USER GUIDE

UTREL-16F

LogTag

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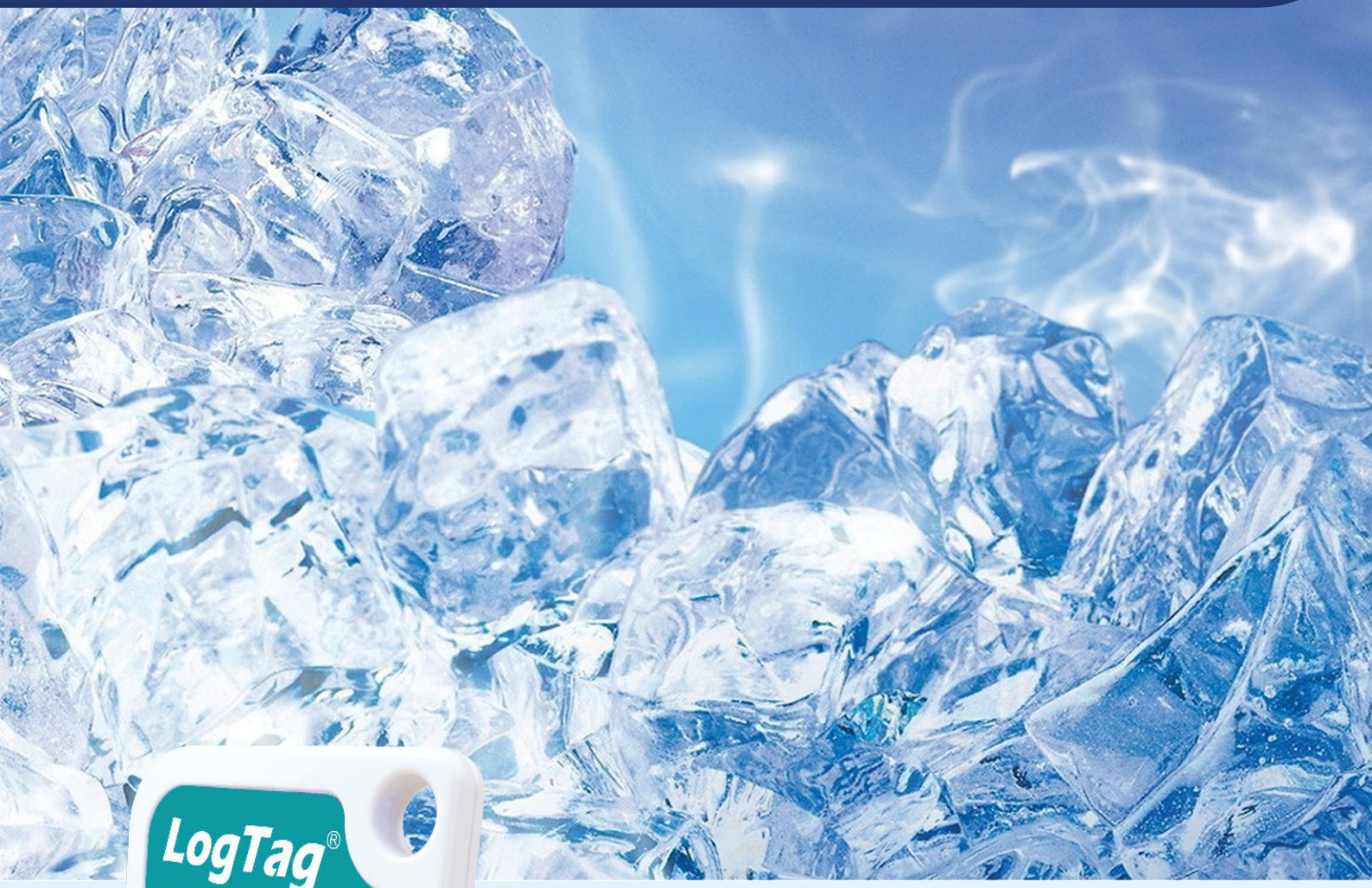

UTREL-16

USB PDF Low-Temperature Recorder with Remote Probe and Display

Product User Guide

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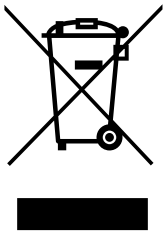
Safety Information



The UTREL-16 USB temperature logger contains a non-replaceable Lithium Battery. When the battery indicates "LOW", the logger should be replaced, and the battery recycled or disposed of according to your local regulations.

Do not expose the logger to extreme temperatures as it may lead to the destruction of the battery and may cause injuries.

Keep out of the reach of children.

Liability

LogTag Recorders' standard warranty terms apply. A copy can be requested by emailing support@logtagrecorders.com. In addition, LogTag Recorders shall not be held liable:-

- if the device was used beyond LogTag Recorders' stated limitations
- for any claims due to the improper storage and use of the device
- for any problems with refrigeration units
- for the bad quality of the monitored goods, if any
- for incorrect readings if the device was used with a low battery
- for consequential loss

Battery Life

The batter in the UTREL-16 designed to power the device for up to 24 months, provided:-

- the device was not stored for more than prior to activation
- the recording interval is not shorter than 15 minutes
- the device is stored and operated according to LogTag Recorders' recommendations

⚠ The UTREL-16 is unable to record readings when connected to USB. You cannot use a USB power supply to power the device!

Disclaimer

The UTREL-16 monitors temperature exposure and not the quality of the goods it accompanies. Its purpose is to signal if product quality evaluation/testing is required.

Typographical Conventions

Text **in this font** refers to buttons on the UTREL-16.

Text in this font refers to option settings, dialogue boxes or actions to be taken in LogTag® Analyzer.

Text in this font describes features of the product.

This text describes certain aspects of the product, where incorrect use of a feature may lead to inadvertent loss of data.

This text contains important information for the correct operation of your UTREL-16.

This text contains information that explains some aspects of a feature in more detail.

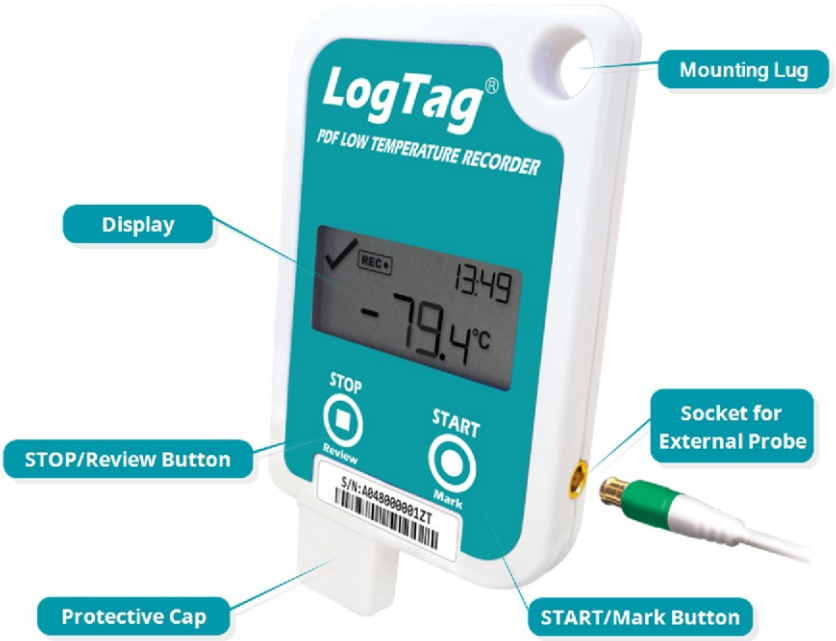
This text contains tips that help you get the best out of your UTREL-16 logger

Introduction

LogTag's UTREL-16 is a fully configurable, multi-use USB PDF temperature logger with an external temperature probe and a built-in display, that can create temperature reports without the need to install proprietary software or hardware at the destination. Select statistical data can be reviewed directly on the display without the need for a PC. The logger can be configured using LogTag® Analyzer, and is then placed with the goods to be monitored. At the destination the UTREL-16 can be plugged straight into a computer's USB port and generates a PDF file, which can be accessed using PDF software such as Acrobat Reader.

Features

The UTREL-16 USB PDF temperature logger features the familiar LogTag case layout with an additional USB plug at the bottom.



Case

- Mounting lug for secure fastening of logger to fixtures
- USB plug with protective cap - shields USB connector from moisture and dirt
- Gold-plated, high-quality MCX socket for external temperature probe
- Durable polycarbonate case, IP61

Buttons

- **START/Mark** button; used to start the unit, clear alarms or place an inspection mark in the data
- **STOP/Review** button; used to stop the unit or to review data recorded during the trip

Display

- Shows last recorded temperature and information about alerts
- Allows reviewing statistical dataabout the current trip

Probes

The UTREL-16 will accept any probe from the ST10 product range.

PDF

The UTREL-16 will generate a detailed PDF report when plugged into a USB port of a PC. The PDF report shows a summary of the trip, presents the data in chart and list format. A CSV file of the data list is also available.

The PDF can be shown in several different languages:

- English
- French
- German
- Russian
- Spanish

The default ex-factory language is English. You can select which language to use during configuration in the File Settings tab.

> ⚠ You can only change the language during configuration, but not when viewing the PDF.

