Installation Instructions
M100+™ Laboratory Turbidimeter
White Light - Model 28060
Infrared - Model 28061

Table of Contents

IS-HF-M100+-29293 Rev 5 2137

scientific
A WATTS Brand

Attention Owners and Users

Thank you for purchasing the M100+™ turbidimeter. This equipment will provide safe and productive operation as long as it is installed, used, maintained, and serviced in accordance with the instructions in this manual and is properly maintained. Importantly, unless the user is adequately trained and supervised, there is a possibility of a personal injury, property damage or damage to the equipment.

Owners and users of this equipment bear the responsibility to make certain that this equipment is used properly and safely. READ THIS MANUAL carefully, learn how to use and service this equipment correctly, and strictly follow all of the instructions contained in this manual and the requirements of local, state and federal law. Failure to do so could result in personal injury, property damage or damage to the equipment. This manual should be considered a permanent part of your machine and should be kept available for easy reference by any user.

Owners should not permit anyone to touch this equipment unless they are over 18 years of age, are adequately trained and supervised, and have read and understood this manual. Owners should also ensure that no unauthorized personnel comes in contact with this equipment.

If this equipment, or any of its parts, becomes damaged or needs repair, stop using the equipment and contact an experienced service individual immediately. If the warning labels or this manual are misplaced, damaged or illegible, or if you require additional copies, please contact customer service at +1-239-337-2116 or 888-203-7248 for these items at no charge.

Please remember that this manual and the warning labels do not replace the need to be alert, to properly train and supervise users, and to use common sense when using this equipment.

If you are ever uncertain about a particular task or the proper method of operating this equipment, ask your supervisor, consult this manual, access www.wattswater.com, or contact customer service.

Product Identification

Please record your product's identification and purchase information which will help in the event you have questions or need any service.

Model:	Date of Purchase:
Serial #:	Seller Name/Address:

Understanding Safety Information

This manual contains safety and use instructions that must be followed during the installation, commissioning, operation, care and maintenance and service of the AccUView LED Ex. All responsible personnel must read this manual prior to working with this instrument and should familiarize themselves with the following safety symbols, signals and pictorials.

⚠ WARNING

Read this Manual BEFORE using this equipment.

Failure to read and follow all safety and use information can result in death, serious personal injury, property damage, or damage to the equipment.

Keep this Manual for future reference.

This is a safety-alert symbol. The safety alert symbol is shown alone or used with a signal word (DANGER, WARNING, or CAUTION), a pictorial and/or a safety message to identify hazards.

When you see this symbol alone or with a signal word on your equipment or in this Manual, be alert to the potential for death or serious personal injury.

⚠DANGER This symbol identifies hazards which, if not avoided, will result in death or serious injury.

⚠WARNING This symbol identifies hazards which, if not avoided, could result in death or serious injury.

⚠CAUTION This symbol identifies hazards which, if not avoided, could result in minor or moderate injury.

NOTICE This symbol identifies practices, actions, or failure to act which could result in property damage or damage to the equipment.

This pictorial alerts you to the need to read the manual.

This pictorial alerts you to electricity, electrocution, and shock hazards.

Introduction to the Unit

Overview

The M100+ is a process turbidimeter that allows for the laboratory measurement of the turbidity of sample water. The white light M100+ has been designed to meet the design criteria specified by the US EPA 180.1 on turbidity measurement. The infrared M100+ was designed to meet the criteria specified in ISO 7027 and DIN 27027 for the measurement of the turbidity of a sample. Both models have long life lamps.

The M100+ instruments are equipped with a USB slot in order to download logged data and calibration information. The USB slot is also used to update operating software.

The M100+ is equipped with a color touch screen for easy and efficient operation.

Specifications

M100+ White Light Model 28060	Conforms to specifications set forth in EPA method 180.1 (Nephelometric Method)§ This model uses a tungsten filament lamp.
M100+ Infrared Model 28061	Conforms to specifications set forth in ISO 7027: Water Quality - Determination of Turbidity. This model uses an IR LED lamp.
Measurement Range	0-4000 NTU
Accuracy†‡	±2% of reading or ±0.02 NTU below 40 NTU, whichever is greater ±5% of reading above 40 NTU
Repeatability‡	≤±1% of reading or ±0.02 NTU, whichever is greater
Resolution	Menu settable up to 0.0000 over the entire range
USB	Printer or download logged data & calibration data & upload new firmware via thumb drive (USB flash stick).
Power Supply	UL, CSA & CE approved 12V DC, Wall Mount
Miscellaneous Specifications	1. USB port for logged data download and software updates. 2. Built-in diagnostics 3. Three year battery backup with no external power
Operating Temperature Range	1°C to 40°C (34°F to 104°F)
Sample Temperature Range	0°C to 40°C (32°F to 104°F)
Dimensions	237mm W x 254mm L x 121mm H (10.75"W x 10" L x 4.75" H)
Shipping Weight	2.5 kg (5.5 lbs)
Certifications	LC mark tested to UL and CSA. Conforms to CE.
Warranty	1 year from date of shipment

§ The specifications found in EPA method 180.1 are essentially the same as the specifications set out in method 2130B of the Standard Methods of the Examination of Water and Wastewater 22nd Edition and the specifications set out in ASTM Standard Method D1889-94. The M100+ meets or exceeds the specifications set forth in these methods.

