



InTemp CX400 series loggers measure temperature in indoor monitoring applications. Designed to meet World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) guidelines, this logger is ideal for clinical applications, such as vaccine storage and pharmaceutical manufacturing. This Bluetooth® Low Energy-enabled logger is designed for wireless communication with a mobile device. Using the InTemp app, you can easily configure the logger with one of four preset configurations designed for ambient storage, clinical refrigerator, freezer, or refrigerator monitoring or you can set up a custom configuration for other applications. You can also quickly perform daily logger checks, download reports, and monitor tripped alarms. Use the built-in LCD screen to check the current temperature, daily maximum or minimum temperatures, logging status, battery use, and more. The CX402 model uses a 2- or 4-meter probe and is available with a 5, 15, or 30 mL glycol bottle (bottle holder included). It also contains an internal sensor for ambient temperature monitoring. The CX403 model is available with an internal sensor only.

## Specifications

### InTemp CX Temperature Logger

#### Models:

- CX402-T205, 2 meter probe and 5 mL glycol bottle
- CX402-T215, 2 meter probe and 15 mL glycol bottle
- CX402-T230, 2 meter probe and 30 mL glycol bottle
- CX402-T405, 4 meter probe and 5 mL glycol bottle
- CX402-T415, 4 meter probe and 15 mL glycol bottle
- CX402-T430, 4 meter probe and 30 mL glycol bottle
- CX402-T2M, 2 meter probe
- CX402-T4M, 4 meter probe
- CX403

#### Included Items:

- Double-sided tape (for models with glycol bottles)
- Two AAA 1.5 V alkaline batteries
- Battery door and screw
- NIST Certificate of Calibration

#### Required Items:

- InTemp app
- Device with iOS 8.3–9.2 or Android™ 4.4, 5.0, or 5.1 and Bluetooth 4.0

#### External Temperature Probe

<b>Range</b>	-40° to 100°C (-40° to 212°F)
<b>Accuracy</b>	±0.5°C from -15° to 80°C (±0.9°F from 5° to 176°F) ±1.0°C from -40° to -15°C (±1.8°F from -40° to 5°F) ±0.7°C from 80° to 100°C (±1.3°F from 176° to 212°F)
<b>Resolution</b>	0.024°C at 25°C (0.04°F at 77°F)
<b>Drift</b>	<0.1°C (0.18°F) per year
<b>Response Time</b>	Probe only: 1 minute 30 seconds typical to 90% in air moving 1 m/s With 5 mL bottle: 10 minutes typical to 90% in air moving 1 m/s With 15 mL bottle: 20 minutes typical to 90% in air moving 1 m/s With 30 mL bottle: 25 minutes typical to 90% in air moving 1 m/s
<b>Cable Length</b>	2 or 4 meter (6.56 or 13.12 feet) flat ribbon cable
<b>Probe Dimensions</b>	Food-grade stainless steel probe with pointed tip, 53.34 mm (2.1 inches) long, 3.18 mm (0.125 inches) diameter



#### Ambient Temperature Sensor

<b>Range</b>	-30° to 70°C (-22° to 158°F)
<b>Accuracy</b>	±0.5°C from -15° to 70°C (±0.9°F from 5° to 158°F) ±1.0°C from -30° to -15°C (±1.8°F from -22° to 5°F)
<b>Resolution</b>	0.024°C at 25°C (0.04°F at 77°F)
<b>Drift</b>	<0.1°C (0.18°F) per year
<b>Response Time</b>	15 minutes typical to 90% in air moving 1 m/s

