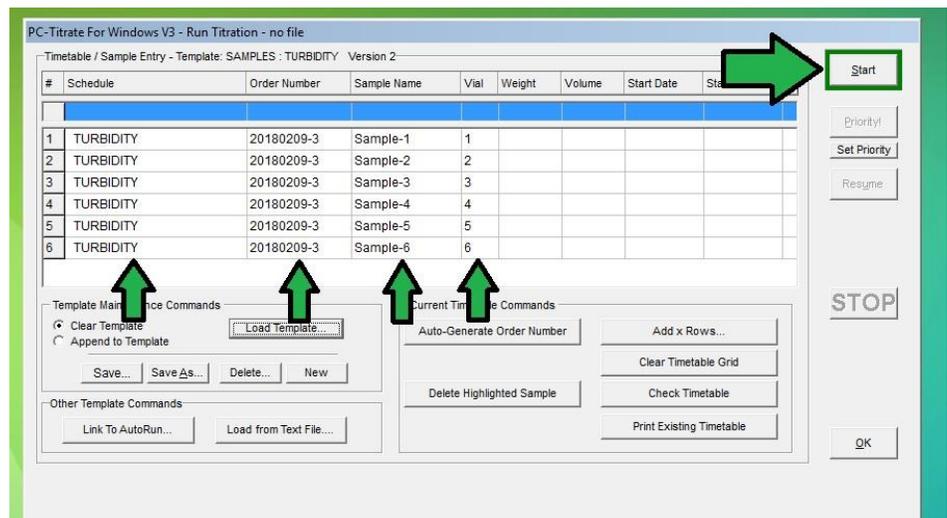
5.3 OPERATION WITH AUTOMATED SETUP

Automated Turbidity operation with the Flow-Through Cell requires valid module and software calibrations performed within the last 90, and 30 days respectively. Refer to Sections 3.3 and 3.4 for instructions on performing these calibrations. With valid calibrations performed, pour the samples into sequential cups/tubes on the Autosampler tray, then use one of the Autorun buttons on the bottom of the PC-Titrate home screen to bring up a pre-made Timetable template, or navigate through the drop-down menu Titrator>Run Titration... to create a custom Timetable (see below).



When creating a custom timetable, there are 4 fields that must be filled out for each sample. The **“Schedule”** field should have a schedule with Turbidity operation selected. This may include schedules with multiple parameters including Turbidity. To select a schedule, double click on the Timetable grid box under the **“Schedule”** header and select a schedule from the pop-up window. The **“Order Number”** field contains an alphanumeric code used to link together all

samples in one run. If **“Auto-Generate Order Number”** is used, the following date code will be generated: YYYYMMDD-N with **“N”** containing a number referencing the sequential runs through each day. The **“Sample Name”** field contains a user-entered Sample ID unique to each sample. Names for multiple sequential samples can be auto-numbered by right-clicking and dragging the sample name from the first sample’s grid box down to the last sample’s grid box. The **“Vial”** field contains the numbered location of each sample on the Autosampler tray. These numbers can be auto-generated sequentially by dragging from the first sample’s grid box to the last sample’s grid box. The **“Weight”** and **“Volume”** fields are not used for turbidity operation. The sample run can be set to start at a later date/time by entering values in the **“Start Date”** and **“Start Time”** fields for the first sample. Click the **START** button to begin the sample run.



6. CONFIGURATION

6.1 TIME/DATE

This configuration is used to change the time and date set within the T10 meter and tagged with each saved sample result. To change the time/date, follow the instructions below.

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Time/Date**.
2. Use the **↑↓** keys to specify the **Time** or **Date** to change, then press the **READ** key.
 - a. Time format is 24 hour, **HH:MM:SS**
 - b. Date format is **MM/DD/YY**
3. Use the **↑↓** keys to adjust the time/date numbers, and the **MENU/READ** to move the cursor right/left.
4. Hold the **SAVE** key for 3 seconds to set the new time/date or press the **ESC** key to return to the previous menu.

