

S-400



User Guide



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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 S-400 Series™ modules contain a non-rechargeable, non-removable lithium battery. Battery life is influenced by operating temperatures.

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 S-400 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 S-400 Series wireless monitoring solution.

Summary

Temptime S-400 Series is a Bluetooth-enabled wireless device designed to monitor temperature-sensitive products during shipping. With its small footprint, S-400 Series fits conveniently inside many types of product packaging and containers, where it tracks temperature according to parameters that you can define for your specific needs.



1	Pushbutton to check status or activate module
2	Status indicator light

S-400 Series records ambient temperature at regular intervals and stores the information in its memory. S-400 Series is designed for relatively short-term operation for shipping applications lasting about 12 months. The battery in S-400 Series is not replaceable.

By using Temptime S-400 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 without having to open any containers.

Package Contents

- One S-400 Series module with internal temperature sensor
- Adhesive tape for mounting.

Companion Products

The S-400 Series datalogger is 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 S-400 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 S-400 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: S-400 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 S-400 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

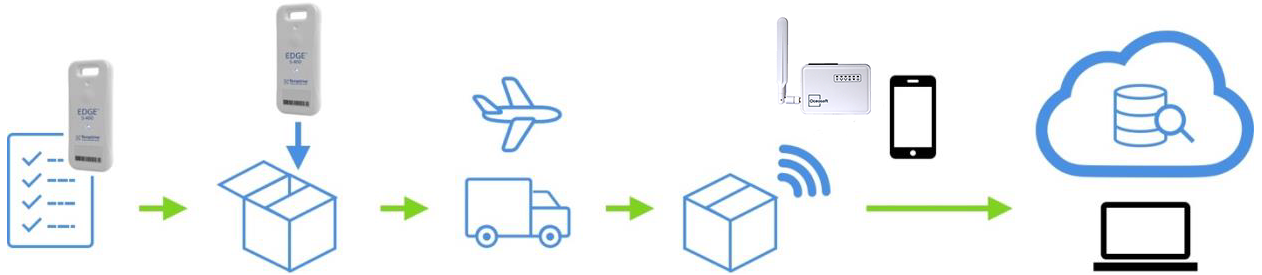
Placed at a central location in a storage or shipping facility, OCEABridge automatically collects data via Bluetooth when it detects Temptime S-400 Series devices within wireless range. It then forwards the data to the EDGECloud online platform, where you can access it with EDGEVue Web.



Process Summary

Here is a sample overview of the tracking process using S-400 Series dataloggers.

Figure 1 End-to-End Cycle from Packaging to Data on EDGECloud



Placing Your S-400 Series Module

S-400 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 adhesive 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.

S-400 Series Features

- Wireless Technologies:
 - Bluetooth Smart for reading and transmitting data. (Bluetooth 5.0 Ready) 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: -30 to +70°C
 - Humidity range: 0 to 99.99% non-condensing
 - Reading precision: $\pm 0.3^{\circ}\text{C}$
 - Sensor resolution: 0.01°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 autonomy 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:
 - IP30 product protection index
 - ABS casing
 - Unique serial number for every module
 - Dimensions:
 - H: 81 mm (3.2 in.)
 - W: 43.4 mm (1.4 in.)
 - D: 8.2 mm (0.3 in.)
 - Weight: 26.2 g (0.9 oz.)
 - Adhesive mount (optional)
- Operating and storage conditions
 - Indoor use only
 - Designed for altitudes up to 6,500 feet (2,000 meters)
 - Module operating range: -30 to +70°C
 - Module storage conditions: 0°C to 30°C (32°F and 86°F); 0 to 99.99% relative humidity non-condensing
 - Pollution degree: 3
- Battery
 - Non-replaceable Lithium battery
 - Battery life up to 12 months

The shelf life (before first use) depends mainly on the storage temperature. To benefit from a full year of operation we recommend storing S-400 Series modules between about 10°C and 20°C (50°F and 68°F).

See [Battery Life on page 16](#) for estimated operating and storage times.

Using Your S-400 Series Module

Generally speaking, most of the useful features provided by S-400 Series are activated or accessed through the companion software and hardware tools. The module itself is quite simple, with just two user interface functions: the pushbutton and the LED light.

