

# M-300 Series



## User Guide



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# Contents

<b>Notices and Safety</b> .....	<b>5</b>
Disclaimer and Limitation of Liability .....	5
Safety Instructions .....	5
Battery Warnings .....	5
FCC Statements .....	5
FCC part 15 Modular Qualification.....	5
FCC RF Radiation Exposure Statement .....	6
IC Statements (Industry Canada RSS-210 Modular Qualification – IC: 12208A-04) .....	6
Conformity with European Regulations .....	6
Bluetooth .....	6
WEEE Compliance.....	7
Environmental Protection .....	7
RoHS Compliance.....	7
<b>Introduction</b> .....	<b>8</b>
Summary.....	8
Package contents.....	9
Companion Products.....	9
EDGEVue Mobile .....	10
EDGEVue Web.....	10
OCEABridge .....	11
Process Summary.....	11
Placing the M-300 Series Module .....	12
Links to Download User Guides.....	12
M-300 Series Features.....	12
<b>Battery Installation</b> .....	<b>14</b>
M-300 Battery (-40°C to +85°C) Modules.....	14

**Using the M-300 Series Module ..... 16**

- Using the M-300 Series Magnet..... 16
- Mounting M-300 Series with the Magnet ..... 17
- Programming Your Module with EDGEVue Mobile..... 17
- Using the LED to Check Module Status ..... 18

**Maintaining Your Modules ..... 19**

- Cleaning Instructions..... 19

**Battery Life..... 20**

- Battery Details..... 20
  - M-300 (-40°C to +85°C) Modules ..... 20
- Estimated Operating Lifetime..... 20
  - M-300 Series -40°C to +85°C Modules ..... 21

# Notices and Safety

## Disclaimer and Limitation of Liability

Temptime assumes no responsibility for any loss or claims by third parties which may arise through the use of this product. In particular, users must not use the product in any manner not specifically indicated by Temptime. Temptime shall not be held liable for improper use of this product. This document is non-contractual and subject to change without notice.

## Safety Instructions



**IMPORTANT:** Do not use this product for protection or as part of an automated emergency system or as for any other application that involves protecting people and/or property. Customers and users of Temptime products are responsible for making sure that the product is fit for the intended usage. Do not open the product casing and do not disassemble or modify internal components in any manner. Temptime products do not contain any internal components that require user intervention or repair. If the device shows signs of improper operation, disconnect it immediately from its power source and contact Temptime technical services.

## Battery Warnings



Temptime M-300 Series modules contains a lithium battery. Make sure you respect polarity (+/-) when inserting batteries into Temptime devices. Reversing polarity by inserting the batteries incorrectly can cause the product to heat up, and may lead to battery liquid leakage. Use only batteries recommended by Temptime. Do not change battery types, such as rechargeable, alkaline and magnesium, or use batteries of different brands, or even different types of batteries of the same brand. Incorrect batteries may cause the device to heat up, and may result in a fire or battery liquid leakage. Never dispose of batteries in fire. Do not charge regular batteries that are not specifically rechargeable. When the battery is low, or in case the battery-operated device in question remains unused for a lengthy period of time, remove the battery from the device in order to avoid any risk of battery liquid leakage. Never leave batteries within the reach of children. In case of a battery leak, avoid all contact with the liquid present on the batteries. Rinse with clear water immediately in case the battery liquid comes into contact with the eyes, mouth or skin. Contact a doctor or emergency service immediately. Battery liquid is corrosive and can damage vision, or cause blindness or chemical burns.

## FCC Statements

### FCC part 15 Modular Qualification

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.

(2) This device must accept any interference received, including interference that may cause undesired operation.

### FCC RF Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

### IC Statements (Industry Canada RSS-210 Modular Qualification – IC: 12208A-04)

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.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

### Conformity with European Regulations

Temptime M-300 Series (Bluetooth component BMD-300) is compliant with the essential requirements and other relevant requirements of the following standards and/or normative documents.

