

MX100 Temp Logger Manual



The MX100 Temp logger measures temperature in indoor environments. With an IP67 environmental rating, the logger can be deployed in indoor locations where moisture may form. This Bluetooth® Low Energy-enabled logger is designed for wireless communication with a mobile device. Using the HOBOMobile® app, you can easily configure the logger, read it out, and view data on your phone or tablet, or automatically upload the data to HOBOLink® for further analysis. The logger has a built-in alarm you can configure to trip at thresholds you specify. Designed with a non-replaceable lithium battery, this logger also has a power-saving mode that allows you to use the Bluetooth signal only when needed to maximize battery life. **Note:** This logger is not supported by the MX Gateway.

MX100 Temp Logger

Required Items:

- HOBOMobile app
- Device with iOS or Android™ and Bluetooth

Specifications

Temperature Sensor

Range	-30° to 70°C (-22° to 158°F)
Accuracy	±1.0°C from -30° to -5°C (±1.8°F from -22° to 23°F) ±0.5°C from -5° to 50°C (±0.9°F from 23° to 122°F) ±1.0°C from 50° to 70°C (±1.8°F from 122° to 158°F)
Resolution	0.04°C (0.072°F)
Drift	<0.01°C (0.018°F) per year
Response Time	6 minutes typical to 90% in open air moving 1 m/s, unmounted

Logger

Logger Operating Range	-30° to 70°C (-22° to 158°F)
Radio Power	1 mW (0 dBm)
Transmission Range	Approximately 30.5 m (100 ft) line-of-sight
Wireless Data Standard	Bluetooth Low Energy (Bluetooth Smart)
Logging Rate	1 second to 18 hours
Time Accuracy	±1 minute per month at 25°C (77°F)
Battery	CR2450 3V lithium, not replaceable
Battery Life	1 year, typical with logging interval of 1 minute and Bluetooth Always Off disabled; 2 years, typical with logging interval of 1 minute and Bluetooth Always Off enabled. Faster logging intervals, remaining connected with the app, excessive downloads, and paging may impact battery life.
Memory	30,000 measurements
Full Memory Download Time	Approximately 30 seconds; may take longer the farther the device is from the logger
Dimensions	6.9 x 4.5 x 1.1 cm (2.71 x 1.76 x 0.42 inches)
Weight	25.5 g (0.90 oz)
Environmental Rating	IP67



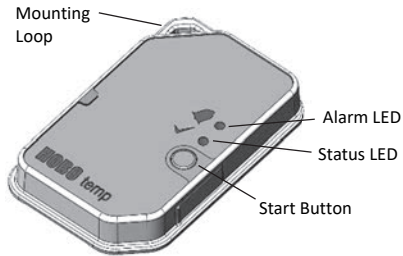
The CE Marking identifies this product as complying with all relevant directives in the European Union (EU).



See last page

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Logger Components and Operation



Mounting Loop: Use this when deploying the logger by tying it to an object.

Alarm LED: This LED blinks red every 4 seconds when an alarm is tripped (unless Show LED is disabled as described in *Configuring the Logger*). Both this LED and the status LED will blink once when you press the start button to wake up the logger before configuring it. If you select Page Logger LED in the HOBObot app, both LEDs will be illuminated for 4 seconds.

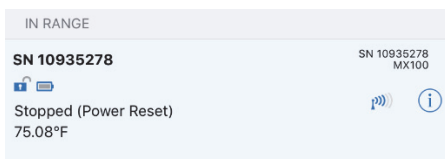
Status LED: This LED blinks green every 4 seconds when the logger is logging (unless Show LED is disabled as described in *Configuring the Logger*). If the logger is waiting to start logging because it was configured to start "On Button Push" or with a delayed start, it will blink green every 8 seconds.

Start Button: Press this button for 1 second to wake up the logger; both the alarm and status LEDs will blink. Once the logger is awake, press this button for 1 second to move it to the top of the loggers list in HOBObot. Press this button for 4 seconds to start or stop the logger when it is configured to start or stop "On Button Push" (see *Configuring the Logger*). Both LEDs will blink four times when you press the button to start or stop logging. Press this button for 10 seconds to reset a password.

Downloading HOBObot and Connecting to a Logger

Install the HOBObot app to connect to and work with the logger.

1. Download the HOBObot app from the App Store® or Google Play™.
2. Open the app and enable Bluetooth in the device settings if prompted.
3. Press the button on the logger to wake it up.
4. Tap the HOBObot icon (on Android devices) or tap the Devices icon and then tap Loggers at the top of the screen (on Apple® devices). Tap the logger in the list to connect to it.



