UHADO-16

USB PDF Temperature and Humidity Logger with Display

Product User Guide

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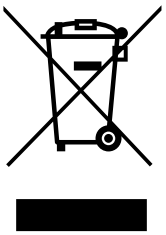
Safety Information



The UHADO-16 PDF USB temperature logger contains a user-replaceable Lithium Battery. When the battery indicates "LOW", you can replace it as per the instructions in Battery Replacement on page 42. The empty battery should be 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 main battery in the UHADO-16 is designed to power the device for up to 12 months of operation, provided

- the device was not stored for more than 12 months prior to activation;
- a fresh battery from a reputable manufacturer is used;
- the device is not downloaded excessively to a PC (more than once a week);
- the recording interval is not shorter than 5 minutes;
- the acoustic alarm is not active over long periods;
- the device is stored and operated according to LogTag Recorders' recommendations.

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

Disclaimer

The UHADO-16 monitors temperature and humidity 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 UHADO-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 UHADO-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 UHADO-16 logger

Introduction

LogTag's UHADO-16 is a fully configurable, multi-use USB PDF temperature and humidity logger that shows the most recent reading on the built-in display and can create reports without the need to install proprietary software or hardware at the destination. Minimum and maximum recorded trip values 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 UHADO-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. Additionally, logged data can be downloaded via a standard LogTag® Interface to the free companion software LogTag® Analyzer, where you can display data in chart, list or summary formats. The software also allows electronic archiving and exporting or transmitting data in support of sophisticated data management systems such as LogTag® Online.

Features

The UHADO-16 temperature and humidity logger features the familiar LogTag® case layout and an additional USB socket at the bottom of the product.

Figure 1: *UHADO-16 features*

Case

- mounting lug for secure fastening of the logger to fixtures
- USB socket with protective seal - shields USB connector from moisture and dirt
- robust polycarbonate case, IP61
- durable communications contacts

Buttons

- **START/CLEAR/STOP** button
  can be used to start and stop the unit or to clear an alarm. It is also used to exit the statistics review
- **REVIEW/MARK** button
  can be used to enter the statistics review and to scroll through the statistical data directly on the display. It is also used to place an inspection mark in the data listing

Display and LED

The display shows ‘at a glance’ if alarm events have occurred. Details of any alarm event can be checked directly on the logger's display or in more detail by downloading the logged data. In addition, a red alarm LED shows if an alarm event has occurred, and a buzzer will sound.

Sensor

The UHADO-16 contains a digital temperature and humidity sensor. The logger comes standard with a factory calibration certificate but can also be calibrated by third-party laboratories for both temperature and humidity according to your needs.

PDF

The UHADO-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 and presents the data in chart and list format. A CSV file of the data list is also available.

Required Equipment

Aside from the LogTag® UHADO-16 USB PDF Temperature and Humidity Logger with Display you will need the following items:

- a micro-USB cable for communication to the PC (it is recommended that you connect each UHADO-16 via a permanently plugged in micro-USB cable to protect your computer's USB socket, if you use the USB communication)
- one of the LogTag® USB interface models if you wish to use this method of configuration/download
- a PC running Windows 7 or later and LogTag® Analyzer installed if you wish to configure and download the logger
- a PC with PDF reader software installed for viewing the generated PDF files

Software Requirements

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

If you wish to configure UHADO-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 UHADO-16 into a computer's USB port using a micro-USB to USB-A cable. Depending on the settings made during configuration, a number of on-board files will be generated[1] 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[2]
- 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

You can also download data directly into LogTag® Analyzer without accessing the logger's on-board files, using either a micro-USB lead or a standard LogTag® USB interface.