† Instrumental accuracy measured under controlled laboratory conditions at 25°C (77°F).

‡ Both the accuracy and repeatability specifications for the M100+ are valid only for measurement of static (non-flowing) samples.

Unpacking and Inspection of the Instrument

Remove all items from packing carton and carefully inspect to ensure that no visible damage has occurred during shipment and that all items listed below have been received. If the items received do not match the order, please contact your local distributer or the HF scientific Customer Service department.

- M100+ Laboratory Turbidimeter
- Accessory Kit for M100+ (2 empty sample cuvettes with caps)
- Full Range Calibration Kit High Range A, High Range B, 1000 NTU, 10 NTU & 0.02 NTU
- Quick Start Guide
- Flash Drive - Contains full owner's and user's manual
- Wall Mount Power Supply with Ferrite

NOTICE

A ferrite is included with the power supply. This should be looped twice through the cord near the side that connects to the instrument to eliminate EMI interference.

Site Selection

The follow should be taken into consideration when selection a site for the M100+ instrument.

- Must be in a suitable, dry location with adequate ventilation.
- Should not be located where chemicals, such as chlorine, are located.
- Must be operated and stored between 1 and 40°C.
- Should be used on a stable table top.
- Table top location should be less than 90 cm (3 feet) from a power source.

Power Requirements

The M100+ requires 12VDC for proper operation. The provided power supply is rated at 1A.

The instrument is supplied with a wall mount power supply intended for oepration with 100-240 VAC, 47-63 Hz power source. **Before installing, verify that the line voltage falls within these specifications.**

The wall mount power supply connects to the instrument's rear panel.

An optional Euro wall mount power supply is available.

Setup

Before using your M100+, you will need to familiarize yourself with the instrument's operating modes and functions and perform some setup, configuration and calibration.

The M100+ allows for the measurement of the turbidity of water. The turbidity of the water is usually reported in Nephelometric Turbidity Units (NTU) but may be reported in Formazin Nephelometric Units (FNU). This is user selectable.

Readings up to 4400 are possible but readings above 4000 are outside of the rated specifications. Readings above 4400 NTU will cause the display to flash, indicating an over-range condition.

During normal operation the instrument will be at the HOME screen. This is the screen where measurements can be viewed.

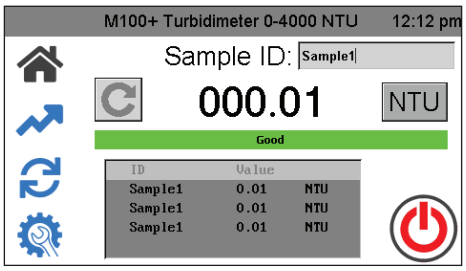
Please note, some features depicted in this manual may change with future firmware updates.

Operating Screens

There are four main operating screens in the form of icons, **Home** (), **Trend** (), **Calibration** () and **Setup** (). Touch the appropriate icon to switch between screens.

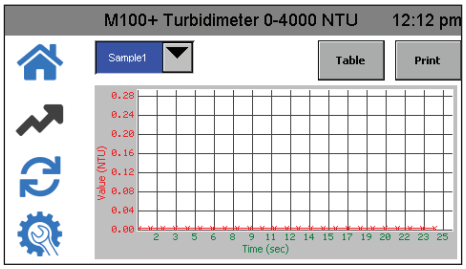
Home Screen

The **Home** screen is the normal reading screen. This is the default mode when power is applied or restored. The other three operation screens are limited to 15 minutes with no key presses. After 15 minutes, the screen will return to Home.



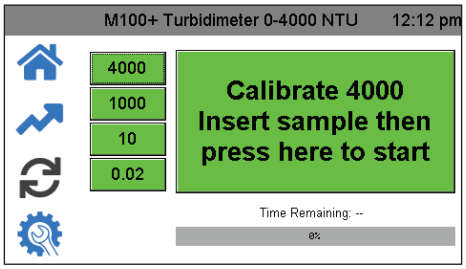
Trend Screen

The **Trend** Screen is used for displaying trend information. This information can be downloaded to the USB stick or printed to a serial printer.



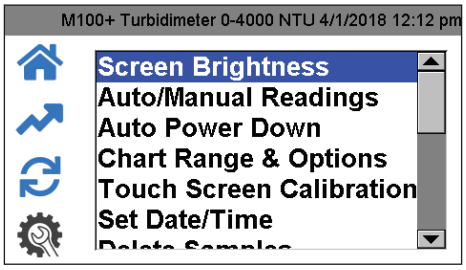
Calibration Screen

The **Calibration** screen is used for calibration. The instrument was calibrated and tested prior to leaving the factory. Therefore, it is possible to use the instrument out of the box. Under normal conditions, re-calibration is required once every three months. Quarterly calibration ensures performance within accuracy specifications.



Setup Screen

The **Setup** screen is where configuration changes can be made. In the **Setup** screen, you can customize the instrument according to needs and preferred operation at any time during normal operation. The **Setup** screen has been split into sub-menus to facilitate instrument configuration. This is also where logged files and calibration logs can be downloaded and where new software, when available, can be uploaded.



Configuring the Instrument

The M100+ has been designed to provide the ability to customize the instrument according to your needs at any time during normal operation. The **Setup** screen has been split into sub-menus to facilitate instrument configuration. This section describes how to use each of the sub-menus to configure the instrument.