6.2 DISPLAY

Within this configuration you can set and change the Contrast, Backlight Time/Brightness, and adjust how the sample result is displayed on the meter screen. Follow the instructions below to change these settings.

6.2.1 CONTRAST

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Display>Contrast**.
2. Use the **↑↓** keys to adjust the screen contrast between **0-30**.
3. Hold the **SAVE** key for 3 seconds to set the new contrast or press the **ESC** key to return to the previous menu.

6.2.2 BACKLIGHT TIME

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Display>Backlig.Time**.
2. Use the **↑↓** keys to adjust the screen contrast between **0-60 minutes**. Setting to **0 minutes** will cause the screen backlight to be always on.
3. Hold the **SAVE** key for 3 seconds to set the new backlight time or press the **ESC** key to return to the previous menu.

6.2.3 BACKLIGHT LEVEL

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Display>Backl. Level**.
2. Use the **↑↓** keys to adjust the screen contrast between **0-100**. Setting to **0** turns off the backlight.
3. Hold the **SAVE** key for 3 seconds to set the new backlight level or press the **ESC** key to return to the previous menu.

6.2.4 PARTIAL RESULTS

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Display>Partial Res.0**.
2. Use the **↑↓** keys to select between **Yes** and **No**. Setting to **Yes** will show the updating readings as it is taking the average to get the result. Setting to **No** will show the previous result as it is averaging to get the new result.
3. Hold the **SAVE** key for 3 seconds to confirm the setting change or press the **ESC** key to return to the previous menu.

6.2.5 BIG NUMBER

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Display>Big Number**.
2. Use the **↑↓** keys to select between **Yes** and **No**. Setting to **Yes** will show the result in a large, two-line format when sitting between readings. Setting to **No** will show the result in a standard, one-line format at all times.
3. Hold the **SAVE** key for 3 seconds to confirm the setting change or press the **ESC** key to return to the previous menu.

6.3 INSTRUMENT

This set of configurations is used to adjust the settings controlling the meter functionality. This includes settings for Automatic Shutoff, Automatic Readings, Color Compensation, User-Calibrated Curves, Fast-Settling, Sample Averaging, Sample/User IDs, Calibration Interval/Check, Instrument Name/Tag Number, and Language. Use the instructions below to adjust these settings.

6.3.1 AUTO-OFF

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Instrument>Auto Off**.
2. Use the **↑↓** keys to adjust the screen contrast between **0-60 minutes**. Setting to **0 minutes** will turn off the auto-off feature.
3. Hold the **SAVE** key for 3 seconds to set the new auto-off time or press the **ESC** key to return to the previous menu.

6.3.2 AUTO-READING

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Instrument>Auto Reading**.
2. Use the **↑↓** keys to adjust the screen contrast between **0-250 seconds**. This setting will cause the meter to perform automated readings on a set timed interval, until the meter is turned off. Setting to **0 seconds** turns off the auto-reading feature.
3. Hold the **SAVE** key for 3 seconds to set the new auto-reading time or press the **ESC** key to return to the previous menu.

6.3.3 COLOR COMPENSATION

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Instrument>Color Compens.**
2. Use the **↑↓** keys to select between **Yes** and **No**. Setting to **Yes** will turn on color compensation for each reading. Setting to **No** will turn off color compensation. When activated, a **C** will appear in the upper right corner of the display on the reading screen.
3. Hold the **SAVE** key for 3 seconds to confirm the setting change or press the **ESC** key to return to the previous menu.

6.3.4 TEST CURVES

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Instrument>Tests Curves**.
2. Use the **↑↓** keys to navigate between the different test curves. This menu selects which test curves to display in the quick-menu for selection by the user. Press **READ** to select a mode, and **ESC** to deselect a mode. The different analysis types are listed below:
 - a. 0-250 EBC
 - b. 0-1000 NTU
 - c. 0-99.9 NTU
 - d. 0-9.99 NTU
 - e. Auto NTU
 - f. Sensor
 - g. Custom 1
 - h. Custom 2
3. Hold the **SAVE** key for 3 seconds to confirm the available analysis modes or press the **ESC** key to return to the previous menu.