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

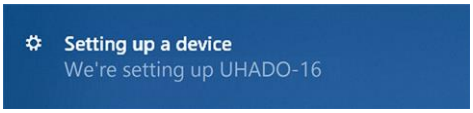
Configuring the UHADO-16

UHADO-16 products can be ordered pre-configured, ready to start. Different profiles are available; if none of these suit or the UHADO-16 needs different configuration settings to those already installed, the unit can be configured using LogTag® Analyzer:

- Start the LogTag® Analyzer software.
- Using the USB socket on the UHADO-16: Remove the protective seal and insert a micro-USB to USB-A cable into the USB socket; connect the cable to a USB port on your PC.

Please note the USB connector's orientation.

You will receive a message that a new USB device has been found, and a generic driver will be installed[3].



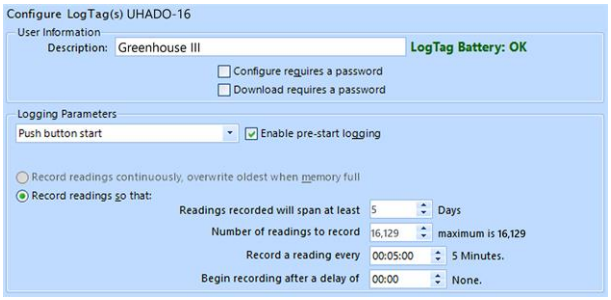
3 Depending on the factory configuration additional drivers may be installed at this time.

Once the driver is installed and the UHADO-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 UHADO-16's. Although you can configure many devices at the same time, 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.

- Using a standard USB interface: Insert the UHADO-16 into the interface, contacts towards the rear. You can now use the UHADO-16 like any other logger with the 3 contact pins at the rear, both for configuration and for downloading data.

Standard Configuration Options

The standard configuration options are very similar to those of other LogTag® logger products and 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.

Temperature Alarm Configuration Options

LogTag® Analyzer allows up to 4 different alarm trigger conditions for temperature when configuring a UHADO-16 for recording.
Each alarm trigger condition consists of a threshold temperature value, an activation type (which can be instant, consecutive or accumulative[4]) 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***.
An alarm event is generated, when either of the entered alarm conditions is triggered.

4
- 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.

When an alarm is triggered, the display will show the alarm symbol (✕) instead of the tick (✓) and the red alert LED will blink every 8 seconds. If activated, a buzzer will also sound (see Audible Alarm on page 26). The alarms will be shown on the PDF and reported to the software.

The UHADO-16 can have one or two upper alarms, and one or two lower alarms.