If the logger does not appear in the list or if it is having trouble connecting, follow these tips.

- Make sure the logger is "awake" by pressing the start button. The alarm and status LEDs will blink once when the logger wakes up. You can also press the button a second time to bring it to the top of the list if you are working with multiple loggers.
- Make sure the logger is within range of your mobile device. The range for successful wireless communication is approximately 30.5 m (100 ft) with full line-of-sight.
- If your device can connect to the logger intermittently or loses its connection, move closer to the logger, within sight if possible.
- If the logger appears in the list, but you cannot connect to it, close HOBObot and power cycle the mobile device. This forces the previous Bluetooth connection to close.

Once the logger is connected, you can select one of the following actions:

- **Configure.** Select logger settings and load them onto the logger to start logging. See *Configuring the Logger*.
- **Readout.** Download logger data. See *Reading Out the Logger*.
- **Full Status Details.** Check the battery level and view the configuration settings currently selected for the logger.
- **Start Logging.** Select this option to begin logging (if the logger is configured to start "On Button Push" as described in *Configuring the Logger*).
- **Stop Logging.** Stop the logger from recording data. This overrides any other Stop Logging settings that may be configured.
- **Page Logger LED.** Press and hold this option to illuminate the alarm and status LEDs for 4 seconds.
- **Logger Password.** Select this to create a password for the logger that will be required if another mobile device attempts to connect to it. To reset a password, connect to the logger, tap Set Logger Passkey, and select Reset to Factory Default. You can also press the button on the logger for 10 seconds to reset the password.
- **Update Firmware.** When new logger firmware is available, this action appears in the list. Select it and follow the instructions on the screen. A logger readout will be completed automatically at the beginning of the firmware update process. If the connection is lost between the logger and the mobile device during the firmware update, a Firmware Update Pending Status displays for the logger in the HOBObot list. Connect to the logger and select Restore Logger (or Update Firmware if that option is available) to continue updating the firmware.

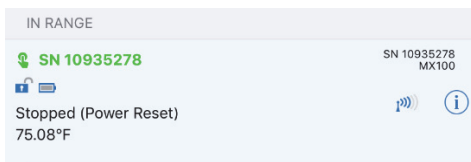
Important: Before updating the firmware on the logger, check the remaining battery level by selecting Full Status Details and make sure it is no less than 30%. Make sure you have the time to complete the entire update process, which requires that the logger remains connected to the device during the upgrade.

- **Force Offload.** This may appear if an error was encountered when loading configure settings. Select this to offload all the data on the logger before reconfiguring it.

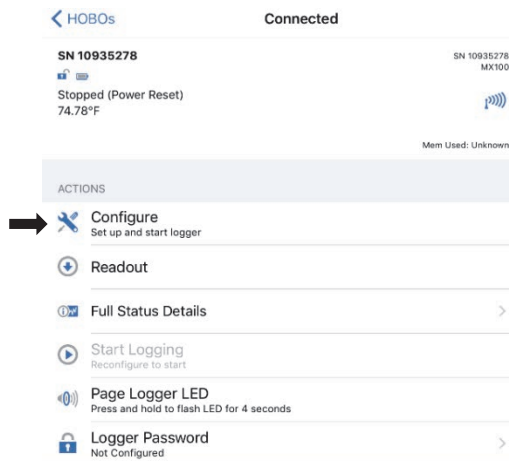
Configuring the Logger

Use HOBOMobile to set up the logger, including selecting the logging interval, start and stop logging options, configuring alarms, and other settings.

1. Press the button on the logger to wake it up.
2. Find the logger in the list and tap it to connect to it. If you are working with multiple loggers, you can press the button on the logger a second time to bring it to the top of the list. The logger name (or serial number if no name has been assigned) turns green when the logger moves to the top of the list. Note that the current temperature is displayed even when the logger is not logging.