6.3.5 MEASURING MODE

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Instrument>Measure Mode**.
2. Use the **↑↓** keys to navigate between the instrument measuring modes. The measuring modes are listed below:
 - a. Fast Settling
 - b. Average
 - c. Normal (Median)
3. When Fast Settling is selected, the measurement time is automatically lowered to the minimum, and an **f** appears next to the progress bar while measuring.
4. Hold the **SAVE** key for 3 seconds to confirm the measuring mode or press the **ESC** key to return to the previous menu.

6.3.6 SAMPLE

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Instrument>Sample**.
2. This setting adjusts the number of measurements used to calculate each result. Higher numbers will result in longer measuring time. Use the **↑↓** keys to adjust the screen contrast between **8-100 samples**.
3. Hold the **SAVE** key for 3 seconds to set the new number of measurements or press the **ESC** key to return to the previous menu.

6.3.7 ID

This menu is used to set up user names, passwords and sample IDs on the T10 meter.

6.3.7.1 USER ID

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Instrument>ID>User ID**.
2. To create a new user, navigate to the **Edit** menu. Choose a user number between 00 and 50, then press **READ**. Use the **↑↓** keys to choose a name for the user, then hold **SAVE** for 3 seconds. Next, use the **↑↓** keys choose a PIN password for the user, then hold **SAVE** for 3 seconds.
3. To define when the user ID and password will be requested, navigate to the **Request** menu. Use the **↑↓** keys to select between the following options:
 - a. Always – requested at every measurement
 - b. On Start – requested at instrument start-up
 - c. MEMO – requested when **SAVE** is pressed (reading mode)
 - d. Previous – will not request, and instead use previous user entered
 - e. No – will not request
4. Press and hold the **ESC** key for 3 seconds to return to the previous menu.

6.3.7.2 SAMPLE ID

1. Hold to **MENU** key for 3 seconds, then navigate to **Menu>Config>Instrument>ID>Sample ID**.
2. To create a new sample, navigate to the **Edit** menu. Choose a user number between 00 and 50, then press **READ**. Use the **↑↓** keys to choose a name for the user, then hold **SAVE** for 3 seconds.
3. To define when the sample ID will be requested, navigate to the **Request** menu. Use the **↑↓** keys to select between the following options:
 - a. Always – requested at every measurement
 - b. On Start – requested at instrument start-up
 - c. MEMO – requested when **SAVE** is pressed (reading mode)
 - d. Previous – will not request, and instead use previous user entered
 - e. No – will not request
4. Press and hold the **ESC** key for 3 seconds to return to the previous menu.

6.3.8 SCHEDULE CALIBRATION

1. Hold the **MENU** key for 3 seconds, then navigate to **Menu>Config>Instrument>Schedule Cal.>F.Scale**.
2. This menu is used to set up a time interval before a calibration is requested by the meter.
3. Use the **↑↓** keys to select the number of days, hours, and minutes before the calibration warning graph will appear on the display.
4. While calibration schedule is programmed, a graph will be displayed in the upper right corner during measurements. When the calibration date arrives, a bar will appear in the graph and a calibration warning will be displayed.
5. Press and hold the **ESC** key for 3 seconds to return to the previous menu.

6.3.9 CALIBRATION CHECK

1. Hold to **MENU** key for 3 seconds, then navigate to **Menu>Config>Instrument>Cal Check**.
2. This menu determines whether the instrument will require a 10 NTU QC check prior performing analysis. This would occur when the instrument is powered on, and directly following a guided calibration.
3. Use the **↑↓** keys to select between **Yes** or **No**, then hold **SAVE** for 3 seconds to confirm the setting.
4. Press and hold the **ESC** key for 3 seconds to return to the previous menu.