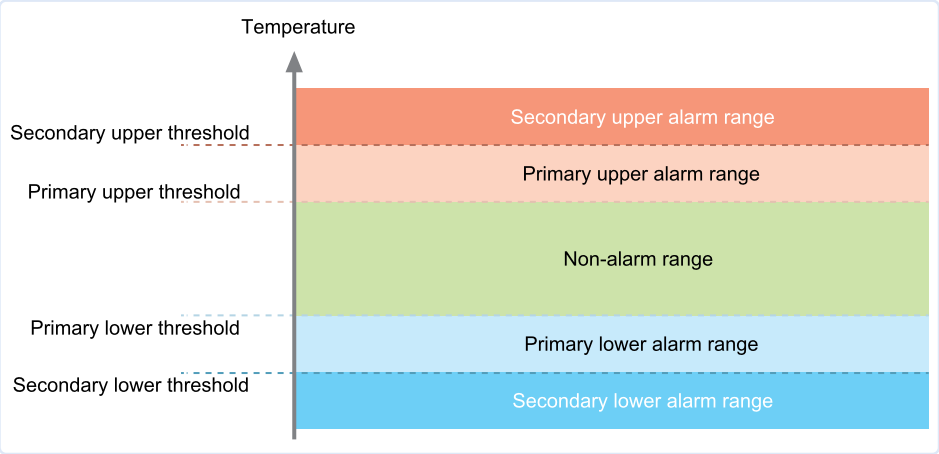


Figure 2: *Alarm ranges and thresholds*

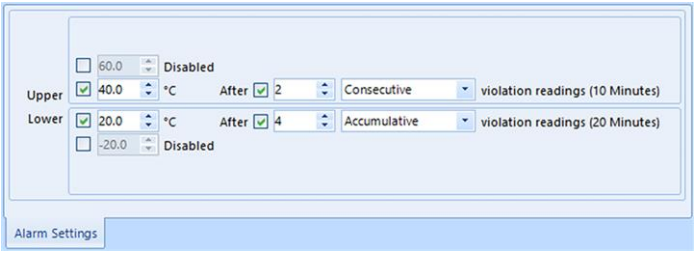


Figure 3: *Representation in LogTag® Analyzer*

The following rules apply when entering alarm conditions into the configuration screen in LogTag® Analyzer:

- A primary alarm condition must be entered before the corresponding secondary 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. Similarly, this applies in reverse to the lower alarms.
- Threshold values can be equal and combined with different delay values. For example, you can enter a primary upper alarm with 8 ℃ threshold and 10 accumulative readings, plus an alarm with 8 ℃ threshold and 5 consecutive readings. In this instance the alarm will be triggered, if either 10 readings in total are above 8 ℃, or 5 consecutive readings above 8 ℃ have occurred.

Humidity Alarm Configuration Options

LogTag® Analyzer allows up to 2 different alarm trigger conditions for humidity when configuring a UHADO-16 for recording.

Each alarm trigger condition consists of a threshold humidity value, an activation type (which can be instant, consecutive or accumulative) and a delay time, if it is not an instant alarm.

If an alarm trigger condition requires readings to exceed an upper threshold humidity it is called an ***upper alarm***. If an alarm trigger condition requires readings to go below lower thresholds it is called a ***lower alarm***.

An alarm event is generated, when either of the entered alarm conditions is triggered.

When an alarm is triggered, the display will show the alarm symbol (✕) instead of the tick (✓) and the red alert LED will blink every 8 seconds. If activated, a buzzer will also sound (see Audible Alarm on page 26). The alarms will be shown on the PDF and reported to the software.

The UHADO-16 can have one upper alarm, and one lower alarm.