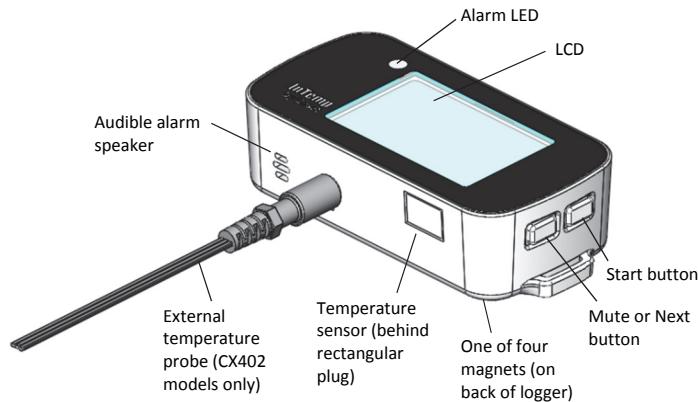
#### Logger

<b>Radio Power</b>	1 mW (0 dBm)
<b>Transmission Range</b>	Approximately 30.5 m (100 ft) line-of-sight
<b>Wireless Data Standard</b>	Bluetooth Low Energy (Bluetooth Smart)
<b>Logger Operating Range</b>	-30° to 70°C (-22° to 158°F), 0 to 95% RH (non-condensing)
<b>Logging Rate</b>	1 second to 18 hours
<b>Time Accuracy</b>	±1 minute per month at 25°C (77°F)
<b>Battery Type</b>	Two AAA 1.5 V alkaline or lithium batteries, user replaceable
<b>Battery Life</b>	1 year, typical with logging interval of 1 minute. Faster logging intervals, remaining connected with the InTemp app, excessive report generation, numerous audible alarms, and paging all impact battery life.
<b>Memory</b>	128 KB (84,650 measurements, maximum)
<b>Full Memory Download Time</b>	Approximately 60 seconds; may take longer the farther the device is from the logger

## Specifications (continued)

<b>LCD</b>	LCD is visible from 0° to 50°C (32° to 122°F); the LCD may react slowly or go blank in temperatures outside this range
<b>Dimensions</b>	9.4 x 4.5 x 2.59 cm (3.7 x 1.77 x 1.02 inches)
<b>Weight</b>	90.2 g (3.18 oz)
<b>Environmental Rating</b>	IP54
	The CE Marking identifies this product as complying with all relevant directives in the European Union (EU).
	See last page

## Logger Components and Operation



**Start Button:** Press this button for 1 second to start the logger when it is configured to start “on button push” (see *Configuring the Logger*).

**Mute or Next Button:** Press this button for 1 second to mute a beeping alarm (see *Logger Alarms*). For CX402 loggers, press this button for 1 second to switch between the external probe and ambient internal sensor temperature readings.

**Magnets:** There are four magnets on the back of the logger (not shown in diagram) for mounting.

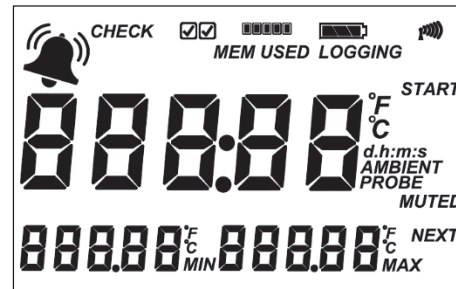
**Temperature Sensor:** This internal sensor measures ambient temperature.





**External Temperature Probe:** This is the probe that is plugged into the logger for measuring temperature (CX402 models only).

**Audible Alarm Speaker:** This is the speaker for the audible alarm that beeps when an alarm is tripped or the external probe is removed (if applicable).

**Alarm LED:** This LED blinks every 5 seconds when an alarm is tripped or the external probe is removed (if applicable). See *Logger Alarms*.

**LCD:** This screen shows the latest temperature reading and other status information. The LCD screen refreshes at the same rate as the logging interval. The example shows all symbols illuminated on the LCD screen followed by a table with descriptions of each symbol.



LCD Symbol	Description
	An alarm has tripped because the temperature reading is outside the specified range
CHECK <input type="checkbox"/>	The logger has been configured to perform daily or twice daily checks (twice daily is shown in this example), but no checks have been performed yet.
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	The once daily or twice daily logger check (twice in this example) has been performed.
MEM USED 	This indicates how much memory has been used for the current deployment. In this example, approximately 40 percent of the memory has been used.
	The shows the approximate battery power remaining.
LOGGING	The logger is currently logging.
	The logger is currently connected to a phone or tablet via BlueTooth. The more bars there are, the stronger the signal.
START	The logger is waiting to be started. Press and hold the Start button for 3 seconds to start the logger.
37.82 <sup>°F</sup> PROBE	This is an example of a temperature reading from an external probe.
68.45 <sup>°F</sup> AMBIENT	This is an example of a temperature reading from the internal sensor.
36.58 <sup>°F</sup> MIN	This is an example of a minimum temperature, which is the lowest probe temperature reading from the day (CX402 models) or the lowest ambient temperature reading (CX403 model).
40.23 <sup>°F</sup> MAX	This is an example of a maximum temperature, which is the highest probe temperature reading from the day (CX402 models) or the lowest ambient temperature reading (CX403 model).
Error and PROBE	The external probe is not connected to the logger (if applicable).