What You Need

Required Items

In addition to your LogTag® UTREL-16 USB PDF Low-Temperature Recorder with Remote Probe and Display you will need the following:

- an external probe of the ST10 series
- a PC running Windows 7 SP1 or later and LogTag® Analyzer 3 installed if you wish to configure and download the logger
- a PC with PDF reader software installed for viewing the generated PDF files

Optional Items

In addition to the above, following items are useful accessories:

- a wall mount bracket, which can be used, for example, to attach the UTREL-16 to the side of a fridge[1]

1 The bracket must be manufactured after August 2020; brackets manufactured earlier do not feature the right-hand side cutout required for the USB products

- a silica sand temperature buffer, which simulates environmental behaviour of a vaccine vial

Software Requirements

Software requirements vary depending on the type of file you want the UTREL-16 to generate when plugged into a USB port.

If you wish to configure UTREL-16 products you will need to download the LogTag® Analyzer software from LogTag®'s web site at https://logtagrecorders.com/software/lta3/download/. Follow the instructions to install and start the software.

If you only plan to view a report, plug the UTREL-16 into a computer's USB port. Depending on the settings made during configuration, a number of on-board files will be generated[2] and made available to you in a new drive:

- a PDF file

  you can open the file directly from the logger's USB memory storage with Acrobat Reader 4.0 or later, or any other compatible PDF reader software of your choice[3]
- a CSV file

  this file can be imported into a spreadsheet program such as Microsoft Excel
- an LTD file

  LTD files are LogTag® Analyzer's native, encrypted data files. You can open this file in LogTag® Analyzer, where you can analyze data in detail, generate report files or combine data from multiple recorders for comparison

2 Depending on the configuration, the UTREL-16 may produce all, some or none of the files.
3 PDF files generated by any USB logger can be opened directly in LogTag® Analyzer.

You can also download data directly into LogTag® Analyzer without accessing the logger's on-board files.

Getting Started

Your LogTag® data logger is typically configured, placed with goods that require monitoring and then downloaded once the goods reach their intended destination. Other applications may involve stationary loggers placed in warehouses or to monitor fridges.

Each application requires several steps so you can deploy your data logger and retrieve the recorded measurements. You may be able to skip some of the steps, depending on the way the logger was prepared when it was delivered to you and how you wish to analyze the data.

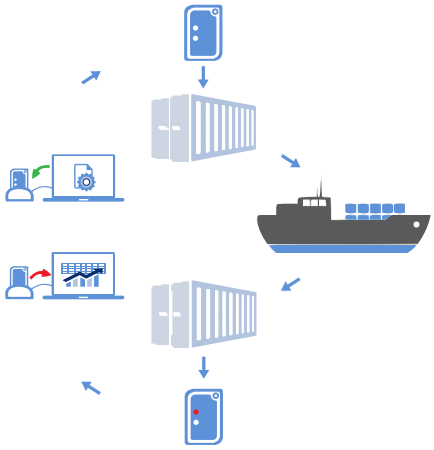


Figure 1: *LogTag® recording cycle*

Things to do before you start logging

1. Download and install the latest version of LogTag® Analyzer 3.
   You can do this from the LogTag Recorders Software Download page.
2. Configure the unit using LogTag® Analyzer.
3. Connect a probe and place the unit in the monitoring location.
4. Start the logger.

Things to do while recording data

5. Clear an active alarm.
6. Review Minimum and Maximum values during the trip, as well as alarm threshold violations.
7. Reset Minimum and Maximum values.
8. Place a mark in the recorded readings.
9. Stop the logger recording data.

Things to do when you have finished

10. Plug the unit into a USB port.
11. View the PDF report generated by the UTREL-16.
12. Download the unit to LogTag® Analyzer for analysis.
13. Re-configure or reset the logger, ready for a new trip.

Configuring the UTREL-16 for logging

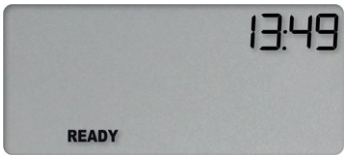
Before a UTREL-16 logger can be deployed, it must be configured with the parameters required for starting and recording temperature values.

Loggers can be purchased unconfigured, or pre-configured, ready to be started, using one of a number of different profiles that are available.

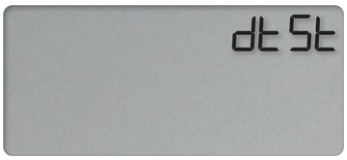
You can check if your logger is already configured or not by briefly pressing the **STOP/Review** button.

The logger is already configured to start

If your logger is configured to start it will show either



if the logger was pre-configured for a push-button start, or



if the logger was pre-configured for a Date/Time start.

If your logger shows one of these screens you may skip the configuration process.

The logger is unconfigured

An unconfigured UTREL-16 logger is delivered to you hibernated (i.e. in a state of low power consumption), and pressing the **STOP/Review** shows:

followed by

and then

If your logger is unconfigured you must set it up with the parameters required for:

- starting and recording temperature values
- triggering alarms
- printing the PDF

This is done using LogTag® Analyzer software, which can also be used for downloading and analyzing data.

Preparing the logger

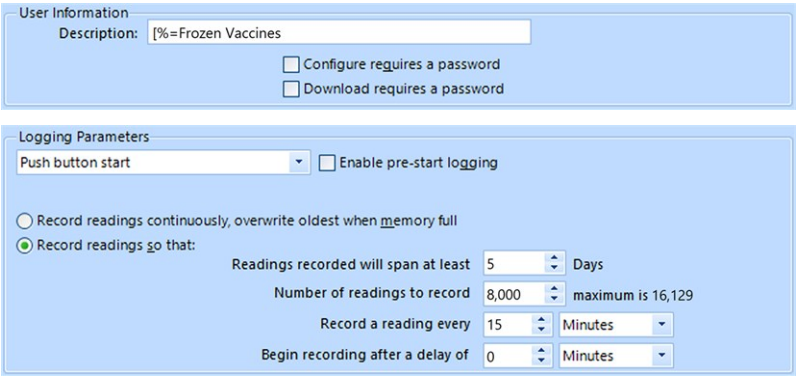
- Start the LogTag® Analyzer software.
- Remove the protective cap from the UTREL-16's USB connector, plug it into a USB socket on your computer and wait for the drivers to be installed[4].

  You will receive a message that a new USB device has been found, and a generic driver will be installed[5].

  Once the driver is installed and the UTREL-16 is ready, it can receive configuration data. Click **LogTag - Configure**; LogTag® Analyzer will scan all USB ports and display the configuration options for connected UTREL-16 units. Although you can configure many devices at the same time[6], it is practical to limit the number of devices to about 10, using a powered USB hub. It is not possible to configure different models at the same time.
- Click **Configure** from the **LogTag menu**; LogTag® Analyzer will display the configuration options for connected loggers.

Standard Configuration Options

The standard configuration options include settings such as User ID, start method, pre-start recording, logging interval and duration, start delay, and password.



For detailed information about each parameter please read the section about **Configuring a LogTag® for logging** in LogTag® Analyzer's User Guide or press F1 for help.

4 You can configure more than one UTREL-16 at the same time, however it is practical to limit the number of units to about 6, using a powered USB hub.
5 Depending on the factory configuration additional drivers may be installed at this time.
6 You can configure more than one UTREL-16 at the same time, however it is practical to limit the number of units to about 6, using a powered USB hub.

UTREL-16 Start Options

During configuration with LogTag® Analyzer you can decide when the UTREL-16 starts taking temperature readings:

Push button start

The logger will start taking temperature readings as soon as you have pressed the **START/Mark** button (see Starting the Logger on page 22).

When you choose the push button start option, you can **Enable pre-start logging** (or disable it) and also **Begin recording after a delay**.

Pre-start readings

If you enable pre-start readings, the UTREL-16 starts recording as soon as it is unplugged from the USB port[7] and will continue to do so until you start the unit via the button. No alarms are processed while pre-start readings are being taken, pre-start readings will not appear in the PDF file after the logger was started, and no PDF file will be generated if only pre-start readings are present in the logger. Using pre-start readings is a good way to avoid data loss if you forget to start the unit, as you can still access the data using LogTag® Analyzer.

Start delay

If you configure the UTREL-16 to start after a delay period, the logger will not immediately record temperature readings after you have pressed **START/Mark**, but start a countdown timer instead, and record readings only after the timer has ended. The value for the timer is set during configuration. If pre-start readings are enabled, these will continue to be recorded during the delay period.

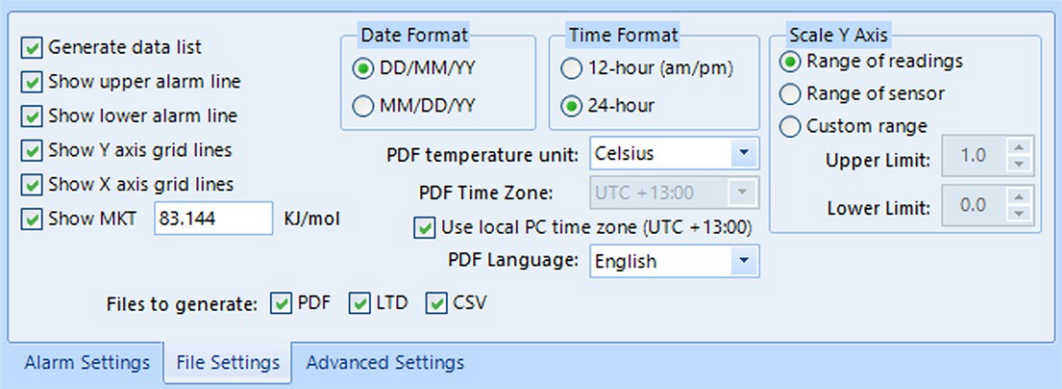
Date/Time start

The logger will start taking temperature readings at the date and time you enter during configuration (local time). You cannot combine a date/time start with pre-start readings or the start delay function.