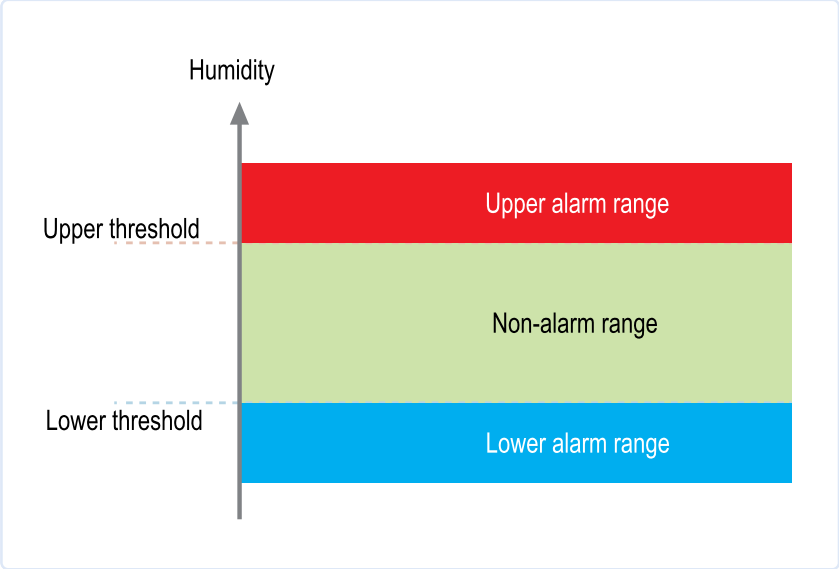


Figure 4: *Alarm ranges and thresholds*

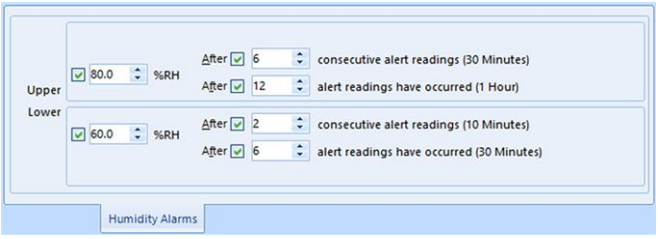


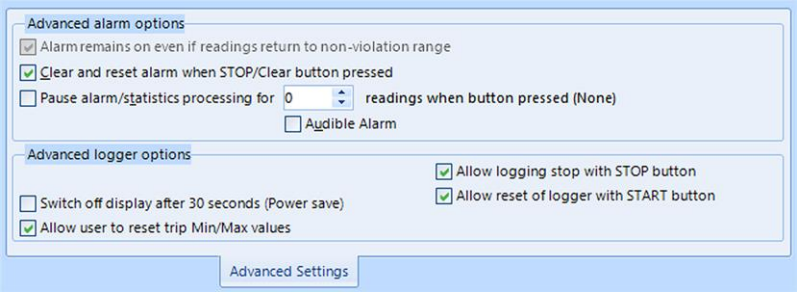
Figure 5: *Representation in LogTag® Analyzer*

The following rules apply when entering alarm conditions into the configuration screen in LogTag® Analyzer:

- Only one upper and one lower threshold are available.
- You can enable both, just one of them, or none at all.
- For each threshold you can define consecutive and accumulative delay values separately, and enable both, only one of them, or none (instant alarm).

Advanced Settings

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



Parameters that influence the appearance of the display are:

- pausing alarm/statistics processing (see Paused Readings on page 27)
- switching off the display after 30 seconds (Power save, see Power Save on page 27)
- allowing a user to reset the trip's minimum and maximum values on the display during recording

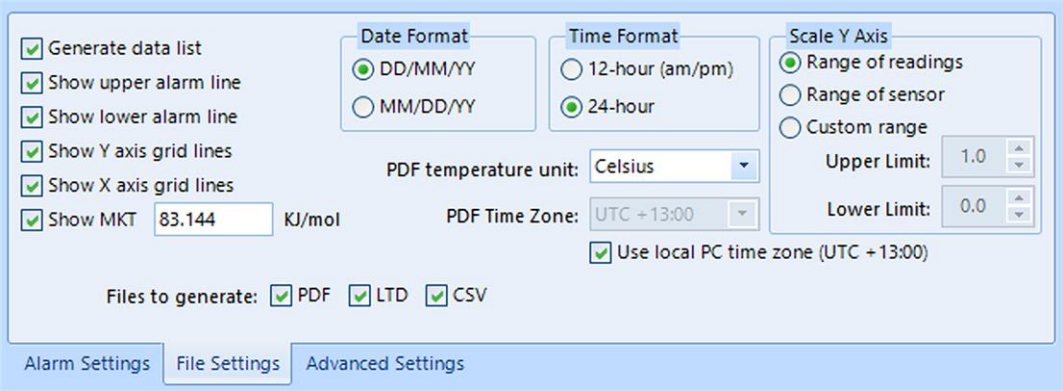
Parameters influencing specific behavior of the UHADO-16 are:

- clearing and resetting alarms when the **START/CLEAR/STOP** button is pressed
- leaving the alarm turned on, even if readings return to the normal temperature range again
- allowing the user to stop the logger with the **START/CLEAR/STOP** button
- allowing the user to reset the logger with the **START/CLEAR/STOP** button
- enabling the buzzer for the audible alarm

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.

File Settings

Select the **File Settings** tab for the settings that decide which files are generated when the UHADO-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 used in the files

> ⚠ 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

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.

Finalizing the configuration

Click Configure to upload the configuration data to the UHADO-16.

When the configuration is complete, unplug the UHADO-16 from the USB socket and replace the protective seal, or remove it from the interface.