- Directives:
  - 2014/53/EU Radio Equipment Directive (RED)
  - 2014/30/EU EMC Directive
  - 2014/35/EU Low Voltage Directive
- In application of the following standards
  - EN 61326-1: 2012
  - EN 301 489-1 V1.9.2
  - EN 301 489-3: V1.6.1
  - EN 301 489-17 V2.2.1
  - EN 300 330-2 V2.1.1
  - EN 300 328 V2.1.1
  - CEI 61010-1: 2010

### Bluetooth

- RF-PHY Component (Tested) – DID: D030629
- QDID: 81876

### WEEE Compliance

This wireless device complies with the essential requirements and other relevant provisions of the Waste Electrical and Electronic Equipment Directive 2002/96/EC (WEEE Directive).

## Environmental Protection

Please respect local regulations concerning disposal of packaging, unused wireless devices and their accessories, and promote their recycling.



## RoHS Compliance

The wireless device complies with the restriction of the use of certain hazardous substances in electrical and electronic equipment, 2011/65/EU Restriction of Hazardous Substances Directive (RoHS Directive). Do not dispose of this product with household trash. Temptime recycles this product under certain conditions. Please contact us for more information.



# Introduction

Congratulations and thank you for choosing the Temptime M-300 Series wireless monitoring solution.

## Summary

The Temptime M-300 is a Bluetooth-enabled wireless device designed to monitor temperature-sensitive products during product shipment or storage. With its small size and optional magnetic mount, the M-300 can be placed easily inside many types of product packaging and containers where it tracks temperature according to parameters that you can define for your specific needs.

**Figure 1** M-300



1	Status indicator light
---	------------------------

The M-300 records ambient temperature at regular intervals and stores the information in its memory. The M-300 features a replaceable battery, and may be used multiple times.



**Figure 2** M-300-P with External Temperature Sensing Probe



The M-300-P is an extended range model similar to the M-300 that uses an external temperature sensing probe. The M-300-P module and EDGEVue software operate identically for both M-300 and M-300-P.

By using the Temptime M-300 Series with specially designed companion products, you can benefit from a flexible temperature monitoring solution that adapts to many usage scenarios, from low- to very high-volume needs. With this solution, you can keep track of critical temperature information wirelessly at different times and points along the route.

## Package contents

- One M-300 module with an internal temperature sensor (M-300 model only)
- One M-300-P module (M-300-P model only)
- One PT100 external probe sensor (M-300-P model only)
- One replaceable Lithium battery
- One mounting kit with magnet / screws
- One additional color ID ring (M-300 model only).

## Companion Products

The M-300 Series dataloggers are designed to work with several different types of companion products from Temptime, in particular, depending on the volume of modules you intend to use, and whether or not you wish to use the EDGECloud online tools.



**IMPORTANT:** The M-300 Series datalogger must only be used with companion products approved and recommended by Temptime.

## EDGEVue Mobile

The EDGEVue Mobile Application for iOS and Android offers numerous features (refer to the EDGEVue Mobile Application User Guide for more information).



Notably, it allows you to:

- Program all datalogging settings on M-300 Series modules, including temperature ranges, alarm limits, and the module's startup mode.
- Read and geolocate data collected from the module wirelessly.
- Push mission and temperature data to the EDGECloud online service (Note: M-300 Series modules include free data storage and access on EDGECloud).

## EDGEVue Web

EDGEVue Web is a web application that allows you to access and analyze M-300 Series mission information (notably temperature, location, and other key events) that is pushed to the EDGECloud service either manually by users with smartphones or automatically by the OCEABridge gateway.