LCD Symbol	Description
MUTE or MUTED	MUTE indicates an alarm is beeping. Turn off the beeping alarm by pressing the Mute button. The LCD then changes to MUTED.
CHIRP OFF	The audible alarm has been muted.
05:38	The logger has been configured to start logging on a delay. The display will count down in days, hours, minutes, and seconds until logging begins. In this example, 5 minutes and 38 seconds remain until logging will begin.
LoAd	The configuration settings are being loaded onto the logger from the app.
Err	An error occurred while loading the configuration settings onto the logger from the app. Try reconfiguring the logger.
HELLO	The logger was paged from the app.
Stop	The logger has been downloaded and stopped with the app or because the memory is full.
boot	The logger is being updated with new firmware.

**Note:** If the logger has stopped logging because the memory is full, the LCD screen will remain on with “STOP” displayed until the logger is downloaded to your mobile device. Once the logger has been downloaded, the LCD will turn off automatically after 2 hours. The LCD will turn back on the next time the logger connects with your device.

## Getting Started

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

- 1. Install the batteries and battery door.** Insert two AAA batteries in the logger, observing polarity. Insert the battery door in the back of the logger making sure it is flush with the rest of the logger case. Use the included screw and a Phillips-head screwdriver to screw the battery door into place.
- 2. Insert the external probe (if applicable).**
- 3. Download InTemp.** Go to the App Store® or Google Play™ and download the InTemp app to your phone or tablet.
- 4. Open the InTemp app.** Enable Bluetooth in your device settings if prompted.
- 5. Set up a user account.** Enter your email address, first and last name, and a password. You can also enter a company name, add notes and select a profile photo. Tap Save when done entering your user settings and log in to the account when prompted.
- 6. Connect to the logger.** In the Loggers screen, find the logger in the list (if more than one is in range of your device), and tap the logger to connect to it.



If you are having trouble connecting:

- 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 the app, power down the mobile device, and then turn it back on. This forces the previous Bluetooth connection to close.

- 7. Configure the logger.** Once connected, tap Configure. Swipe left and right to select one of the preset logger configurations (Ambient Storage, Clinical Refrigerator, Freezer, or Refrigerator). Type a name for this logger deployment and tap Start to load the selected configuration to the logger and start logging. **Note:** You can also create your own custom configuration under Settings. See *Configuring the Logger* for details.

Once logging begins, the logger will display the current temperature reading and the minimum and maximum readings within the current 24-hour period (midnight from one day to midnight the next day). These values are also available in the logger reports (see *Downloading the Logger and Generating Reports*).

For CX402 models, you can click Next to switch between external probe and ambient temperature readings. Minimum and maximum readings are only available for the external probe.

## Configuring the Logger

There are four preset configurations associated with this logger when monitoring conditions in the following applications: ambient storage, clinical refrigerator, freezer, and refrigerator. You can view the settings associated with each configuration by tapping the Settings icon in the InTemp app and then tapping Logger Configurations. These preset configurations cannot be changed, but you can disable them or create your own custom configurations to suit other monitoring applications. To create a new configuration:

1. Tap the Settings icon and tap Logger Configurations.
2. Tap the plus icon in the upper right corner.
3. Type a configuration name.
4. Tap Logging Interval. Select a logging interval and tap Save.
5. Tap Start and select one of the following start options:
  - Immediately. The logger will begin logging immediately.
  - On next even interval. The logger will begin logging on the next even interval (such as 11:00 or 11:05).
  - On date/time. The logger will begin logging on a date and time you specify. The specific date and time is not selected now. You will select the date and time when you configure the logger.
  - After a fixed delay. The logger will begin logging after a certain period of time, such as five minutes or 3 hours.