Turning on the Instrument

1. Confirm that the M100+ is safely and properly plugged into a suitable power source.
2. Touch the screen to turn the instrument on.

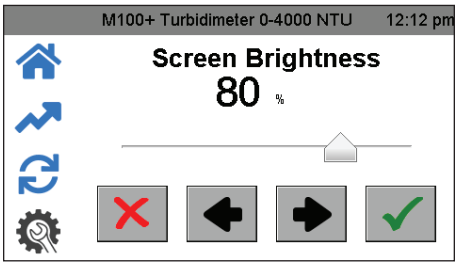
The instrument will power down automatically unless the Auto Power Down setting is disabled. If the Auto Power Down setting is disabled, it allows the instrument to stay on and require a manual shutdown. An On/Off button will appear on the Home screen. It is not recommended to leave the instrument on constantly as it may cause drift and premature degradation of the lamp. The drift can be corrected by more frequent calibrations.

The following configuration settings can be set on the **Setup** screen. Use the slider on the right-hand side to access all of these settings.

- Screen Brightness
- Auto/Manual Readings
- Auto Power Down
- Touch Screen Calibration
- Set Time/Date
- Delete Samples
- Data Resolution
- Offset
- Device ID
- Calibration Reminder
- Calibration Download
- Firmware Update
- Reset Defaults
- About Device

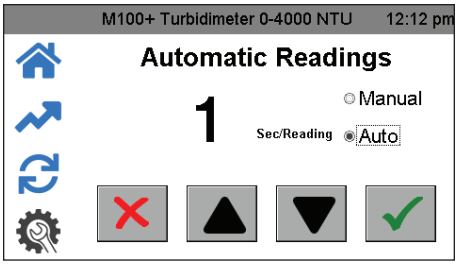
At any time, any of the Home, Trend, Calibration and Setup screens can be selected and implemented. To select any of the Setup options, press the **Setup** icon and then select the option you wish to change.

Screen Brightness



1. Press the **Setup** icon. Select Screen Brightness.
2. Adjust current screen brightness.
3. Use ⬅ & ➡ or the drag cursor.
4. Push ✓ to save and return to Setup Menu.

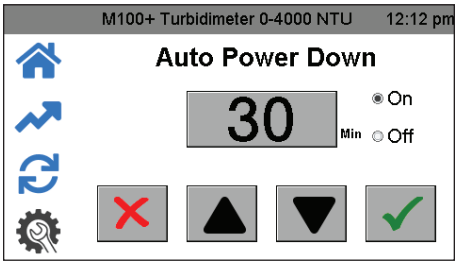
Auto/Manual Readings



1. Press the **Setup** icon. Select Auto/Manual Readings.
2. In this screen, a selection can be made for continuous readings (Auto) or for a single reading (Manual).
3. If Auto is selected, the rate of updates can be selected from 1 to 60 seconds using the ▼ and ▲ buttons.

   If Manual is chosen, a button will appear in the Home icon to take readings. (Manual readings take approximately 10 seconds to display. It will say “capturing” to indicate that it is processing.)
4. Push ✓ to save and confirm.

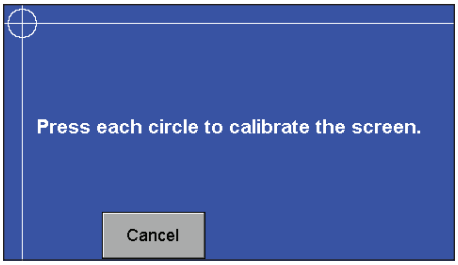
Auto Power Down



The M100+ can be set to power down automatically. The factory setting is to power down after 30 minutes. This setting is recommended to save lamp life. There is also an option to manually power off the instrument.

1. Press the **Setup** icon. Select Auto Power Down.
2. If setting Auto Power Down to On, the time before automatically powering down can be adjusted using the ▲ and ▼ buttons.
3. Set the Auto Power Down to Off if you need to keep the instrument on. To turn the M100+ off when this setting is set to Off, press the power button on the Home screen.

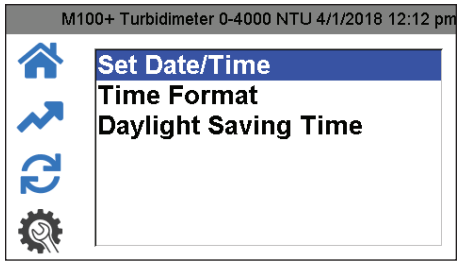
Touch Screen Calibration



The screen has been factory adjusted but can be adjusted if the alignment is off. The screen may need to be calibrated if new software has been downloaded. It is a 5 position setup.

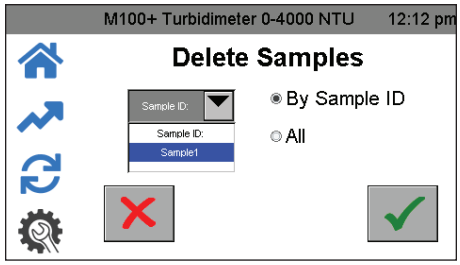
1. Press the **Setup** icon. Select Touch Screen Calibration.
2. If this calibration fails, restart the instrument by unplugging and reinserting the power plug.
3. Press the top screen time banner for 5 seconds to reset to factory default screen setting.
4. Then attempt the calibration again.