7 The first pre-start reading is taken one log interval after you unplug the unit from the USB port.

File Settings

Select the **File Settings** tab to select which files are generated when the UTREL-16 is plugged into a computer's USB port, and what information these files contain. Select as many file formats as you wish to generate.



Parameters that influence the appearance of all files are:

- setting the temperature units

> ⚠ The temperature unit for the PDF file is also used for the units shown on the display.

- setting the date and time format
- configuring time zone and MKT values
- setting the language

Parameters specifically influencing the appearance of the PDF file are:

- scaling parameters for the chart
- showing or hiding grid lines
- showing or hiding alarm threshold lines
- generating the data list

For detailed information about each parameter please read the section about **Configuring a LogTag® for logging** in LogTag® Analyzer's User Guide or press F1 for help.

> The PDF file can not only be viewed in a PDF viewer, but can also be opened with LogTag® Analyzer directly.

Advanced Configuration Settings

Select **Advanced Settings** for additional configuration settings. These settings decide how some of the elements are displayed on the unit's own display and set certain options specific to the UTREL-16.

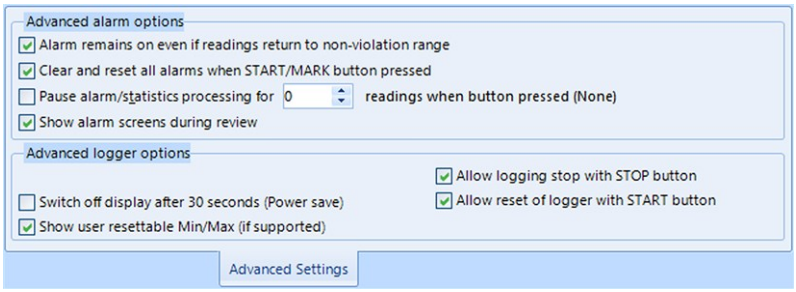


Figure 2: *UTREL-16 advanced configuration screen in LogTag® Analyzer 3*

Parameters that influence the appearance of the display are:

- Pause alarm/statistics processing (see Paused Readings on page 32)
- Switch off display after 30 seconds (Power save, see Power Save on page 32)
- allowing a user to reset the trip's minimum and maximum values on the display during recording (see Resetting the Trip Minimum/Maximum Temperatures on page 30)
- showing the alarm screens during review (Reviewing Statistics and Alarms on page 26)

Parameters influencing specific behavior of the UTREL-16 are:

- clearing and resetting alarms when the **START/Mark** button is pressed (see Clearing an Alarm on page 31)
- leaving the alarm turned on, even if readings return to the normal temperature range again
- allowing the user to reset the logger with the **START/Mark** button

For detailed information about each parameter please read the section about **Configuring a LogTag® for logging** in LogTag® Analyzer's User Guide or press F1 for help.

Alarm Configuration Options

LogTag® Analyzer allows up to 6 different alarm trigger conditions for temperature when configuring a UTREL-16 for recording.
Each alarm trigger condition consists of a threshold temperature value, an activation type (which can be instant, consecutive or accumulative[8]) and a delay time, if it is not an instant alarm.
If an alarm trigger condition requires readings to exceed an upper threshold temperature it is called an ***upper alarm***. If an alarm trigger condition requires readings to go below lower thresholds it is called a ***lower alarm***.

8
- Instant = one temperature reading is above (below) the threshold
- Consecutive = temperature readings are above (below) the threshold for the time defined in the activation delay without interruption
- Accumulative = temperature readings are above (below) the threshold for the total time defined in the activation delay time, but may not necessarily be sequential.

An alarm event is generated, when either of the entered alarm conditions is triggered. The threshold values themselves are included in the alarm range, i.e. if an upper alarm threshold is set at +8.0 °C, a value of 8.0 °C will trigger an alarm, but a value of 7.9 °C will not.

The UTREL-16 can have up to three upper alarms, and up to three lower alarms.

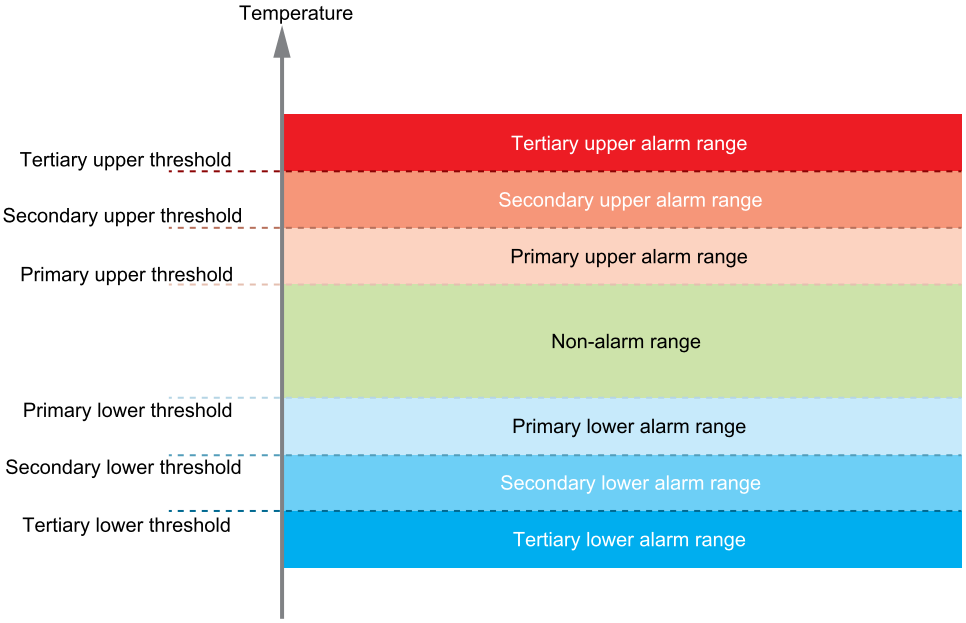


Figure 3: Alarm ranges and thresholds

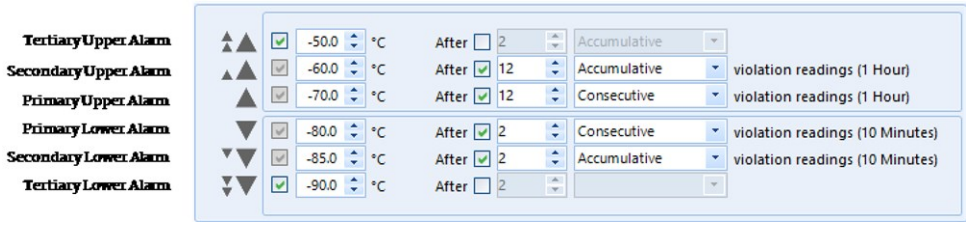


Figure 4: Representation in LogTag® Analyzer

You need to observe some basic rules when entering alarm conditions into the configuration screen in LogTag® Analyzer:

- A primary alarm condition must be entered before the corresponding secondary alarm condition.
- Equally, primary and secondary alarm conditions must be entered before the corresponding tertiary alarm condition.
- You can enter a different number of upper and lower conditions, or only upper, or only lower conditions, or none at all.
- A secondary upper alarm cannot be entered with a lower threshold value than the primary upper alarm.

- A tertiary upper alarm cannot be entered with a lower threshold value than the secondary alarm. Threshold values can, however, be equal and combined with different time-to-activation values. For example, you can enter a primary upper alarm with an -70.0 °C threshold and 10 accumulative readings, plus an alarm with an -70.0 °C threshold and 5 consecutive readings. In this instance the alarm will be triggered, if either 10 readings in total are above -70.0 °C, or 5 consecutive readings above -70.0 °C have occurred.

If an alarm is triggered, you will be able to see this on the PDF, in the software and on the display.

The section about Reviewing Statistics and Alarms on page 26 shows examples of how this is represented and reviewed on the display.

Finalizing the configuration

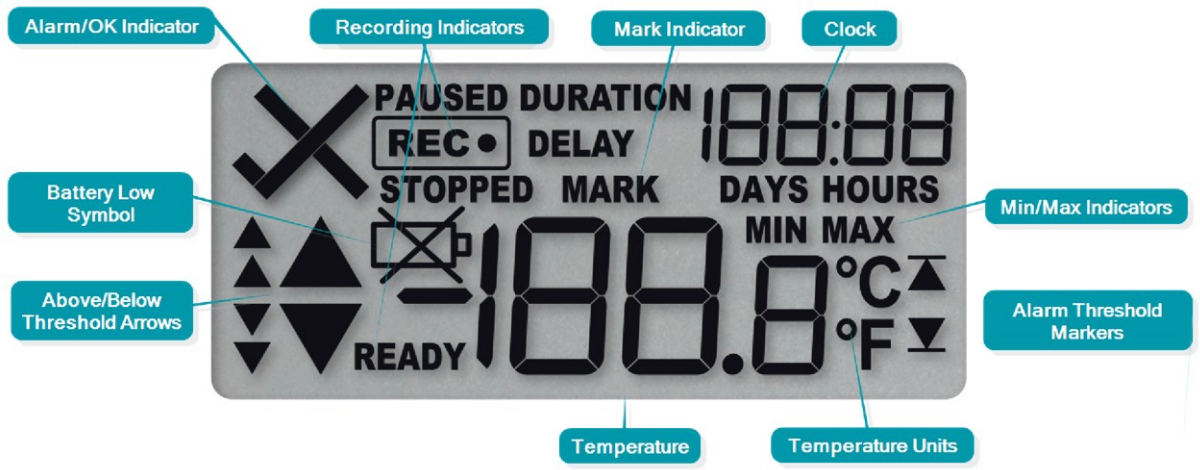
Click **Configure** to upload the configuration data to the UTREL-16.