- On button push. The logger will begin logging when you press the Start button on the logger.
6. Enable the High Alarm and Low Alarm if desired. Enter an alarm limit for each. For a high alarm, an alarm will trip if the sensor reading rises above the value you enter in the High Alarm field. For a low alarm, an alarm will trip if the sensor reading falls below the value you enter in the Low Alarm field.
  7. If you set up an alarm, enable “Audible Alarm on Trip” if you want the logger to beep when a high or low alarm trips.
  8. If you set up an alarm, tap “Trip alarm after” and select how many minutes should pass before the alarm trips. If you want an alarm to trip immediately on the first reading outside the limits, set “Trip alarm after” to zero.

Tap either Cumulative or Consecutive. If you select Cumulative, 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, the alarm will trip when the time the sensor is continuously out of range is equal to the selected duration. For example, if you select Cumulative and the high alarm is set to 45°F with a “Trip alarm after” time of 30 minutes, then an alarm will trip once the sensor reading has been at or above 45°F for a total of 30 minutes since logging started. This could be 15 minutes above 45°F in the morning and then 15 minutes above 45°F again in the afternoon. If Consecutive was selected instead, then the alarm would only trip if all sensor readings were at or above 45°F for a continuous 30-minute period.

Tap Save in the Alarm Trip Settings screen.

9. Tap Save in the Create Configuration screen when done selecting all settings. The new custom configuration is added to the list of enabled configurations and will be available to select when you connect to the logger to configure it.

## Logger Alarms

There are two conditions that will trip an alarm:

- When the temperature reading by the external probe (if applicable) or the ambient temperature is outside the range specified in the logger configuration.
- When an external probe (if applicable) is disconnected during logging.

When a temperature alarm trips:

- The logger LED will blink every 5 seconds.
- The alarm icon will appear on the LCD and in the app.
- The logger will beep every 15 seconds (unless audible alarms are disabled in the logger configuration).
- An Alarm Tripped event is logged.

When an external probe is removed:

- The logger LED will blink every 5 seconds.
- “ERROR” and “PROBE” will appear on the LCD and “ERROR” will appear in the app.
- An alarm icon will appear in the app.

- The logger will beep every 15 seconds.
- A Probe Disconnected event is logged.

To mute a beeping alarm, press the Mute button on the logger. Once muted, you cannot turn the beeping back on.

Download the logger to view details about a tripped alarm and to clear alarm indicators in the app and on the LCD (the probe must be reconnected for ERROR to clear on the LCD). For a temperature alarm, the tripped alarm will clear once the reading is back within limits.

## Setting a Passkey

You can create an encrypted passkey 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 passkey uses a proprietary encryption algorithm that changes with every connection.

To set a passkey:

1. Tap the Loggers icon and connect to the logger.
2. Tap Set Logger Passkey.
3. Type a passkey up to 10 characters.
4. Tap Save.
5. Tap Disconnect.

Only the phone or tablet used to set the passkey can then connect to the logger without entering a passkey; all other mobile devices will be required to enter the passkey. For example, if you set the passkey 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 passkey 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 passkey. To reset a passkey, simultaneously press both the top and bottom button on the logger for 3 seconds, or connect to the logger, tap Set Logger Passkey, and select Reset to Factory Default.

## Downloading the Logger and Generating Reports

You can download the logger and generate reports that include logged probe (if applicable) and ambient readings, events, user activity, alarm information, and more. Reports can be shared immediately upon download or accessed later.

To download the logger:

1. Tap the Loggers icon and connect to the logger.
2. Tap Download.
3. Choose a download option:
  - Download & Continue. The logger will continue logging once the download is complete.
  - Download & Restart. The logger will start a new deployment using the same configuration once the download is complete.
  - Download & Stop. The logger will stop logging once the download is complete.

A report of the download is generated. Tap Settings to change the default report type and report sharing options. The report is also available in both Secure PDF and XLSX formats for sharing at a later time. Tap the Reports icon to access previously downloaded reports. See the *InTemp App User's Guide* at [www.onsetcomp.com/manuals/intempapp](http://www.onsetcomp.com/manuals/intempapp) for details on working with reports.

### Performing Logger Checks

If your monitoring application requires that you perform daily or twice daily checks of the logger, you can use the InTemp app to connect to the logger and perform a check.