Set Date/Time



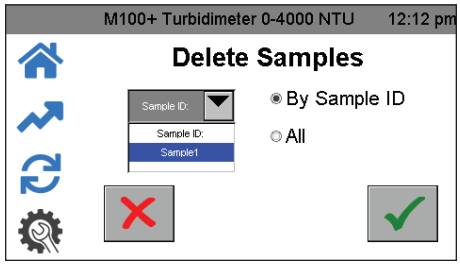
1. Press the **Setup** icon. Select Set Date/Time.
2. Set the date and time by using the ▼ and ▲ buttons.
3. Set the Time Format to either 12 or 24 hour time by using the ▼ and ▲ buttons. This menu will change slightly if the 24-hour format is selected.
4. Enable or disable the Daylight Savings Time setting by using the ▼ and ▲ buttons.
5. When complete, press the ✓ to save the setting and return to **Setup** menu.

Delete Samples



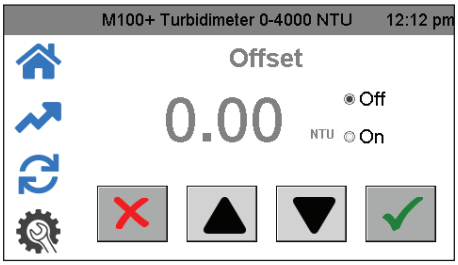
1. Press the **Setup** icon. Select Delete Samples.
2. Select either All or By Sample ID.
3. If Sample ID is selected, select sample.
4. Press ✓ to delete sample.

Data Resolution



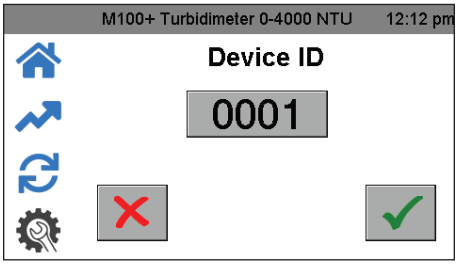
1. Press the **Setup** icon. Select Data Resolution.
2. Set the resolution or number of digits after decimal point shown in **Home** screen.
3. Use the ⬅ and ➡ buttons to set the resolution. The screen shows a representation.
4. Press ✓ to save and return to **Setup** menu.

Offset



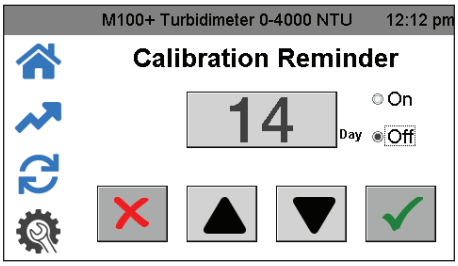
1. Press the **Setup** icon. Select Offset.
2. Adjust the reading slightly to allow for agreement with another instrument.
3. Turn On to use the offset and use the ▼ and ▲ buttons to set the offset. Allowable resolution is -1.00 to +1.00 in increments of 0.01 NTU.

Device ID



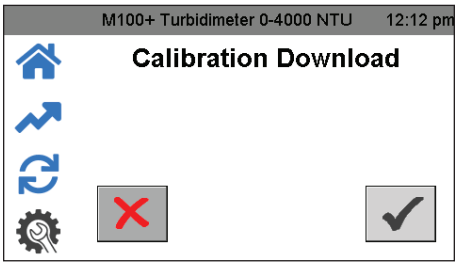
1. Press the **Setup** icon. Select Device ID.
2. Set the Device ID for data logging purposes by touching the number box to bring up a keypad.
3. Enter the desired number on the keypad and press the ✓ to save the setting.

Calibration Reminder



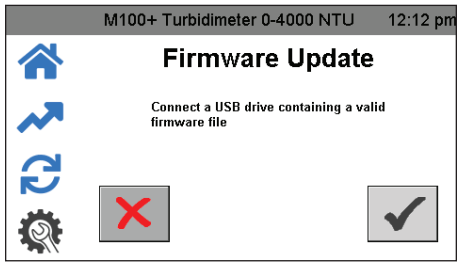
1. Press the **Setup** icon. Select Calibration Reminder.
2. Use the ▼ and ▲ buttons to set how often (in days) the calibration reminder comes up on the **Home** screen. The USEPA recommends calibration every quarter (90 days). Set to OFF if not desired.
3. Press the ✓ to save the setting and return to the **Setup** menu.

Calibration Download



1. Press the **Setup** icon. Select Calibration Download.
2. Insert a USB memory stick into the USB port to download the calibration history.
3. Press the ✓ to transfer the information and return to the Setup menu.

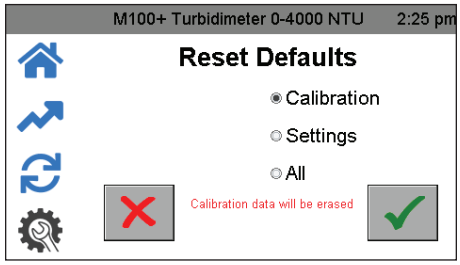
Firmware Update



1. Press the **Setup** icon. Select Firmware Update.
2. Insert the USB memory stick that contains the software into the USB port.
3. If the firmware revision on the memory stick is older than the firmware currently installed, the instrument will ask if you wish to continue.
4. Press the ✓ to continue with the firmware installation.