6.3.10 CUSTOMIZE

1. Hold to **MENU** key for 3 seconds, then navigate to **Menu>Config>Instrument>Customize**.
2. This menu sets a customizable name for the instrument that shows up on screen during start up and is also available when downloading data from the unit.
3. Use the **↑↓** keys to type out the name for the meter, then hold **SAVE** for 3 seconds.
4. Press and hold the **ESC** key for 3 seconds to return to the previous menu.

6.3.11 TAG NUMBER

1. Hold to **MENU** key for 3 seconds, then navigate to **Menu>Config>Instrument>Tag Number**.
2. This menu sets a tag number for the instrument that is available when downloading data from the unit, to set it apart from other T10 meters.
3. Use the **↑↓** keys to type out the tag number for the meter, then hold **SAVE** for 3 seconds.
4. Press and hold the **ESC** key for 3 seconds to return to the previous menu.

6.3.12 LANGUAGE

1. Hold to **MENU** key for 3 seconds, then navigate to **Menu>Config>Instrument>Language**.
2. This menu sets the language for the instrument menus.
3. Use the **↑↓** keys to select between **US**, **ES**, and **BR** for English, Spanish, or Portuguese language, then hold **SAVE** for 3 seconds to confirm the setting.
4. Press and hold the **ESC** key for 3 seconds to return to the previous menu.

6.4 COMMUNICATION

This configuration menu allows the user to alter the T10 meter communication parameters. This includes settings for when results are sent, when the logs are sent, the serial baud rate, the log header, CSV separator, and serial communication method. Use the instructions below to adjust these settings.

6.4.1 ECO RESULT

1. Hold to **MENU** key for 3 seconds, then navigate to **Menu>Config>Communication>Eco Result**.
2. This setting determines when the measurement data is sent to the USB port.
3. Use the **↑↓** keys to select between the following options, then hold **SAVE** for 3 seconds to confirm the setting:
 - a. **Auto** – Sends all measurement data to the USB when they are performed
 - b. **Manual** – Sends data that is selected by pressing **SAVE** during measurement mode
 - c. **Off** – No measurement data sent to the USB
4. Press and hold the **ESC** key for 3 seconds to return to the previous menu.

6.4.2 LOG TRANSMIT

1. Hold to **MENU** key for 3 seconds, then navigate to **Menu>Config>Communication>Log Transmit**.
2. This setting selects between 4 ways the data log can be sent to the USB port.
3. Use the **↑↓** keys to select between the following options, then hold **SAVE** for 3 seconds to confirm the setting:
 - a. **New Mark** –
 - b. **All Mark** –
 - c. **New** –
 - d. **All** –
4. Press and hold the **ESC** key for 3 seconds to return to the previous menu.

6.4.3 SERIAL BAUD

1. Hold to **MENU** key for 3 seconds, then navigate to **Menu>Config>Communication>Serial Baud**.
2. This setting selects the serial baud rate used for the USB port communication.
3. Use the **↑↓** keys to select between the following options, then hold **SAVE** for 3 seconds to confirm the setting:
 - a. **9600**
 - b. **19200**
 - c. **38400**
 - d. **57600**
4. Press and hold the **ESC** key for 3 seconds to return to the previous menu.

6.4.4 HEADER

1. Hold to **MENU** key for 3 seconds, then navigate to **Menu>Config>Communication>Header**.
2. This setting selects whether a header is sent in the data log transmit.
3. Use the **↑↓** keys to select between **Yes** or **No** then hold **SAVE** for 3 seconds to confirm the setting.
4. Press and hold the **ESC** key for 3 seconds to return to the previous menu.

6.4.5 CSV SEPARATOR

1. Hold to **MENU** key for 3 seconds, then navigate to **Menu>Config>Communication>CSV Separator**.
2. This setting selects the separator that is used for delimiting data in the output log file.
3. Use the **↑↓** keys to select between the following options, then hold **SAVE** for 3 seconds to confirm the setting:
 - a. **TAB**
 - b. **|**
 - c. **/**
 - d. **:**
 - e. **,**
 - f. **Auto**
4. Press and hold the **ESC** key for 3 seconds to return to the previous menu.