To enable the perform check feature:

1. Tap the Settings icon.
2. Under Record Logger Checks, select either Once Daily or Twice Daily. If you choose Twice Daily, a Perform Morning Check action will be listed in the Connected screen from 12:01 AM until 12:00 PM and then a Perform Afternoon Check action will be listed from 12:01 PM to 12:00 AM. If you choose Once Daily, an action will be listed in the Connected screen to Perform Daily Check.

**Note:** Changes to the Record Logger Checks setting will take effect the next time the logger is configured.

To perform a check:

1. Tap the Loggers icon and connect to the logger.
2. Tap Perform (Morning, Afternoon, or Daily) Check.

Once a check is completed, it is recorded as a logged user action along with the user email and the location, and is available for view in a Secure PDF or XLSX report. The action is also listed as performed in the Connected screen and a checkmark will illuminate on the logger LCD.

You can also set up a notification to display on your phone or tablet to remind you to perform a check. Use the Reminders option under Settings.

### Logger Events

The logger records the following events to track logger operation and status. These events are listed in reports downloaded from the logger.

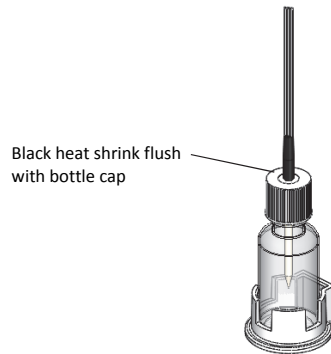
Event Name	Definition
Started	The logger started logging.
Stopped	The logger stopped logging.
Downloaded	The logger was downloaded.
Probe Disconnected/ Connected	The external probe was disconnected or connected during logging (CX402 model only).
Probe Alarm Tripped/Cleared	A probe temperature alarm has tripped or cleared because the reading was outside the alarm limits or back within range (CX402 model only).
Ambient Alarm Tripped/Cleared	An ambient temperature alarm has tripped or cleared because the reading was outside the alarm limits or back within range (CX403 model only).

Event Name	Definition
Performed/Missed Check	The user performed or missed the daily, morning, or afternoon logger check.
Safe Shutdown	The battery level dropped below 1.85 V; the logger performs a safe shutdown.

### Deploying the Logger

Follow these guidelines for deploying the logger:

- Use the four magnets on the back of the logger case to mount it to a magnetic surface.
- If using the CX402 logger for vaccine storage monitoring, the logger must remain outside of the refrigerator with the logger probe and glycol bottle placed inside the center of the refrigerator.
- If you remove the probe from the glycol bottle with a CX402 logger and then reinsert it, make sure you insert it through the center of the glycol bottle cap and push it down until the stainless steel probe is completely in the bottle. The black heat shrink on the probe cable should be flush with the top of the cap as shown in the following example.



- For CX402 loggers, use the included double-sided tape to affix the bottle holder to a surface if desired.

### Protecting the Logger

The logger is designed for indoor use and can be permanently damaged by corrosion if it gets wet. Protect it from condensation. If the logger gets wet, remove the battery immediately and dry the circuit board.

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

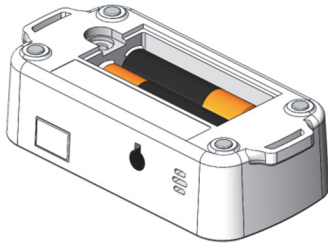
The logger has been tested to 8 KV, but avoid electrostatic discharge by grounding yourself to protect the logger. For more information, search for “static discharge” on [onsetcomp.com](http://onsetcomp.com).

### Battery Information

The logger requires two user-replaceable AAA 1.5 V alkaline or optional lithium batteries for operation at the extreme ends of the logger operating range. Expected battery life varies based on the ambient temperature where the logger is deployed, the frequency of connecting to the phone or tablet and downloading reports, the duration of audible alarms, and battery performance. New batteries typically last 1 year with logging intervals greater than 1 minute. 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.

To install or replace the batteries:

1. If the battery door is already installed on the back of the logger, use a Phillips-head screwdriver to remove it.



2. Remove any old batteries.
3. Insert two new batteries observing polarity.
4. Screw the battery door into place.

**⚠ WARNING:** Do not cut open, incinerate, heat above 85°C (185°F), or recharge the lithium batteries. The batteries 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 batteries in fire. Do not expose the contents of the batteries to water. Dispose of the batteries 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.