The upload will take several minutes. During the initial upload, the screen will show "busy" and screen anomalies may appear until the upload is complete. The screen will then turn off, signaling the upload has been completed. Any firmware updates will be posted to our website at www.hfscientific.com. The current firmware version is shown in About Device (see section below).

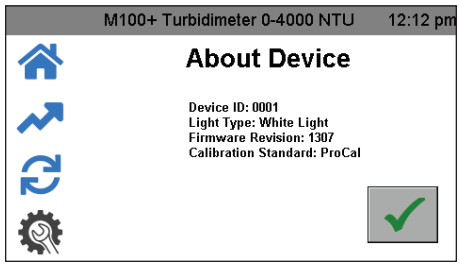
Reset Defaults



This menu allows resetting the calibration and/or settings. This clears the calibration and new calibration will be required to operate the instrument. Settings may also change, so these should be checked as well.

1. Press the **Setup** icon. Select Reset Defaults.
2. Use the ▼ and ▲ buttons to select Calibration, Settings or All.
3. Press the ✓ to select the setting and return to the **Setup** menu.

About Device



This menu shows the current setting of the Device ID, the lamp type and firmware revision number. Firmware revision can be compared to available firmware revisions on the website.

1. Press the **Setup** icon. Select About Device.
2. Press the ✓ to return to the **Setup** menu.

Calibrating the M100+

The instrument was calibrated and tested prior to leaving the factory, so it is possible to use the instrument directly out of the box. Under normal conditions, recalibration is required once every three months. Quarterly calibration ensures performance within accuracy specifications.

The EPA and ISO recommend that on-line turbidimeters used for reporting purposes be calibrated with a primary standard at least once every three months.

Calibration Standards

If the M100+ will be used over the entire range of 0.02 to 4000 NTU, a complete calibration as described below will be required, which includes two High Range standards.

If the instrument accuracy is only required below 1000 NTU, a calibration may be performed using the 1000 NTU standard, the 10 NTU standard and the 0.02 NTU standard. To calibrate starting at 1000 NTU, simply press the 1000 button on the calibration screen.

If the instrument accuracy is only required below 10 NTU, such as for potable water, a calibration may be performed using only a 10 NTU and a 0.02 NTU standard. To calibrate starting at the 10 NTU, simply press the 10 button on the calibration screen.

We recommend that the following materials be used during calibration to achieve the full-scale accuracy stated in this manual. All calibration standards listed below are available for purchase from HF scientific.

- High Range A ProCal Calibration Standard
- High Range B ProCal Calibration Standard
- 1000 NTU ProCal Calibration Standard
- 10.0 NTU ProCal Calibration Standard
- 0.02 NTU ProCal Calibration Standard

NOTICE

Diluted Formazin is unstable. If Formazin is used to calibrate the instrument, ensure that a fresh stock suspension of Formazin is used to achieve the accuracy quoted for the instrument. A Formazin Stock Solution Kit (catalog no. 50040) is available from HF scientific.

The HF scientific ProCal (Primary Calibration Standards) are more stable than Formazin and have a minimum shelf life of 12 months. For more information on ordering HF scientific's ProCal Standards, see Accessories and Replacement Parts List later in this manual.

Prior to recalibration, review the expiration dates to ensure that the standards have not expired.

Care of ProCal Standards

The information below is provided as general guidelines for proper care of ProCal standards.

- Standards should only be handled by the top, black cap or by the very bottom of the cuvette.
- Keep cuvette glass clean of fingerprints and debris.
- Cuvettes can be cleaned with any domestic glass cleaner and the provided microfiber cloth.
- Prevent ProCal standards from freezing. This will most likely destroy them.
- Standards under 100 NTU must be freshly poured from the supplied bottle as they are not stable in the glass cuvette.
- There is no need to shake standards, but standards over 1000 NTU should be up-ended gently before use.
- Replace standards at the expiration date.

Indexing Calibration Cuvettes

To achieve the greatest accuracy and account for normal scratches and aberrations in cuvette glass when calibrating, HF scientific recommends indexing the cuvettes.

Standards and standards kits purchased from HF scientific are supplied with indexing rings. Complete instructions on how to index cuvettes are included in the calibration kits.

Indexing is best performed if the automatic reading is enabled and set to 1 sec/reading. See Auto/Manual Readings section for more information. The following steps allow repeatable indexing of calibration standards.

1. With the instrument in the home screen, insert the standard.
2. Slowly rotate the standard inside the optical well one complete turn (360°).
3. While rotating the standard slowing, observe the measured turbidity and locate the position of the cuvette having the lowest reading.
4. With the calibration standard positioned at the location having the lowest turbidity reading, install the indexing ring over the cap on the standard so that the pointer of the indexing ring faces directly forward.

When using the standards in the future, always insert the standard so that the pointer of the indexing ring faces forward. Slowing rotate the standard back and forth about 5° to find the lowest point. The standard is now indexed and ready for use.