6.4.6 SERIAL COMMUNICATION

1. Hold to **MENU** key for 3 seconds, then navigate to **Menu>Config>Communication>Serial Com**.
2. This setting selects the method of serial communication. At this time, only USB communication is supported.
3. Use the **↑↓** keys to select between the following options, then hold **SAVE** for 3 seconds to confirm the setting:
 - a. **USB**
 - b. **BT**
4. Press and hold the **ESC** key for 3 seconds to return to the previous menu.

6.5 USER TEST

This configuration allows the user to create a custom calibration curve to use for sample analysis. The user can enter specific calibration points, customize the name and units for the analysis, and set the expected readings for the calibration points. This feature is not supported with MANTECH automated analysis at this time.

NOTE: When a user curve is calibrated, the instrument performance might change due to standards and procedures adopted. The factory calibrated curve is made with 100% traceable standards and reference materials in controlled environment, use it in order to have full confidence in instrument performance.

6.6 SECURITY

This configuration allows the user to set up and adjust the security settings for each menu in the T10 meter. Each menu option can be given a specific security level, and a custom password. The default password for all menu options on the T10 meter is 9999. The cursor must be moved to the left of the last 9, then the user holds **SAVE** for 3 seconds to check the password.

7. REPLACEMENT PARTS, ACCESSORIES AND CONSUMABLES

PC-1000-1114	Turbidity T10 Meter - White Light kit: includes 0-1000 WL Turbidity T10 Meter. Includes sealed standards, communication cable, measuring cells, carrying case and accessories. Can be used with MT Automated Environmental Analyzers
PC-1000-1115	Turbidity T10 Meter - IR Light kit: includes 0-1000 IR Turbidity T10 Meter. Includes sealed standards, communication cable, measuring cells, carrying case and accessories. Can be used with MT Automated Environmental Analyzers
PC-1000-1118	Turbidity T10 Meter – White Light Meter Only: includes 0-1000 WL Turbidity T10 Meter. Requires communication cable to be used with MT Automated Environmental Analyzers.
PC-1000-1119	Turbidity T10 Meter – IR Light Meter Only: includes 0-1000 IR Turbidity T10 Meter. Requires communication cable to be used with MT Automated Environmental Analyzers.
PC-1212	USB Communication Cable for Turbidity T10 Meter
PC-1000-1121	Set of Sealed Calibration Standards for Turbidity T10 Meter
PC-1000-1123	Measuring cuvette with cap for the Turbidity T10 Meter
PC-1000-1120	MANTECH Flow-Through Cell for Automation of Turbidity T10 Meter
PC-1000-1124	Tubing Kit for MANTECH T10 Automated Turbidity Systems including AM73 and AM122 samplers
PC-1000-1127	Carry Case for Turbidity T10 Meter
PC-1000-1129	Tubing Kit for MANTECH T10 automated turbidity system including AM197 & AM300 series samplers
PC-5000-1801	Stand for Automation of Turbidity T10 Meter
PCK-T10-100	Consumable Parts Package for Preventative Maintenance of MANTECH T10 Automated Turbidity Systems including AM73 and AM122 samplers
PCK-T10-101	Consumable Parts Package for MANTECH T10 automated Turbidity systems including AM197 & AM300 series samplers