When the configuration is complete, unplug the UTREL-16 from the USB socket and replace the protective cap.

If you wish to configure more UTREL-16 units with the same configuration, insert the next loggers into USB sockets, wait until they are ready for configuration and click **Repeat Configure**. Alternatively, you can use the **Profile** function to configure multiple units with the same settings.

You can upload the configuration to a UTREL-16 logger as often as required.

Display Overview



ALARM/OK indicator

The ✕ symbol is shown as soon as the UTREL-16 has registered an alarm event. While there are no alarms, the ✓ symbol is shown.

Recording indicators

The recording indicators show what the UTREL-16 is currently recording.

- If **READY** is shown, the UTREL-16 is ready to be started with the **START/Mark** button. Depending on the configuration it may already record pre-start readings.
- If **REC●** is shown, the UTREL-16 is recording temperature at the sample interval defined during configuration.
- If **REC●** is shown together with the word **PAUSED**, the product is also recording, but the recorded values are not taken into account when calculating alarm events and durations.
- If the word **STOPPED** is shown, the UTREL-16 has finished recording temperature data.

Mark indicator

The word **MARK** is shown when the next temperature reading is identified with an inspection mark in the recorded data.

MIN/MAX indicator

The word **MAX** is shown when the temperature on the display represents the maximum recorded temperature for the current trip. The word **MIN** is shown when the temperature on the display represents the minimum recorded temperature for the current trip[9].

Temperature Units

Depending on the selected PDF temperature units, this shows either °F or °C.

9 If MIN/MAX data were reset during the trip, these temperatures reflect only the period since the reset took place.

Temperature Value

This shows the most recently recorded temperature while the UTREL-16 is recording. Once the logger has stopped, nothing will be displayed. During review, this will show minimum or maximum temperatures.

Above/Below Threshold Arrows

The up-arrow ▲ is shown when the temperature displayed (i.e. last recorded) is above the specified upper temperature threshold. The down-arrow ▼ is shown when the temperature displayed is below the specified lower temperature threshold.

The four smaller up/down-arrows are secondary and tertiary alarm symbols. They are used when more than one upper or more than one lower alarm is defined and are shown then the current temperature is above or below the corresponding alarm levels.

Battery Low

The battery low symbol will appear if the UTREL-16's battery is low. If the symbol is not shown while the display is turned on, the battery is still OK.

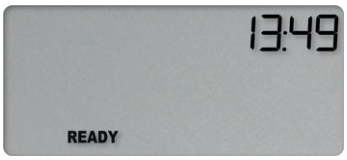
Operating the Logger

The following sections show how to operate the product, and what information you can expect to see on the display.

After the Logger is configured

Push Button Start

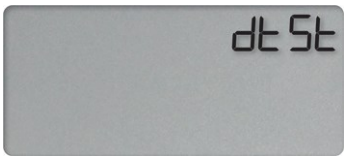
After configuration with LogTag® Analyzer for a push button start the word **READY** is shown, together with the current time in 24-hour format.



At this stage, you won't be able to determine which additional configuration options have been set, such as start delay or pre-start readings.

Date and Time Start

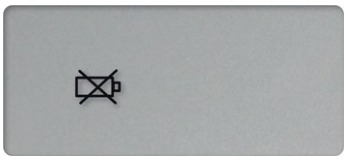
The logger can also be configured to start at a specific time and date. You will see the letters dtSt instead of the clock.



Pre-start readings and start delay options are not available if you choose date/time as the start option.

Low Battery

If at any time during the operation the logger has a low battery, the low battery symbol is shown.



Adding the Probe

Before the UTREL-16 can record temperature data you will need to connect an external probe.

The UTREL-16 accepts any ST10 probe. Plug the sensor into the socket located on the side of the device, as shown.

Starting the Logger

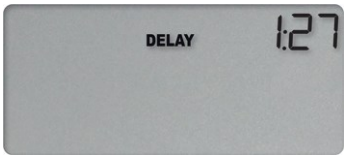
> Before you carry out the following start procedure, please ensure you have plugged the external probe firmly into the socket on the side of the logger.

Push button start

Press and hold the **START/Mark** button until **READY** disappears and the REC symbol**STARTING** is shown. The UTREL-16 now records temperature data. This start option works very similar to other LogTag® LED products.

Push Button Start with Start Delay

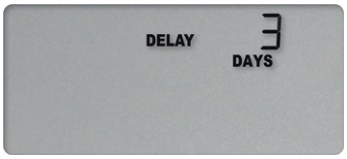
If the logger was configured for push button start with a start delay, the word **DELAY** shown instead of the REC symbol, once you have started the logger.



The delay time is shown in hours and minutes, if it is less than 24:00 hours, and the word **HOURS** is shown.

The time counts down and the UTREL-16 starts recording when it reaches 0:00.

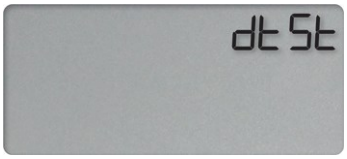
If the start delay is greater than 24 hours the word **DAYS** is shown along with the number of full days remaining.



Each time a user presses the **START/Mark** button during the start delay phase, the start delay value is reset to its originally configured value.

Automatic date/time start

If you configured the UTREL-16 for a date/time start, dtSt will be displayed instead of the clock.



The logger will record temperature values as soon as the configured date and time have passed.

If the logger is still plugged into a USB port when the start time passes, the recorded readings will show USB Paused on the PDF and in the software's reports.

During Recording

During normal operation, the display shows the most recently recorded temperature. The current time is also displayed in 24-hour format. A tick symbol ✓ is shown as long as no alarm event has occurred.

Temperatures can be shown in Celsius (as on the left) or Fahrenheit (as on the right).

> ⚠ The temperature unit on the display is the same as used for the PDF and CSV files. It is set during configuration.

Readings above or below alarm thresholds

If the most recently recorded temperature value is above or below one of the alarm thresholds, one or more alarm markers will be shown on the display.

The ▲ symbol will be shown when the most recent temperature recorded is above the upper alarm threshold, the ▼ symbol when it is below the lower alarm threshold.

This symbol is displayed …	… when the most recent temperature recorded is
▲	above the primary upper alarm threshold, but below the secondary
▲▲	above the secondary upper alarm threshold, but below the tertiary
▲▲▲	above the tertiary upper alarm threshold
▼	below the primary lower alarm threshold, but above the secondary
▼▼	below the secondary lower alarm threshold, but above the tertiary
▼▼▼	below the tertiary lower alarm threshold

> ⚠ The presence of an alarm marker on the display does NOT indicate an alarm event. It only shows that the most recent temperature recorded was above or below the corresponding alarm threshold value. If an alarm marker is shown, but the display still shows a tick, a delayed alarm is configured.

In this example, the most recently recorded temperature is above the primary upper alarm threshold, but below a secondary threshold and no alarm was triggered:

Here, the temperature was below the secondary alarm threshold, but above the tertiary threshold; an alarm event has not been triggered:

An alarm was triggered

If an alarm event occurred, the alarm indicator ✕ is displayed in the upper left corner of the display. Additionally, one of the alarm limit markers ▲ or ▼ is displayed, to show if the event was an upper or a lower alarm.

> ⚠ The alarm marker in this screen does not indicate which alarm threshold caused the alarm, only that the most recent temperature recorded, shown on the display (-55.2 °C) was above the secondary threshold.
> To identify which of the alarm conditions caused the alarm event you will need to review the data on screen as described in Reviewing Statistics and Alarms on the next page, or open the PDF file on your PC.

Marking a reading with an inspection mark

When you press the **STOP/Review** button while the UTREL-16 is recording, the next reading taken will be identified in the downloaded data and on the PDF report with an inspection mark.

The **MARK** symbol appears and remains shown until the next reading is taken.

If the Paused Readings function is enabled, you will also see the **PAUSED** symbol.

An inspection mark will also be recorded if you clear an alarm.

Reviewing Statistics and Alarms

At any time you can review the recorded statistics by briefly pressing the **STOP/Review** button. You can do this while the logger is still taking temperature readings, or when it has already stopped, but not when it is plugged into a USB port.

After each subsequent press of **STOP/Review** the next review screen is shown. The number of screens available for review depends on the number of configured alarms, and whether or not the alarm review screens have been enabled. If no alarms are configured, or the alarm review screens are disabled, only the **MIN** and **MAX** screens appear.