## OCEABridge

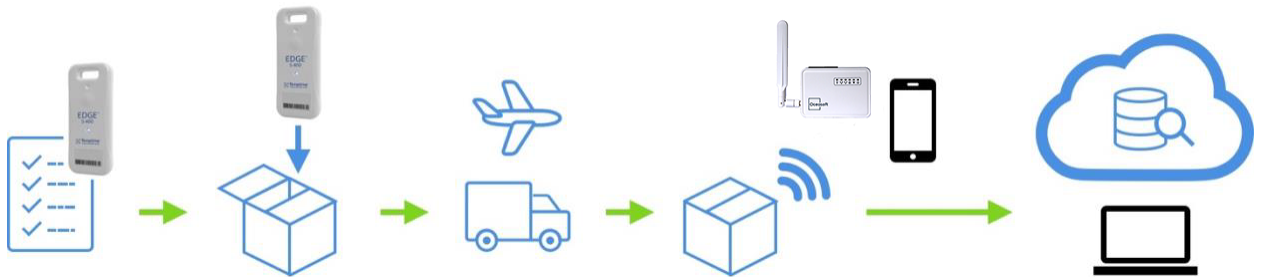
Placed at a central location in a storage or shipping facility, OCEABridge automatically collects data via Bluetooth when it detects Temptime M-300 Series devices within wireless range. It then forwards the data to the EDGECloud online platform, where you can access it with EDGEVue Web.



## Process Summary

Here is a sample overview of the tracking process using M-300 Series dataloggers.

**Figure 3** End-to-End Cycle from Packaging to Data on EDGECloud



## Placing the M-300 Series Module

M-300 Series is designed to be placed directly inside the product package or container whose temperature you would like to monitor.

Depending on the situation, you may choose to use the provided magnet to fix the datalogger to the side of the container, or leave it loose inside a product box.



## Links to Download User Guides

You may download the user guides related to the companion products described above from [zebra.com/electronictempsensorsupport](https://zebra.com/electronictempsensorsupport).

## M-300 Series Features

- Wireless technologies
  - Bluetooth Smart for reading and transmitting data.  
Range: Up to about 50 meters (160 ft.) in line-of-sight  
Frequency (worldwide): 2.4 GHz  
Max output: 4 dBm
  - Flight mode to stop wireless activity during air flight (RTCA DO-160 compliant)
- Monitoring
  - Temperature range:
    - -40 to +85°C (M-300)
    - -200 to +200°C (M-300-P w/external Pt100 sensor probe)
  - Reading precision up to 0.3°C:

## Introduction

- $\pm 0.25^{\circ}\text{C}$  for temperature range between  $0^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$
- $\pm 0.5^{\circ}\text{C}$  for temperature range between  $-20^{\circ}\text{C}$  to  $0^{\circ}\text{C}$  and  $+70^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Sensor resolution:  $0.0625^{\circ}\text{C}$
- Configurable high/low alarm limits, delays, alerts, transmission interval
- Read interval from 15 to 59 seconds, or 1 to 255 minutes
- Data storage:
  - Unlimited data storage on EDGECloud
  - 16,000 readings stored in internal memory, with option to overwrite oldest data or stop datalogging when memory is full (corresponds to approximately 111 days when reading every 10 minutes)
- Automatic and spontaneous alarm transmission (alarms transmitted as they occur, captured by EDGEVue software running in Watch Mode or by OCEABridge gateway)
- LED indicator for alarm status & communication
- Customizable module name
- Casing and dimensions
  - IP67 product protection index (IP40 for PT100)
  - ABS / Aluminum casing
  - Unique serial number for every module
  - Dimensions: Diameter - 50 mm (2 in.); Depth - 22 mm (0.87 in.)
  - Weight: 57 g (2.0 oz.)
  - Magnet / screws mount
- Operating and storage conditions
  - Indoor use only
  - Designed for altitudes up to 6,500 feet (2,000 meters)
  - Module operating range:
    - $-40$  to  $+85^{\circ}\text{C}$  (M-300)
  - Module storage conditions:  $0^{\circ}\text{C}$  to  $30^{\circ}\text{C}$  ( $32^{\circ}\text{F}$  and  $86^{\circ}\text{F}$ ); 0 to 99.99% relative humidity non-condensing
  - Pollution degree: 3
- Battery
  - User-replaceable Lithium battery
  - Battery life up to 52 weeks (M-300), up to 26 weeks
  - The shelf life (before first use) depends mainly on the storage temperature. To benefit from a full year of operation we recommend storing M-300 Series modules between about  $20^{\circ}\text{C}$  and  $30^{\circ}\text{C}$  ( $68^{\circ}\text{F}$  and  $86^{\circ}\text{F}$ ). See [Battery Life on page 20](#), for estimated operating and storage times.