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APPENDIX 1 – WARRANTY

WARRANTY

- 1.1 In addition to rights under statute, MANTECH warrants (to the original purchaser) that all instruments manufactured by MANTECH will be free from defects in materials and workmanship for a period of one year from the date of installation.
- 1.1 To the extent permitted by law, you will not be eligible to claim during the Warranty Period with respect to any instrument manufactured by MANTECH unless you complete the accompanying Instrument Registration Card and return it to the address specified within 30 days of installation.
- 1.2 In the event that you discover a defect in materials or workmanship during the Warranty Period, MANTECH will (at its option) repair or replace instruments or consumables returned to: MANTECH, 5473 Highway 6 North, Guelph, Ontario, Canada, N1H 6J2. Please contact MANTECH or an authorized representative to obtain an authorization report number before returning any instrument or consumable back to MANTECH. Non-MANTECH manufactured products are excluded from this warranty.
- 1.3 Any instruments or consumables repaired or replaced under this warranty will be warranted for the balance of the Warranty Period only. Replacement parts may be new, reconditioned, refurbished, re-manufactured or functionally equivalent and will be provided on an exchange basis only. Returned parts, replaced by MANTECH under warranty, become MANTECH's property upon receipt.
- 1.4 You will be responsible for any applicable import duties and tariffs and insure the instruments or consumables in transit back to MANTECH or accept the risk of loss or damage during such transportation. MANTECH will ship the repaired or replacement instruments or consumables to you freight prepaid but you will be responsible for all charges incurred in returning any defective instruments or consumables to MANTECH (and all costs associated with on-site warranty repair).
- 1.5 This warranty does not cover repair or reuse of consumables (or instruments in contact with biohazardous or hazardous materials) or damage, fault, failure or malfunction due to: installation, handling, use, storage, alteration, modification, maintenance or repair contrary to MANTECH's instructions (as set out in the accompanying operation manual); external causes, including misuse, abuse, accident or neglect; problems with electrical power or your hardware or software or any interface; failure by you to perform required preventive maintenance; normal wear and tear; acts of God, fire, flood, war, acts of violence or any similar occurrence; any attempt by a person not authorized by MANTECH to adjust, repair or support an instrument; and problems caused by use of parts not supplied by MANTECH.
- 1.6 You must ensure that all instruments that are in contact with biohazardous or hazardous materials are decontaminated prior to the return of those products to MANTECH under warranty.
- 1.7 To the extent permitted by law, MANTECH excludes all warranties (including, without limitation, any warranty as to merchantability or fitness for purpose), rights, remedies and liabilities (other than the warranty in clause 1) to you or any third party. Where implied conditions and warranties cannot be excluded, but can be limited, the liability of MANTECH for breach of such conditions and warranties is

limited, at MANTECH's option, to the repair or replacement of the instrument or consumable on the basis set out in these warranty terms.

CHANGE TO SPECIFICATIONS

- 2.1 MANTECH reserves the right to alter the design and other technical specifications (and general description) of its instruments and consumables at any time. You accept that this may result in differences between the specification of instruments and consumables delivered to you (and the description and specification of Products ordered by you) from MANTECH or its authorized distributors.

LIABILITY

- 3.1 You acknowledge and agree that MANTECH's liability to you or any third party and your rights against MANTECH are limited to those set out in these warranty terms and under statute.
- 3.2 To the extent permitted by law, you acknowledge and agree that MANTECH is not liable to you or any third party (in contract or tort or otherwise) for any loss or damage suffered in connection with:
 - a) instruments or consumables not being available for use;
 - b) data that is lost, corrupted, deleted or altered;
 - c) loss of (or failure to realize) anticipated savings, profits, revenues or data or other consequential or non-economic loss;
 - d) delays or business interruption (beyond the reasonable control of MANTECH); or
 - e) any exemplary or punitive damages, incurred by or awarded against you arising in any way out of the supply of an instrument or consumable by MANTECH (including as a result of MANTECH's negligence or any third party even if MANTECH has been advised of their possibility).

Document Change Log

Version	Date	Author	Changes
2	18-Sept-2019	Justin	<ul style="list-style-type: none"> • Updated name • Updated information to include necessary info and exclude unnecessary info • Structure changes • Formatting • This will be first version for distribution after T10 product release
3	03-Apr-2020	Justin	<ul style="list-style-type: none"> • Updated with new pictures and info



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