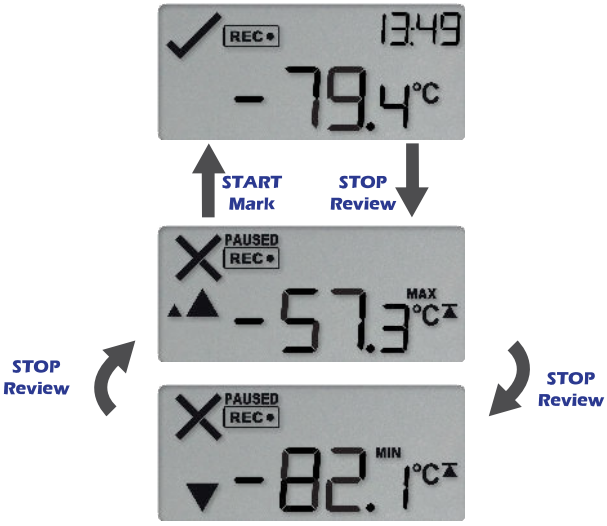


Figure 5: Review cycle with threshold screens disabled

If 6 alarms are configured and the alarm review screens are enabled (which is the maximum), 8 screens will appear.

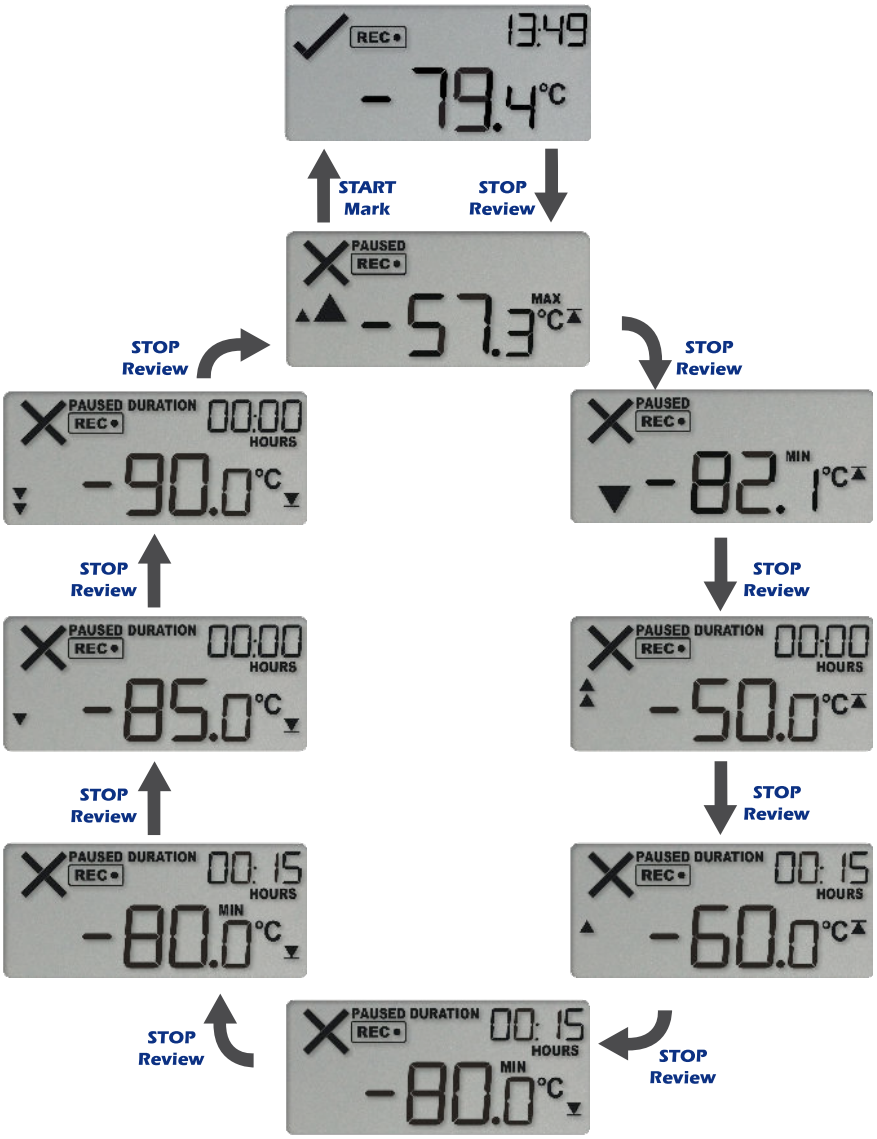


Figure 6: Review cycle with all alarms enabled

You can terminate the review at any time by pressing **START/Mark**, or by waiting 30 seconds without pressing any button.

In the example following alarm settings are used:

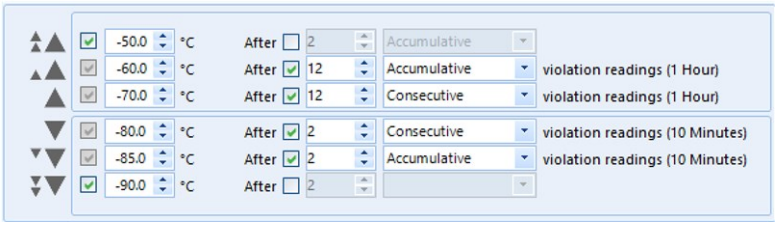


Figure 7: Alarm configuration settings in LogTag® Analyzer

On first press of the **STOP/Review** button the Maximum Reading screen appears.

The clock disappears, and the **MAX** symbol is shown along with the maximum temperature recorded. If this temperature was above or below one of the alarm thresholds, the corresponding alarm threshold arrow is also shown. Here, the maximum was above the threshold.

When you press **STOP/Review** again, the Minimum Reading screen appears.

If this temperature was above or below one of the alarm thresholds, the corresponding alarm marker is also shown. Here, the minimum was below the tertiary threshold.

If the alarm review screens are enabled, the next screens show the enabled alarm threshold values in descending order, starting with the upper most alarm threshold. Up to six screens will be shown, depending on how many alarms were enabled during configuration.

1. In this example the tertiary upper alarm is enabled, indicated by the alarm threshold marker shown in combination with the two small alarm arrows. The **DURATION** symbol is shown, and the clock shows the total number of hours and minutes above the threshold, instead of the time.

   You can see how long the recorded temperature was above this threshold. Here, the -50.0 °C threshold was not exceeded.

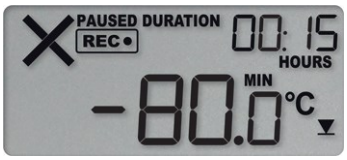
2. The secondary upper alarm is shown next, indicated by the alarm threshold marker shown in combination with a single small alarm arrow.

   The temperature went above the secondary upper alarm of -60.0 °C for 15 minutes, but this did not trigger an alarm.

3. The primary upper alarm is shown next, indicated by the alarm threshold marker shown without any small alarm arrows.

In this example the temperature was above -70 ℃ for 1 day, 1 hour and 15 minutes. If the duration is longer than 24 hours, the display will alternate between showing days and hours.

4. The primary lower alarm is shown next, indicated by the alarm threshold marker shown without any small alarm arrows.



In this example, the temperature was lower than the primary threshold of -80.0 ℃ for 15 minutes.

5. The secondary lower alarm is shown next, indicated by the alarm threshold marker shown without one small alarm arrow.

In this example, the temperature was not lower than the secondary threshold of -85.0 ℃.

6. The tertiary lower alarm is shown next, indicated by the alarm threshold marker shown with two small alarm arrows.

In this example, the temperature was not lower than the tertiary threshold of -90.0 ℃.

Resetting the Trip Minimum/Maximum Temperatures

The currently stored Min/Max temperature values can be reset at any time while the unit is recording, but not once the unit has been stopped.

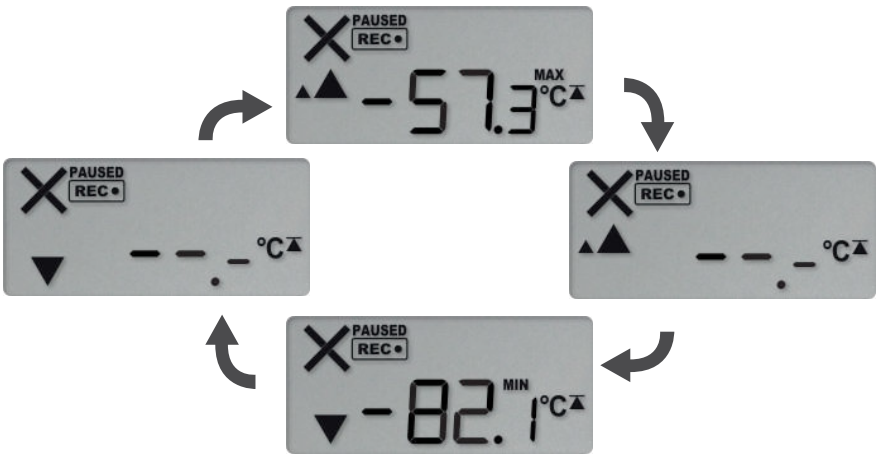
To reset the values, follow this procedure:

- Press **STOP/Review** to display the trip maximum temperature value.

- Press **STOP/Review** again to display the trip minimum temperature value.

> ⚠ You can only complete the next steps if you are viewing the Minimum temperature screen!

- Press and hold **STOP/Review**. After 1 second the following screen sequence will show, and then repeat once:



- After approx. 5 seconds, following screen will show:

  Release the **STOP/Review** button when the screens no longer alternate. The values will be reset, and the normal recording screen will be shown.

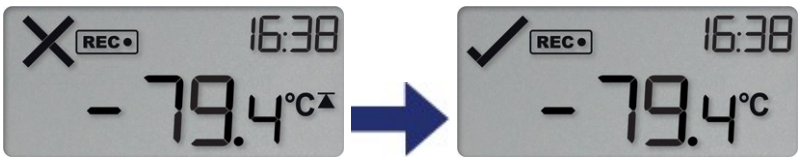
- If you keep holding the **STOP/Review** button, the currently stored min/max values will be retained.