3. Once connected, tap Configure.

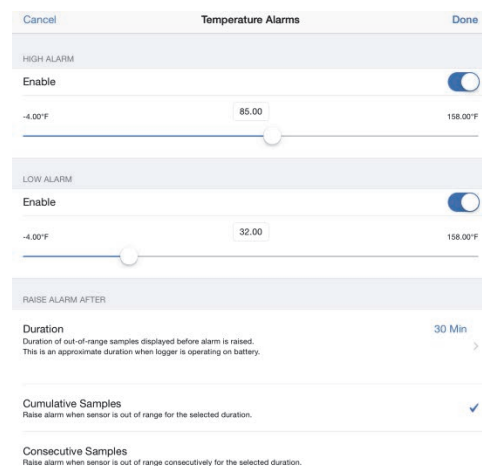


4. Tap Name and type a name for the logger up to 20 characters (optional). Tap Done. If no name is selected, the logger serial number is used as the name.
5. Tap Group to add the logger to the Favorites group, an existing custom group, or create a new group name up to 20 characters (optional). Tap Done.
6. Tap Logging Interval and choose how frequently the logger will record data.
7. Tap Start Logging and select when logging will begin:
 - **Now.** Logging will begin immediately after tapping Start in the Configure screen.
 - **On Next Logging Interval.** Logging will begin at the next even interval as determined by the selected logging interval.
 - **On Button Push.** Logging will begin once you press the button on the logger for 4 seconds.

- **On Date/Time.** Logging will begin at a date and time you specify. Select the Date and time and tap Done.

Tap Done in the Start Logging screen.

8. Tap Stop Logging and select the options for when logging will end.
 - a. Choose one of two memory options:
 - **When Memory Fills.** The logger will continue recording data until the memory is full.
 - **Never (Wrap When Full).** The logger will continue recording data indefinitely, with newest data overwriting the oldest.
 - b. Select On Button Push if you want to be able to stop logging by pushing the button on the logger for 4 seconds. Note that if you also choose On Button Push for the Start Logging option, then you will not be able to stop logging until 30 seconds after logging begins.
 - c. Select one of the following time options for when to stop logging:
 - **Never.** Select this if you do not want the logger to stop at any predetermined time frame.
 - **On Date/Time.** Select this if you want the logger to stop logging on a specific date and time. Select the date and time and then tap Done.
 - **After.** Select this if you want to control how long the logger should continue logging once it starts. Choose the amount of time you want the logger to log data and then tap Done. For example, select 30 days if you want the logger to log data for 30 days after logging begins.
 - d. Tap Done in the Stop Logging screen.
9. Tap the Temperature sensor to configure alarms (optional).
 - a. Enable the High Alarm if you want an alarm to trip when the sensor reading rises above the high alarm value. Drag the slider to the reading that will trip the alarm or tap the value field and type a specific reading. In this example, an alarm will trip when the temperature rises above 85°F.



- b. Enable the Low Alarm if you want an alarm to trip when the sensor reading falls below the low alarm value. Drag the slider to the reading that will trip the alarm or tap the

value field and type a specific reading. In the example, an alarm is configured to trip when the temperature falls below 32°F. **Note:** The actual values for the high and low alarm limits are set to the closest value supported by the logger.

- c. Under Raise Alarm After, select the duration before an alarm is tripped and tap Done in the Alarm Duration.
 - d. Select either Cumulative or Consecutive Samples. If you select Cumulative Samples, then the alarm will trip when the time the sensor is out of range over the course of the deployment is equal to the selected duration. If you select Consecutive Samples, then the alarm will trip when the time the sensor is continuously out of range is equal to the selected duration. For example, the high alarm for temperature is set to 85°F and the duration is set to 30 minutes. If Cumulative is selected, then an alarm will trip once a sensor reading has been at or above 85°F for a total of 30 minutes since the logger was configured; specifically, this could be 15 minutes above 85°F in the morning and then 15 minutes above 85°F again in the afternoon. If Consecutive is selected, then an alarm will trip only if all sensor readings are 85°F or above for a continuous 30-minute period.
 - e. Tap Done in the Temperature Alarms screen. Back in the Configure screen, a setting to maintain the alarm until the logger is reconfigured is enabled automatically. This cannot be disabled.
10. Enable or disable Show LED. If Show LED is disabled, the alarm and status LEDs on the logger will not be illuminated while logging (the alarm LED will not blink if an alarm trips). You can temporarily turn on LEDs when Show LED is disabled by pressing the button on the logger for 1 second.
 11. Enable or disable Bluetooth Always Off. If Bluetooth Always Off is disabled, the logger will “advertise” or regularly send out a Bluetooth signal for the phone or tablet to find via HOBOMobile while it is logging, which uses battery power. When Bluetooth Always Off is enabled, the logger will only advertise during logging when you press the button on the logger to wake it up, thereby preserving as much battery power as possible.
 12. Tap Start in the upper right corner of the Configure screen to load the settings onto the logger.



Logging will begin based on the settings you selected. See *Deploying the Logger* for details on mounting and see *Reading Out the Logger* for details on downloading.

If the logger was configured with alarm settings, an alarm will trip when the temperature reading is outside the range specified in the logger configuration. When an alarm trips, the logger alarm LED blinks every 4 seconds (unless Show LED is disabled), an alarm icon appears in the app, and an Alarm Out of Range event is logged. Even if the temperature reading

returns to a normal range, the alarm indicator will not clear in the app and the alarm LED will continue to blink.