Calibration Procedures

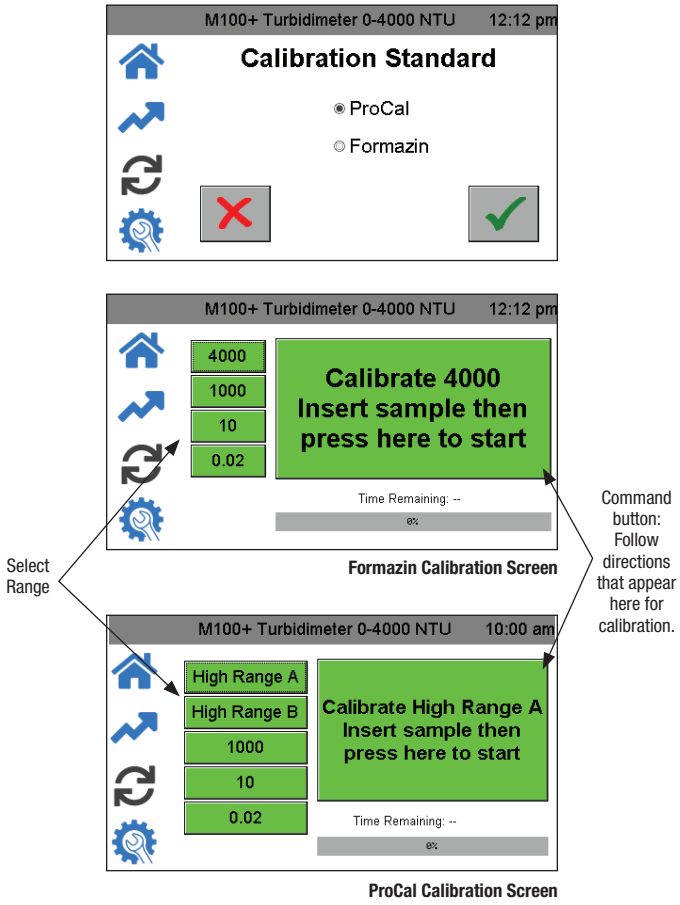
To calibrate for 0-4000 NTU using ProCal, you will need the following standards:

- High Range A
- High Range B
- 1000 NTU
- 10 NTU
- 0.02 NTU standards.

To calibrate for 0-4000 NTU using Formazin, you will need the following standards:

- 4000 NTU
- 1000 NTU
- 10 NTU
- 0.02 NTU

Prior to beginning calibration, clean the calibration standard cuvettes with a microfiber cloth and standard window cleaner. Take care to only handle standards by the black cap to prevent fingerprints or smudges from affecting the readings.



1. Select the calibration function by pressing the **Calibrate** icon.
2. Select the appropriate calibration standard (Formazin or ProCal) and then press ✓ to save the selection.
3. The calibration menu will be displayed as shown above. On the left-hand side are selections for the range for calibration. Select the highest value required for your application.
4. Ensure standards are indexed as described in Indexing Calibration Cuvettes section prior to calibration.
5. Press the command button. The command button dialogue will guide you through the calibration.

Calibrating using ProCal Standards

1. Press the High Range A button on the left side of the screen.
2. Insert the High Range A standard.
3. Press the Command button in the middle of the screen to start calibration. A countdown from 30 will appear on the screen. When the countdown is complete, the screen will request the High Range B.
4. Press the High Range B button on the left side of the screen.
5. Insert the High Range B standard.
6. Press the Command button to continue the calibration. A countdown from 30 will appear on the screen. When the countdown is complete, the screen will request the 1000 NTU standard.
7. Press the 1000 NTU button on the left side of the screen.
8. Insert the 1000 NTU standard.
9. Press the Command button to continue the calibration. A countdown from 60 will appear on the screen. When the countdown is complete, the screen will request the 10 NTU standard.
10. Press the 10 NTU button on the left side of the screen.
11. Insert the 10 NTU standard.
12. Press the Command button to continue the calibration. A countdown from 60 will appear on the screen. When the countdown is complete, the screen will request the 0.02 NTU standard.
13. Press the 0.02 NTU button on the left side of the screen.
14. Inert the 0.02 NTU standard.
15. Press the Command button to continue the calibration. A countdown from 30 will appear on the screen.

When the countdown is complete, all buttons on the left side of the screen should be green and the Command button should say Calibration Good.

Calibrating Using Formazin Standards

1. Press the 4000 button on the left side of the screen.
2. Insert the 4000 NTU standard.
3. Press the Command button in the middle of the screen to start calibration. A countdown from 30 will appear on the screen. When the countdown is complete, the screen will request the 1000 NTU standard.
4. Press the 1000 NTU button on the left side of the screen.
5. Insert the 1000 NTU standard.
6. Press the Command button to continue the calibration. A countdown from 60 will appear on the screen. When the countdown is complete, the screen will request the 10 NTU standard.
7. Press the 10 NTU button on the left side of the screen.
8. Insert the 10 NTU standard.
9. Press the Command button to continue the calibration. A countdown from 60 will appear on the screen. When the countdown is complete, the screen will request the 0.02 NTU standard.
10. Press the 0.02 NTU button on the left side of the screen.
11. Insert the 0.02 NTU standard.
12. Press the Command button to continue the calibration. A countdown from 30 will appear on the screen.

When the countdown is complete, all buttons on the left side of the screen should be green and the Command button should say Calibration Good.

Alternate Calibration Ranges

Alternately you could choose to calibrate to 1000 NTU, which requires 1000 NTU, 10 NTU and 0.02 NTU. Press the 1000 button on the left side and start at step 5 of the previous section.

A calibration for only 10 NTU requires only the 10 NTU and 0.02 NTU standards. Press the 10 NTU button on the left side and start at step 8 of the previous section.

For the two alternate ranges, these will still read the full range with a reduced accuracy above the range of calibration.