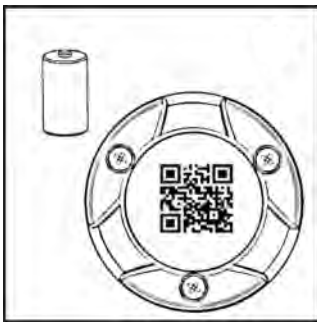
# Battery Installation

M-300 Series modules feature a replaceable battery.

To get started, you must insert the battery into your module.

## M-300 Battery (-40°C to +85°C) Modules

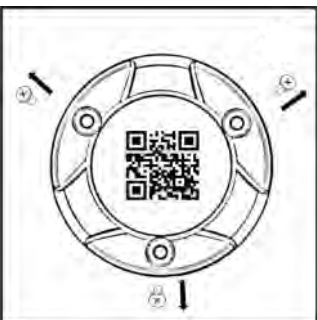
1. The Lithium battery is provided in the product box.



2. Unscrew three screws on the back of the module (turn counterclockwise).

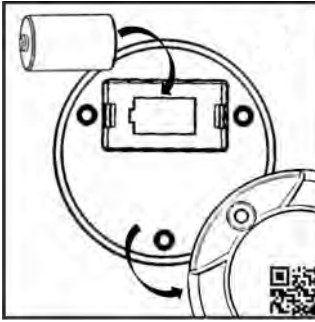


3. Remove the screws.

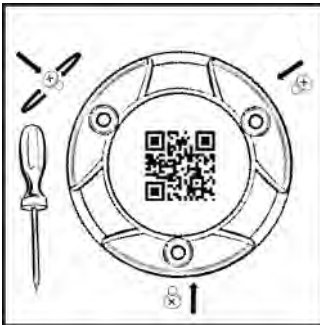


## Battery Installation

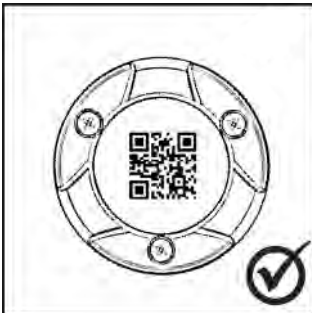
4. Place the battery in the slot, matching polarity to the battery slot.



5. Replace screws (turn clockwise). Ensure that the rubber seal is well seated.



6. M-300 is ready to use.



# Using the M-300 Series Module

Generally speaking, most of the useful features provided by M-300 Series are activated or accessed through the companion software and hardware tools. The module itself is quite simple, with just the magnet and the LED light.

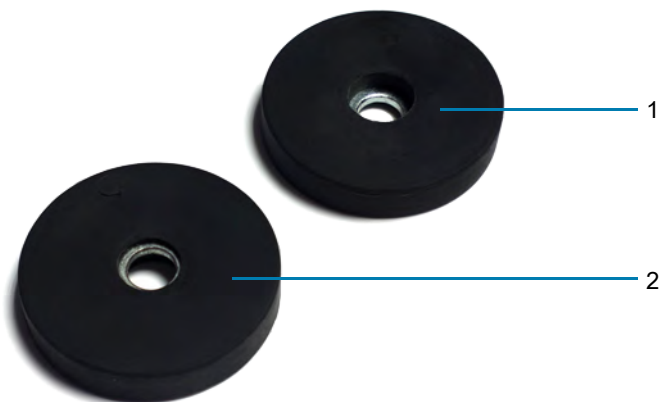
## Using the M-300 Series Magnet

M-300 Series includes a magnet that can be used both for mounting the module onto a magnetic surface or to trigger actions (disabling Flight mode, checking the status of a mission).