Setting a Password

You can create an encrypted password for the logger that will be required if another phone or tablet attempts to connect to it. This is recommended to ensure that a deployed logger is not mistakenly stopped or purposely altered by others. This password uses a proprietary encryption algorithm that changes with every connection.

To set a password:

1. Tap the HOBOS icon (on Android devices) or tap the Devices icon and then tap Loggers at the top of the screen (on Apple devices). Select a logger in the In Range list to connect to it.
2. Tap Logger Password.
3. Type a password up to 10 characters.
4. Tap Save.

Only the phone or tablet used to set the password can then connect to the logger without entering a password; all other mobile devices will be required to enter the password. For example, if you set the password for the logger with your tablet and then try to connect to the device later with your phone, you will be required to enter the password on the phone but not with your tablet. Similarly, if others attempt to connect to the logger with different devices, then they would also be required to enter the password. To reset a password, connect to the logger, tap Set Logger Passkey, and select Reset to Factory Default or press the button on the logger for 10 seconds.



Reading Out the Logger

To download data from the logger:

1. Tap the HOBOS icon (on Android devices) or tap the Devices icon and then tap Loggers at the top of the screen (on Apple devices). Tap the logger to connect to it. If the logger was configured with Bluetooth Always Off enabled, press the button on the logger to wake it up. When working with multiple loggers, you can also press the button on the logger to bring it to the top of the list.
2. Once connected, tap Readout.
3. Tap the Data Files icon to view a mini-graph of the downloaded data.
4. Tap the mini-graph to view a larger version of the graph or to share the file. See the *HOBOMobile User's Guide* for details on viewing graphs and sharing data.

Data can also be uploaded automatically to HOBOLink, Onset's web-based software. Tap the Settings icon to enable the HOBOLink Upload Data option (this requires a HOBOLink account at www.hobolink.com). See the *HOBOMobile User's Guide* for more details on this setting and see the HOBOLink help for details on working with data in HOBOLink. **Note:** MX100 loggers are not supported by the HOBOMobile Gateway. Contact Onset Technical Support for questions on MX100 logger compatibility with the gateway.

Logger Events

The logger records the following events to track logger operation and status. To plot events in HOBOMobile, tap a mini-graph and then tap . Select the events you wish to plot and then tap  again. You can also view events in shared or exported data files.

Event Name	Definition
Host Connect	The logger was connected to a mobile device.
Started	The logger started logging.
Stopped	The logger stopped logging.
Alarm Out of Range/In Range	An alarm has occurred because the reading was outside the alarm limits or back within range. Note: Although the reading may return to a normal range, the alarm indicator will not clear in the app and the alarm LED will continue to blink until you reconfigure the logger.
Safe Shutdown	The battery level dropped below a safe operating voltage and performed a safe shutdown.

Deploying the Logger

You can deploy the logger by using tape or the mounting loop.

- On the back of the logger, remove the backing on the tape that is adhered to the top and bottom of the logger and then mount it on a flat surface.
- Use the mounting loop to tie the logger to another object.

The logger can be placed in indoor locations that experience condensation. Although the logger can withstand incidental splashing with water, do not deploy it in a permanently wet location.


Protecting the Logger

Note: Static electricity may cause the logger to stop logging.

The logger has been tested to 8 KV, but avoid electrostatic discharge by grounding yourself to protect the logger. For more information, search for “static discharge” on www.onsetcomp.com.

Battery Information

The logger uses one CR2450 non-replaceable lithium battery. Battery life is 1 year, typical with a logging interval of 1 minute, but may be extended to 2 years when the logger is configured with Bluetooth Always Off enabled. Expected battery life varies based on the ambient temperature where the logger is deployed and the frequency of connections, downloads, and paging. Deployments in extremely cold or hot temperatures or a logging interval faster than 1 minute can impact battery life. Estimates are not guaranteed due to uncertainties in initial battery conditions and operating environment.

 **WARNING:** Do not cut open, incinerate, heat above 85°C (185°F), or recharge the lithium battery. The battery may explode if the logger is exposed to extreme heat or conditions that could damage or destroy the battery case. Do not dispose of the logger or battery in fire. Do not expose the contents of the battery to water. Dispose of the battery according to local regulations for lithium batteries.

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Industry Canada Statements

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Avis de conformité pour l'Industrie Canada

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

To comply with FCC and Industry Canada RF radiation exposure limits for general population, the logger must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.