Failed Calibration

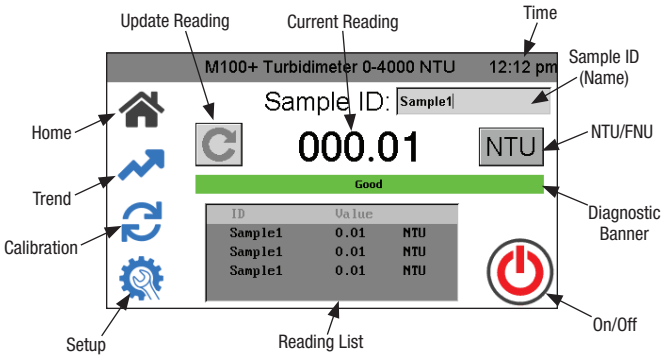
In the case of a failed calibration, the last good calibration is restored once the user exits to the Home screen. A failure will be evident when the calibration screen shows all red.

The instrument can be used with this calibration with a potentially reduced accuracy. The bad calibration will be noted in the calibration log and as a reminder, a yellow diagnostic banner will show on the home screen. The yellow banner indicates that the last calibration had failed and that the instrument is using the previous calibration. The only way to remove this indication is to successfully complete a calibration.

Check the standards for cleanliness. If everything looks good, attempt the calibration again. If the calibration fails after the second attempt, the most likely cause is that the standards are bad or the lamp needs replacement.

Operation

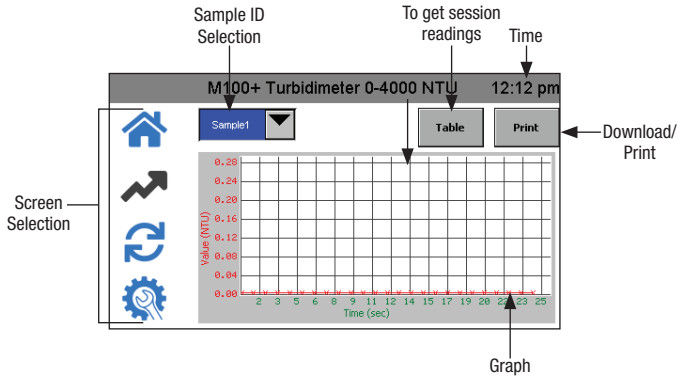
Home Screen



All operations start on the Home screen. Refer to the above figure for all operations.

- When the instrument is in Automatic Readings, Update Reading button will not show. This is only used for manual updates.
- The current reading is always shown in the large number format.
- Toggle between NTU and FNU by touching the button.
- Pressing Sample ID brings up a key pad to allow you to provide a name.
- Sample ID shows up to five previous readings. 100 readings per Sample ID are saved. Once logging is complete, the **Home** screen will say "100 points captured." See **Trend** screen below for more information.
- The instrument can be turned off manually even if Auto Power Down is selected.

Trend Screen



- Select Sample ID first.
- After a reading session in the Home screen, if Trend screen is selected, the Reading List from the Home screen is saved under the Sample ID in the Trend screen and cleared from the Home screen. If a new session is started in the Home screen under the same Sample ID, the readings will be appended to the session readings.
- If a USB memory stick is connected, Session Readings shown will be transferred to the memory stick after pressing **Download/Print**.
- If the USB printer is connected, Sessions Readings shown will be printed after pressing **Download/Print**.
- Sample ID will be saved until deleted. See Delete Samples section for more information.

Data Retrieval

- Data logging can only save 100 points per Sample ID.
- All data is saved in CSV format and is date and time stamped.
- Sample ID Data can be downloaded to a USB memory stick or printed in the **Trend** screen after pressing **Download/Print**.
- Calibration data can be downloaded to a USB memory stick in the Calibration Download menu by pressing the ✓ button. See Calibration Download section for more information.
- Logged data can be downloaded to a USB memory stick in the Log Download menu by pressing the ✓ button.

USB Connection

The M100+ has two USB connections: a USB-A on the side and a USB-B on the back. Only the side connection is active at this time. The USB-B on the back of the instrument may be used in a future firmware update.

The USB-A connection can be used to upload new software or download logged data and calibration reports via a USB memory stick.

Firmware updates can be made by loading the firmware onto a USB memory stick and inserting it into the USB-A connector. The update will not affect configurations or stored data, however it is always advisable to check the configuration after an update as menus may have changed.

Be sure to check our website, www.hfscientific.com, for software updates.

NOTICE

To keep the USB contacts from getting contaminated, a USB plug cover is provided. It is not recommended that this cover is replaced whenever the USB is not being used. The USB-B plug on the back is not active at this time and the USB plug cover should remain in place to prevent damage.

Troubleshooting

M100+ Fault Detection

The M100+ performs continuous diagnostic monitoring. The diagnostic indicator will display any errors or warnings on the Home screen.

- A green indicator shows that everything is good.
- A red indicator denotes an error.
  - Potential errors are a bad lamp or the reading is taking place in a band that has not been calibrated.
- A yellow indicator is a warning and could show either a faulty database or the device plugged into the USB is incompatible.