- Releasing the button within the 5-second period after the initial press switches to the first review screen.

A min/max reset mark will be recorded in the logged data. The logger will now track new min/max values, with the first update shown as soon as the next reading is taken.
You will be able to see in the chart in both LogTag® Analyzer and the PDF report when the min/max values were cleared, but you will not be able to review previous min/max values on screen once they have been cleared.

Clearing an Alarm

A UTREL-16 can be configured so you can clear an alarm from the display. To do this, press and hold the **START/Mark** button.



After 2 seconds the alarm will be cleared and the ✕ will change to a ✓. If you keep holding the button for a further 2 seconds, the ✕ will show again and the alarm will not be cleared.
An inspection mark will be recorded against the next temperature reading taken, whether you clear the alarm or not.

> ⚠ An alarm cannot be cleared once the UTREL-16 has stopped recording. Alarms resulting from an accumulation of readings can also not be cleared.

Paused Readings

During configuration of the UTREL-16 you can set the option to ignore up to 15 readings for alarm and statistics calculations after either button is pressed. The readings are still shown on the graph and in the data listing, but they are labelled as paused, and their value is ignored when determining alarm trigger conditions, minimum/maximum values and other statistical calculations.

It allows the logger to acclimatize to the environment again, before further readings are processed.

After a button press the display shows **PAUSED** next to the symbol. **PAUSED** will turn off as soon as the last ignored reading has been recorded.

The option is set in the Advanced Settings tab during configuration with LogTag® Analyzer and is expressed in number of readings after the last button press.

Paused readings are specially marked in the graph and data listings.

> How long **PAUSED** is displayed depends on when between readings you press the button. It will show longer, if the button is pressed just after the logger takes a reading, but shorter if you press the button just before. For example, if you configure a logging interval of 10 minutes and 2 paused readings, the time **PAUSED** is shown could be as short as 10 minutes, but as long as 20 minutes.

Power Save

When Power Save is enabled, the display will automatically switch off if none of the buttons have been pressed for 30 seconds.

This function is appropriate in applications where you don't need to look at the display frequently, such as in transit monitoring applications, as the logger uses less battery power when the display is not turned on.

Pressing any button will re-activate the display.

Power save is enabled or disabled when configuring the UTREL-16 via LogTag® Analyzer in the Advanced Settings tab.

Battery Low while recording

If the battery is low while the UTREL-16 is still recording, the battery low symbol is shown in addition to any other currently displayed information.

The product has reached the end of its life.

> ⚠ If you continue to use the UTREL-16 despite a low battery warning you may lose readings, or the readings recorded may be inaccurate.

Probe is disconnected

The display shows - -.- instead of a temperature value if the logger's external temperature probe is disconnected.

Any values recorded during this time will not be taken into account when calculating statistics values or alarms.

If, for example, the temperature was above -70 °C for 12 hours (which would normally trigger an alarm event), but the probe was disconnected for 3 hours during this time, no alarm would be generated.

When evaluating data, any readings taken while the probe is disconnected are shown as - -.- in the data list. The chart in LogTag® Analyzer will show a gap during this period.

Stopping the UTREL-16

Automatically

The UTREL-16 automatically stops recording temperature when the maximum number of readings specified during configuration has been reached. Your unit can also be set up to stop when it is inserted into a USB socket. This option needs to be set up at the factory and cannot be changed during configuration with LogTag® Analyzer. Your distributor can supply more information about this option.

Manually

You can configure a UTREL-16 so it can be stopped with the **STOP/Review** button. This feature is useful when you take the logger out of a shipment and don't want to falsify the statistics with readings taken after the shipment completion. The stop function is enabled in the Advanced Options dialogue during configuration.

Press and hold the **STOP/Review** button. The **STOPPED** symbol shows in addition to REC• for 2 seconds.

The REC• symbol turns off after 2 seconds. Release the button and the logger stops taking temperature readings.

If the button is released while REC• is still on, or you wait until **STOPPED** disappears, the display shows REC• again, and the logger continues to record data. In this case, an inspection mark will be recorded in the data against the next temperature reading. The **MARK** symbol will show, and the **PAUSED** symbol also shows if this feature is enabled.

> ⚠ Unlike some other LogTag® products with display, the alarm does **not** have to be cleared before the logger can be stopped.

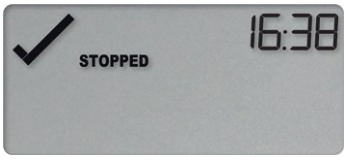
Logger has stopped

Once the logger has stopped, the display will show:

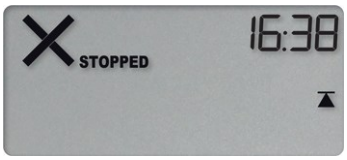
- the **STOPPED** symbol
- the OK indicator (✓) if no alarm was recorded
- the alarm indicator (✕) and one or both alarm threshold(▼▲) indicators if an alarm was recorded during the trip that has not been cleared
- the current time
- the battery low symbol (⌧) if the battery is low

The logger does not show a temperature reading.

The logger has stopped, and no alarms were recorded during the trip.



Here, the logger has stopped, and an upper alarm was recorded during the trip.



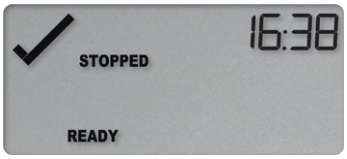
Resetting the Logger

You can reset a UTREL-16 back to its original **READY** state. Once reset, recording can be started again.

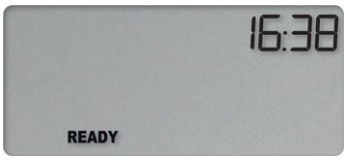
> ⚠ When performing this procedure all recordings and statistics stored in the logger are irrevocably deleted and cannot be recovered. Please ensure your data has been saved!
>
> All settings in the logger are retained.

For this process to work, the logger must be **STOPPED**.

Press and hold the **START/Mark** button. The **READY** symbol will turn on.



When the **STOPPED** symbol turns off, release the button within 2 seconds. The logger is now ready to be started again.



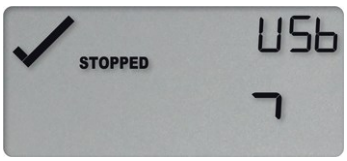
If the button is released while **STOPPED** is still on, or you wait until the **READY** symbol disappears, the display shows again, and the logger remains stopped. This means, the data from the previous trip is still accessible.

The ability to reset a logger is enabled or disabled in the Advanced Settings tab when configuring the UTREL-16 via LogTag® Analyzer.

Plugging the UTREL-16 into a USB port

As soon as you plug the UTREL-16 into a USB port, the word USb appears.

If you have configured the logger to generate files, USb remains turned on until all files have been generated.



During the file generation a small animation will play on the display.

As soon as the file generation is finished, USb will blink every second to indicate these files can now be accessed.

> ⚠ The files are generated each time you plug the logger into the USB port, regardless of whether the logger is still recording readings or not.

What happens on your computer depends on the operating system of the computer, the settings made during configuration and whether or not LogTag® Analyzer is running.

Microsoft Windows

Up to four drivers will now be installed, depending on the UTREL-16's configuration.

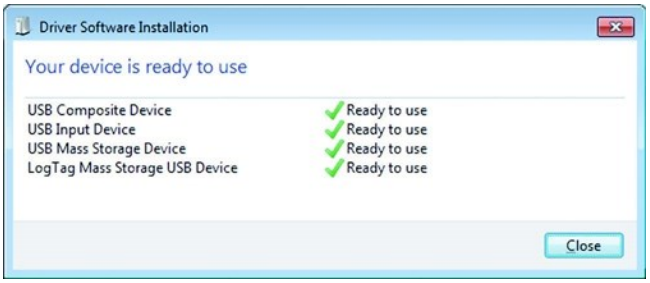
All drivers are part of the operating system and will typically not require administrator privileges for your computer.

1. Mass Storage Device
2. LogTag Mass Storage USB Device

   These two devices are required so you can access the data files in the same way as a USB memory stick. These drivers will not be installed if the UTREL-16 does not generate files.
3. USB Input Device (HID)

   This device is used for communication to LogTag® Analyzer and its driver will always be installed, even if LogTag® Analyzer is not present on the computer.

4. USB Composite Device



macOS and Linux

Typically, in these operating systems a new drive will be mounted, from which you can open the PDF file. You will not be able to configure the UTREL-16 using either of these operating systems, unless you use virtualization software such as Parallels, Fusion or VirtualBox to create a hosted Windows environment. You need to discuss these options with your network administrator.

> ⚠ While a UTREL-16 is plugged into USB, no temperature readings are taken. The graph will display a gap and the data list will show `---` followed by the `#` symbol.

Accessing the files

If the logger was configured to generate files, a new drive letter or mounted device will appear. The device name will be created from the serial number of the UTREL-16. You can access the files by browsing to the newly created drive and double-clicking the PDF, CSV or LTD files.

- For PDF files you need Adobe Acrobat Reader or a similar PDF viewer.
- To open the LTD file you need to install the free LogTag® Analyzer software.
- CSV files can be opened with a text editor, or imported into a spreadsheet program such as Microsoft® Excel.

> ⚠ If a logger has only taken pre-start readings, PDF and CSV files will not be available.