Using the Pushbutton

The S-400 Series pushbutton is used to either to:

- Activate Bluetooth on the module so you can program it with the EDGEVue mobile application on your smartphone or tablet, or
- Check device status with the LED (color codes described below).

Activating Bluetooth to Program with EDGEVue Mobile

Upon delivery from the factory, S-400 Series modules are in a mode called deep sleep. That mode is used to preserve battery life before the module is used. Wireless communication and datalogging are both deactivated in deep sleep.



When you want to program your S-400 Series module via Bluetooth using the EDGEVue Mobile application, you must first activate it.

To activate an S-400 Series module:

1. Press and hold the pushbutton on the front of the S-400 Series module for 3 seconds.
2. Bluetooth is activated, the LED blinks blue, and the S-400 Series may be discovered by EDGEVue Mobile for 1 minute.
3. During that period, you will see the device listed in the EDGEVue Mobile display, at which point you may connect to it to configure a mission.

Using the LED to Check Module Status

The color LED on the front of the S-400 Series module indicates module status. The LED on S-400 Series modules is activated by pressing the button on the 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"> • Deep sleep • Flight Mode • Battery Low 	 <p>(blinks blue once every 10 seconds for 1 minute)</p>
Module currently connected via Bluetooth	 <p>(blinks blue twice every 6 seconds for one minute)</p>

Mission status (● = short flash, ● fixed for 3 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 S-400 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 S-400 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 S- 400 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 S-400 Series with the OCEABridge gateway, or when simply viewing S-400 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

S-400 Series is designed as a single-use temperature monitoring solution, and thus contains a non-user-replaceable battery.

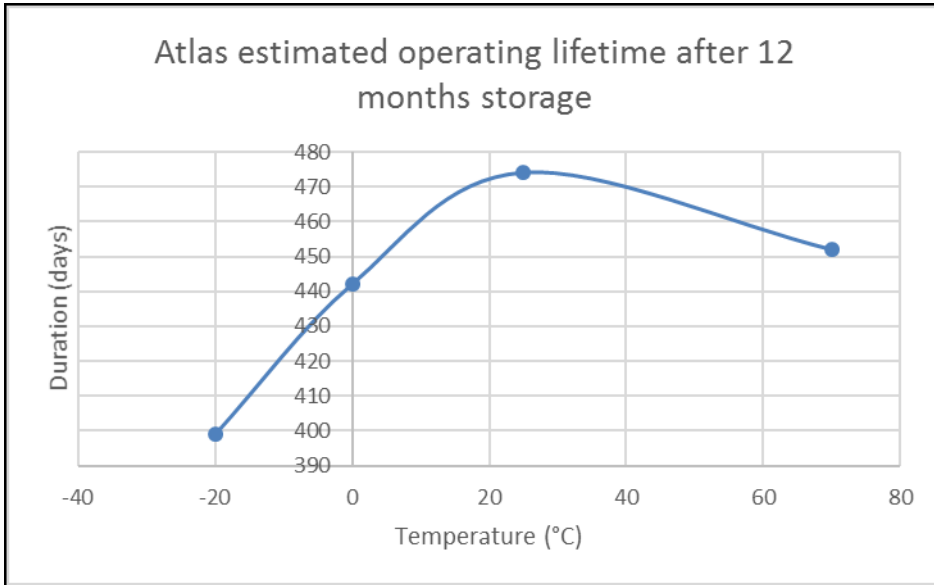
- Battery type: CR2450N
- System: Li / MnO₂
- Nominal voltage: 3 VDC.

Estimated Operating Lifetime

The following chart shows estimated S-400 Series operating lifetime based on:

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

Figure 2 S-400 Series Battery Operation Estimation After 12 Months in Storage



Estimated Shelf-life (Storage Prior to Use)

S-400 Series is designed to provide operation for 12 months, generally on a single mission. In order to ensure 12 months of reliable operation, it is important for the product to be used within a reasonable period of time after manufacturing. A Use by date is indicated on the product packaging.

The chart below shows estimated shelf life for S-400 Series at various temperatures, to ensure 12 months operation with 1 reading per minute (number of connections and downloads not counted here).

Figure 3 S-400 Series Battery Shelf-life Estimation to Ensure 12 Months Operation