Diagnostic Table

Symptom	Cause	Solution
Readings are higher than expected.	Bubbles in solution.	Clean the inside and outside of the cuvette with a detergent solution. Rinse with deionized water. Do not shake samples.
	Instrument out of calibration.	Recalibrate. Refer to Calibration section in this manual.
USB download not working.	USB memory stick is not fully inserted.	Insert memory stick fully.
	USB Memory stick is not formatted.	Format memory stick to FAT32.
Readings are erratic.	Bubbles in solution.	Clean the inside and outside of the cuvette with a detergent solution. Rinse with deionized water. Do not shake samples.
Readings are lower than expected.	Instrument out of calibration.	Recalibrate. Refer to Calibration section in this manual.
Screen calibration not working.	Incorrect screen calibration stored.	Hold upper (time) banner on any screen for 5 seconds to load the default screen calibration. Then go to screen calibration and follow instructions in Touch Screen Calibration section in this manual.

Technical and Customer Assistance

If you need assistance with this instrument or to order replacement parts, please contact HF scientific Customer Service or Technical Service Departments.

HF scientific
16260 Airport Park Drive, Suite 140
Fort Myers, Florida 33913
Phone: (239) 337-2116
Toll Free: (888) 203-7248
Fax: (239) 454-0694
Email: HF.Info@wattswater.com
www.hfscientific.com

Routine Maintenance

Routine maintenance should include calibration of the instrument. See Calibration section in this manual for more information.

Cleaning the Cuvette

Measurement cuvettes used for the sample should be clean and free of marks or scratches.

Clean the interior and exterior of the cuvettes with a detergent solution and then rinse several times with distilled or deionized water. Ensure the cuvettes are clean prior to use.

If cuvettes become scratched or stained, they should be replaced. Replacement cuvettes are available from HF scientific. Order catalog #50051 (3 pack of cuvettes with caps) or 50052 (10 pack of cuvettes with caps).

Replacing the Source Lamp

The infrared and white light source lamps in the M100+ instruments are designed for long life. However, these lamps are not covered by the warranty. If the lamp should need replacement, please contact HF scientific's Service Department for assistance. The lamps can also be purchased with instructions to change. Calibration will be required if a lamp change is made.

Battery

This instrument uses a battery for backup of the clock feature with an expected life span of over 3 years. The battery is non-rechargeable and no attempt to charge it should be made. If the battery needs to be replaced, contact HF scientific to arrange for service.

Accessories and Replacement Parts

Catalog #	Description	Photo
24082S	Replacement Lamp Assembly, White Light w/ Instructions	
21396S	Replacement Lamp Assembly, IR Light w/ Instructions	
29293	Operating Manual, M100+	n/a
39957	ProCal Calibration Kit, 0.02, 10 & 1000 NTU	
39940	ProCal Calibration Kit, 0.02, 10, 1000, High Range A & High Range B (W/L)	
39941	ProCal Calibration Kit, 0.02, 10, 1000, High Range A & High Range B, (IR)	
39825	ProCal Calibration Standard, 10 NTU, 125ml	
50040	Formazin Stock Kit	n/a
70914	Formazin Stock Solution, 4000 NTU, 500 ml	
50051	Replacement Cuvette - 3 Pack	
50052	Replacement Cuvette - 10 Pack	
29297S	US Wall Mount Power Supply	n/a
29301S	EU Wall Mount Power Supply	n/a

Municipal Market Products Limited Warranty

HF scientific, LLC (the “Company”) warrants each municipal market instrument product to be free from defects in material and workmanship under normal usage for a period of one (1) year from first use or two (2) years from date of the Company’s invoice from the original sale of the product, whichever occurs first. In the event of such defects within the warranty period, the Company will, at its option, replace or recondition the product without charge. Parts which by their nature are normally required to be replaced periodically, consistent with normal maintenance, specifically reagents, desiccant, sensors, electrodes and fuses, are excluded. Also excluded are accessories and supply-type items.

Proof of purchase from the Company (Company invoice or paid order confirmation) and/or first use (commissioning) must be provided when making a product warranty claim.

THE WARRANTY SET FORTH HEREIN IS GIVEN EXPRESSLY AND IS THE ONLY WARRANTY GIVEN BY THE COMPANY WITH RESPECT TO THE PRODUCT. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED. THE COMPANY HEREBY SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The remedy described in the first paragraph of this warranty shall constitute the sole and exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental, special or consequential damages, including without limitation, lost profits or the cost of repairing or replacing other property which is damaged if this product does not work properly, other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemical, or any other circumstances over which the Company has no control. In addition, the Company shall not be responsible for any costs incidental to the Company’s warranty response efforts, including, without limitation, costs associated with the removal and replacement of systems, structures or other parts of facilities, de-installation, decontamination and re-installation of products, or transportation of products to and from the Company. This warranty shall be invalidated by any abuse, misuse, misapplication, improper installation or improper maintenance or alteration of the product.

Some states do not allow limitations on how long an implied warranty lasts, and some states do not allow the exclusion or limitation of incidental or consequential damages. Therefore the above limitations may not apply to you. This Limited Warranty gives you specific legal rights, and you may have other rights that vary from State to State. You should consult applicable state laws to determine your rights. **SO FAR AS IS CONSISTENT WITH APPLICABLE STATE LAW, ANY IMPLIED WARRANTIES THAT MAY NOT BE DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL SHIPMENT**

HF scientific®

A WATTS Brand

USA: T: (239) 337-2116 • Toll-Free (888) 203-7248 • F: (239) 454-0694 • HFscientific.com
Latin America: T: (52) 81-1001-8600 • HFscientific.com