> ⚠ To retain the logger-generated files, copy them to a permanent storage location on your computer, such as the **Documents** folder, as they are not automatically copied.
> The data on the logger are retained. Each time you plug the UTREL-16 back into the computer the files are re-generated, until the device is re-configured. Once the battery is exhausted, the real time clock on the unit stops and dates and times for

⚠ the retained data may no longer be accurate. You will, however, still be able to access the last trip's data.

Interpreting the Data

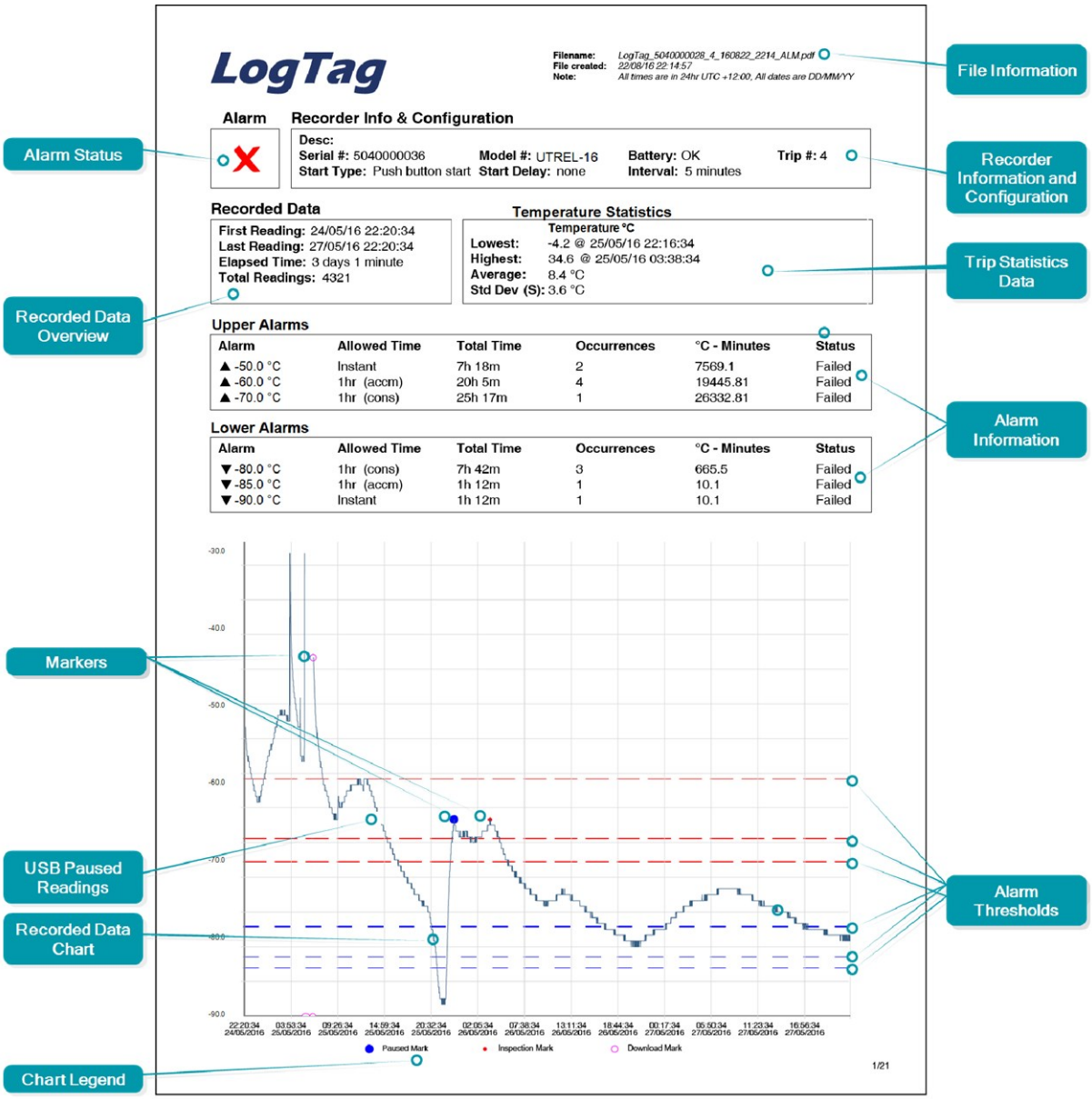


Figure 8: Sample report page with Multiple Alarm Thresholds

Data Evaluation - Report with multiple alarms

Alarm Status

This shows at a glance if the UTREL-16 recorded alarm conditions during the trip (showing a red ✘) or if no alarms were recorded (showing a green ✔).

Recorded Data Overview

This section shows at what time the logger started to record data, when it finished, how many readings were recorded and how long that took.

Temperature Scale

A temperature scale is shown, which adjusts dynamically depending on the settings made during configuration of the logger with LogTag® Analyzer.

Markers

The chart will show marks where the UTREL-16 has been downloaded (o) or where an inspection mark has been placed with the **START/Mark** or **STOP/Review** button (•).

USB Paused Readings

USB loggers cannot take a reading while plugged into a USB port. A gap is shown in the graph where the UTREL-16 was plugged in at the time it would otherwise have taken a reading. The list shows --- instead of the reading.

Recorded Data Chart

The chart shows a graphical representation of the data during the trip. As part of the UTREL-16 configuration process you set the parameters that influence how the chart is presented.

Legend

Shows the symbols for download marks, inspections marks and paused marks if they appear in the readings.

File Information

This section shows general information about the PDF file, such as generation time, date and time formats used in the chart and the data list as well as the file name, which is compiled from information about the data it contains:

LogTag_[serial_number]_[trip number]_[file creation date]_file creation time]_[OK or ALM].pdf

Other files that may be generated have the extensions *.csv and *.ltd.

Logger Information and Configuration

This section shows general information such as serial and model numbers, trip number, battery status and description. It shows how the logger was started, if a start delay was active and the interval used for taking readings.

Logger Statistics Overview

This section gives a brief overview of the temperature data collected during the trip. It shows minimum and maximum values, when these occurred and also shows average, standard deviation and MKT values.

Upper and Lower Alarm Information

These two sections summarize the alarm trigger conditions and occurrences during the trip, including:

- alarm threshold temperature value
- any delay value for consecutive or accumulative alarms
- the total time above or below a threshold
- how often an alarm occurred
- whether or not an alarm was generated for this alarm trigger

You may see up to three alarms for each direction, depending on the logger's configuration.

Upper Threshold Lines

Upper alarm thresholds are shown with red dashed lines --- so you can see at a glance where temperatures went above set limits. You may see up to three lines depending on configuration and zoom settings.

Lower Threshold Lines

Lower alarm thresholds are shown with blue dashed lines --- so you can see at a glance where temperatures went below set limits. You may see up to three lines depending on configuration and zoom settings.

Page information

The current page number and the total number of pages appear on every page.