You may fix the magnet to a metallic wall or insert a screw to fix it onto other types of surfaces.

The provided magnet has a weak and a strong side. The metal ring is close to the edge on the weak side of the magnet. The deeper recess on the other side indicates stronger side.

**Figure 4** M-300 Magnet



1	Deeper recessed ring indicates magnet strong side
2	Ring near magnet edge is magnet weak side



### Mounting M-300 Series with the Magnet

Simply place the module onto the magnet as shown in [Figure 5](#), with the strong side facing the module.

**Figure 5** Mounting M-300 on Magnet





### Programming Your Module with EDGEVue Mobile









Inserting the battery into your module enables Bluetooth connectivity. The LED blinks blue and the M-300 Series may be discovered by EDGEVue Mobile.

When within wireless range, you will see the device listed in the EDGEVue Mobile display, at which point you may connect to it to configure a mission. Please see the user manual provided with EDGEVue Mobile for details on that step.

## Using the LED to Check Module Status

The color LED on the front of the M-300 Series module indicates module status. The LED on M-300 Series modules is activated by passing the magnet in front of the module, offering different patterns based on status, as shown below:

General ( ● = short flash)	
Bluetooth is activated for 1 minute if the module is in one of these states: <ul style="list-style-type: none"> <li>• Flight Mode</li> <li>• Battery Low</li> </ul>	 <p>(blinks blue once every 10 seconds for 1 minute)</p>
Module currently connected via Bluetooth	 <p>(blinks blue twice every six seconds for one minute)</p>

Mission status ( ● = short flash, ● fixed for three seconds)				
	No mission programmed	Mission programmed and waiting to start	Mission started	Mission stopped
Everything OK				
Alarm in progress	n/a	n/a		
Alarm occurred	n/a	n/a		

This same behavior is obtained using the EDGEVue mobile application, with the Blink LED to identify module function, as described in the EDGEVue User Guide.

# Maintaining Your Modules

## Cleaning Instructions

You occasionally may need to clean your M-300 Series modules depending on site or environmental conditions.

Here are some recommendations and guidelines for cleaning your modules:

- Clean using a soft cloth with water, a detergent or isopropanol.
- Do not use any aggressive cleaning agents or scratching cleansers that might cause damage to your datalogger.

# Battery Life

Many factors have an influence on M-300 Series battery life, both during use and in storage before being used. Here are the main considerations to take into account when evaluating product battery life:

- Ambient temperature: battery capacity is diminished when subject to very cold operating and/or storage conditions.
- Wireless communications: Bluetooth connections, from the EDGEVue software to the M-300 Series module, consume battery power. Logically, the more you connect, the more you use the battery.

However, it is worth noting that no connection is established when using M-300 Series with the OCEABridge gateway, or when simply viewing M-300 Series devices in EDGEVue (without going into details). In that case, only the Bluetooth advertisement frames are read, and Bluetooth emits those frames regularly, whether or not you connect.



**NOTE:** The reading frequency does not have significant impact on battery life. Because of the product's optimized electrical architecture and circuitry, there is no significant difference, in terms of battery life, if the sensor reads and stores data once every ten minutes or once every minute.

## Battery Details

### M-300 (-40°C to +85°C) Modules

- Type: User-replaceable battery
- Type Number: ER ½ AA
- CEI designation: 14250
- System: Primary Li-Thionyl / Chloride / LiSOCl<sub>2</sub>

## Estimated Operating Lifetime

The chart below shows estimated battery life (in weeks) at various temperatures, with the temperature representing the module's operating (ambient) temperature.

This information is based on:

- Storage for one year before first use
- One reading per minute

## M-300 Series -40°C to +85°C Modules

Figure 6 Battery Life Estimation for -40°C to +85°C Module