Data Evaluation - Data List

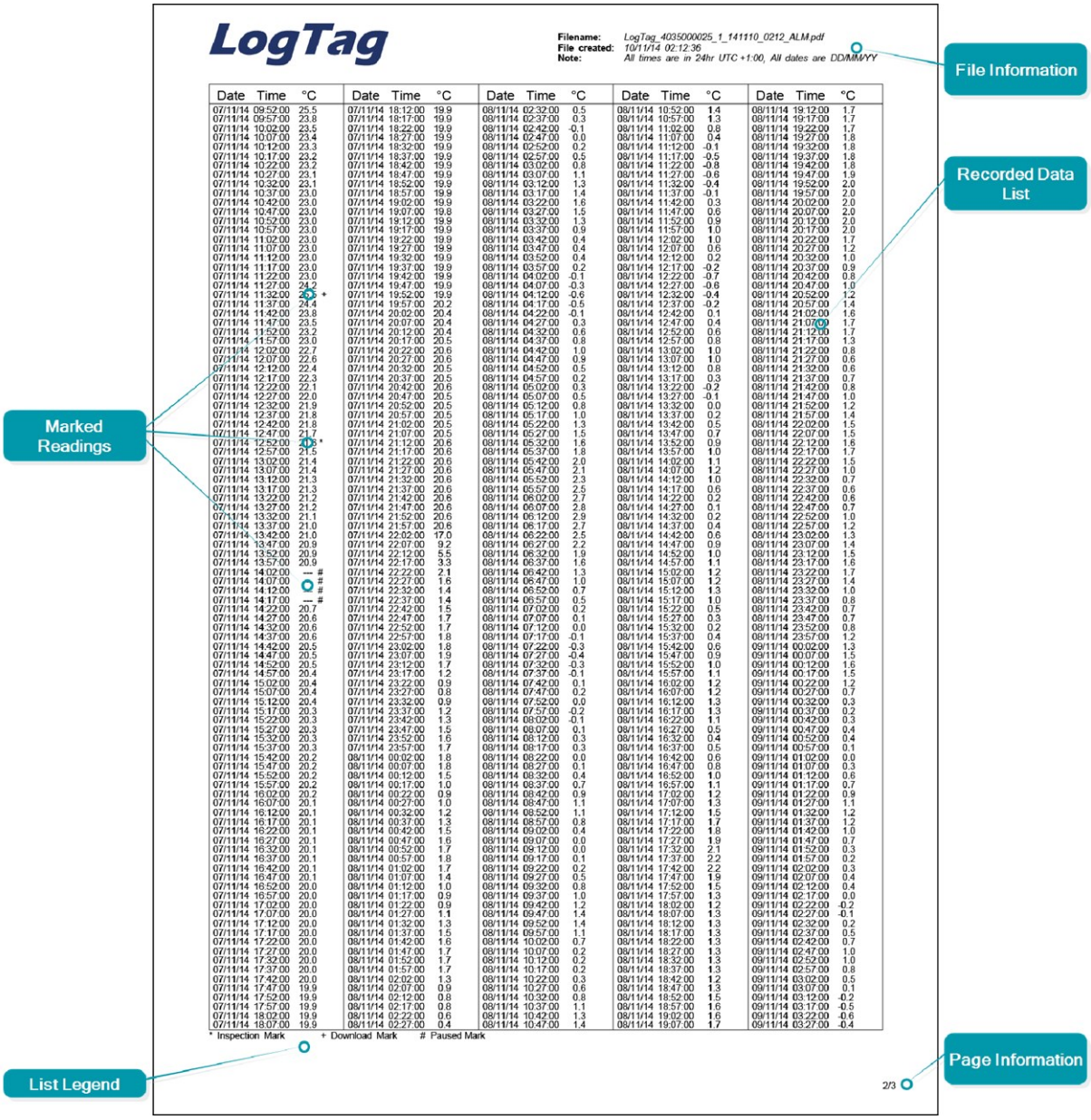


Figure 9: Sample Data List

File Information

This section shows general information about the PDF file, such as generation time, date and time formats used in the chart and the data list as well as the file name, which is compiled from information about the data it contains:

LogTag_[serial_number]_[trip number]_[file creation date]_file creation time]_[OK or ALM].pdf

Other files that may be generated have the extensions *.csv and *.ltd.

Recorded Data list

The Data list shows a single row for each recorded reading, along with the date, time and temperature values, plus any special events that were recorded against this reading.

Page information

The current page number and the total number of pages appear on every page.

Marked readings

In the data list, each entry may be marked with one or more of the following symbols, depending on which event occurred when the reading was taken:

- **A +** symbol will be shown, if the UTREL-16 was downloaded with LogTag® Analyzer just prior to the reading being taken.
- A ***** symbol will be shown where an inspection mark has been placed.
- A **#** symbol will be shown where the logger was plugged into a USB port at the time it would otherwise have taken a reading.

USB Paused Readings

USB loggers cannot take a reading while plugged into a USB port. A gap is shown in the graph where the UTREL-16 was plugged in at the time it would otherwise have taken a reading. The list shows **---** instead of the reading.

Probe Disconnected

A gap is shown in the graph where the UTREL-16's probe was not plugged in at the time it took a reading. The list shows **---** instead of the reading.

Legend

Shows the symbols for **download marks**, **inspections marks** and **paused marks** if they appear in the readings.

Technical Specifications

Model Number	UTREL-16
Temperature Sensor Measurement Range	-90 °C to +40 °C (-130 °F to +104 °F)
Operating Temperature Range	-30 °C to +70 °C (-22 °F to +158 °F)
Storage Temperature Range	0 °C to +40 °C (32 °F to +104 °F)
Ambient humidity range during transport and use	0 to 95 %RH
Rated Temperature Resolution	0.1 °C (0.2 °F) for -85 °C to 0 °C (-121 °F to +32 °F) 0.2 °C (0.4 °F) for 0 °C to +18 °C (+32 °F to +64 °F) and -90 °C to -85 °C (-130 °F to -121 °F) 0.3 °C (0.5 °F) for +18 °C to +30 °C (+64 °F to +86 °F) 0.5 °C (0.9 °F) for +30 °C to +40 °C (+86 °F to +104 °F) Please see resolution chart in Accuracy and Resolution
Rated Temperature Accuracy	Better than ±0.5 °C (±0.9 °F) for -20 °C to +10 °C (-4 °F to 50 °F) Better than ±0.7 °C (±1.3 °F) for -50 °C to -20 °C (-58 °F to -4 °F) and +10 °C to +30 °C (+50 °F to +86 °F) Better than ±1.0 °C (±1.8 °F) for -85 °C to -50 °C (-121 °F +-58 °F) and +30 °C to +40 °C (+86 °F to +104 °F) Better than ±1.8 °C (±3.2 °F) for -90 °C to -85 °C (-130 °F to -121 °F) Please see accuracy chart in Accuracy and Resolution
Probe Compatibility	Any external probe from the ST100 series
Sensor Reaction Time	According to Probe
Clock accuracy	Quartz crystal-locked real time clock, rated accuracy ±25ppm @ 25 °C (equiv to 2.5 seconds/day) Rated temperature coefficient is -0.034±0.006ppm/°C (i.e. typically +/- 0.00294seconds/day/°C)
Recording Capacity	16,129 real time temperature values, giving • 112 days @ 10 min logging, or • 168 days @ 15 min logging
Statistics memory	For displaying statistics on the LCD • trip min/max values • Total time above/below alarm thresholds
Memory type	Non volatile
Sampling Interval	Configurable from 30 seconds to 18 hours
Start options	• Push button start with optional configurable start delay from 1 minute to 72 hours • Date/time start
Alarm functions	• OK tick and Alarm cross on display, linked to alarms • Alarm arrows linked to thresholds • three configurable upper alarms • three configurable lower alarms
Vibration	Withstands vibration specification as detailed in EN12830:2018
Shock	• Withstands shock specification as detailed in EN12830:2018 • Withstands 5 drops from 1m onto smooth concrete floor without loss of function or calibration
EMC compliance	• EC EMC directives (CISPR 11: 2009 + A1: 2010, IEC 61000-4-3:2010, IEC 61000-4-4:2012, IEC 61000-4-6:2008) • RTCA DO-160G:2010, section 21 • Includes electrostatic discharge as prescribed in IEC 61000-4-2:2008 • Complies with FCC Part 15 Subparts A and B
Environmental	IEC 60529: IP61 with USB cap fitted and hung vertically
Case Material	Polycarbonate
Power source	CR2032 3V $LiMnO_2$ coin cell battery, non-rechargeable, non-replaceable

Battery life	Typically 12 months of storage, followed by 24 months of operation with normal use[1]: • 15 minute logging • statistics reviewed on the display no more than once daily, for no longer than 30 seconds each time • display activation no more than once a day for battery check • keeping recorder within the storage temperature range when not in use Battery low indicator
Size	93mm(H) x 54.5mm (W) x 8.6mm (T) including USB cap
Weight	39g
Calibration	Factory calibration using instruments traceable to an ISO/IEC 17025 accredited testing laboratory
PDF features	• compliant with standard 1.6 and later • Single page report with trip and alarm summary • Multi page report with list of readings including date/time
Download time	• Typically with full memory (16,129 readings) less than 30 seconds from time of insertion to availability of PDF report. • Typically less than 10 seconds from time of insertion to availability of LTD file in LogTag® Analyzer (if configured)
Software requirements	• LogTag® Analyzer version 3.1r11 or later to configure and download • PDF reader software to access onboard PDF files
USB compatibility	USB 2.0, type A plug
Accessories	• Wall holder 200-000010 • IP67 Protective Enclosure 200-000020 • Replacement protective cap 200-000425

[1] Data can be accessed for the life of the product via USB

Appendix 1 - Accuracy and Resolution

Temperature Accuracy

The following graph shows the typical rated temperature accuracy of a UTREL-16:

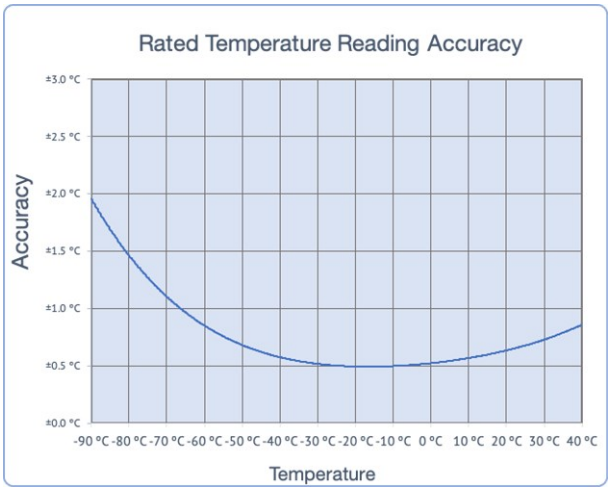


Figure 10: *Rated Temperature Accuracy Chart*

Temperature Resolution

The following graph shows the typical rated native temperature resolution of a UTREL-16:

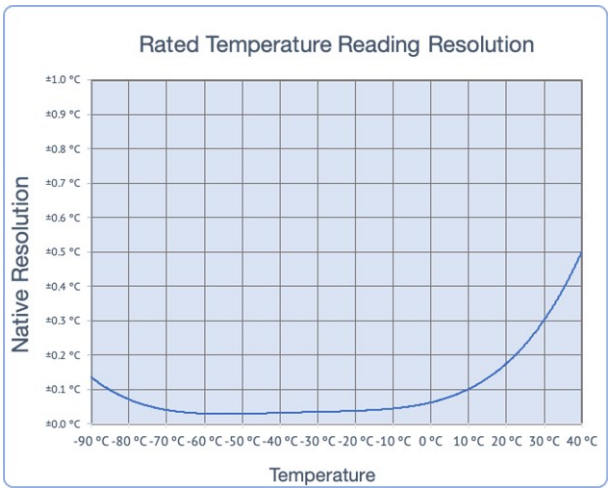


Figure 11: *Rated Temperature Resolution Chart*