If you wish to configure more UHADO-16 units with the same configuration, insert the next loggers into USB sockets, wait until they are ready for configuration and click Repeat

Configure (or use the interface). Alternatively, you can use the **Profile** function to configure multiple units with the same settings.

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

UHADO-16 Start Options

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

Push button start

The logger will start taking temperature readings as soon as you have pressed the **START/CLEAR/STOP** button).

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 UHADO-16 starts recording as soon as it is unplugged from the USB port[5] and will continue to do so until you start the unit. 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

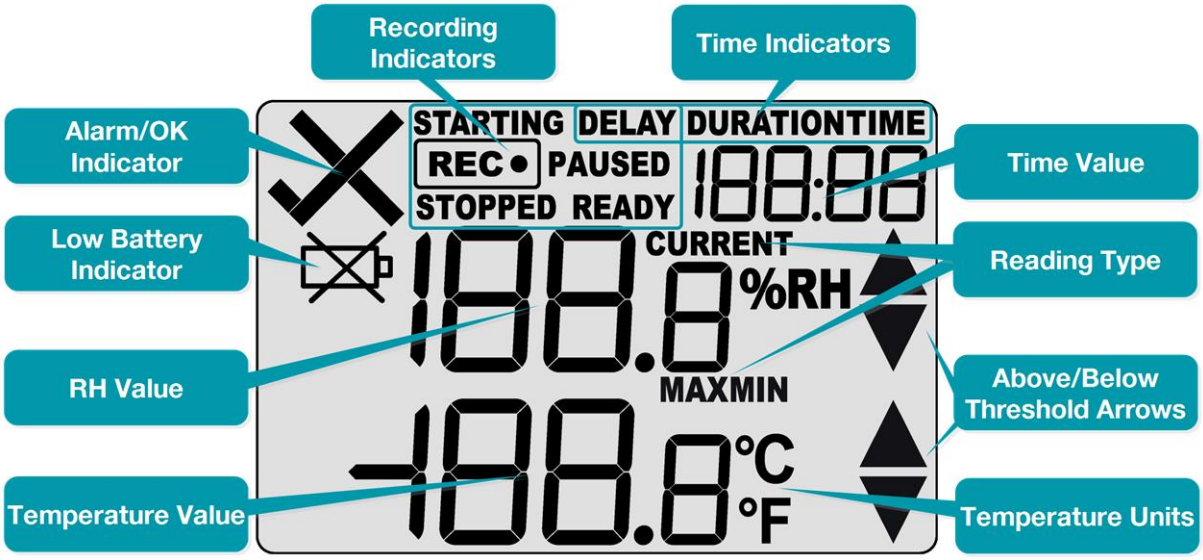
If you configure the UHADO-16 to start after a delay period, the logger will not immediately record temperature readings after you have pressed **START/CLEAR/STOP**, but start a countdown timer instead, and record readings only after the timer has ended. The value for the timer is set during configuration. 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 specified during configuration (local time). You cannot combine a date/time start with pre-start readings or the start delay function.

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

Display Overview



Temperature Value

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

Humidity Value

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

Battery Low

The battery low symbol will appear if the UHADO-16's battery is low and requires changing. Please follow the instructions provided in Battery Replacement on page 42. If the symbol is not shown while the display is turned on, the battery is still OK.

ALARM/OK indicator

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

Reading Type

The word **CURRENT** is shown when the temperature on the display represents the last recorded temperature.

The word **MAX** is shown in Review mode, when the temperature on the display represents the maximum recorded temperature for the day displayed.

The word **MIN** is shown in Review mode, when the temperature on the display represents the minimum recorded temperature for the day displayed.

Recording indicators

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

- If **READY** is shown, the UHADO-16 is ready to be started with the **START/CLEAR/STOP** button. Depending on the configuration it may already record pre-start readings.
- If **STARTING** is shown, the logger has been started, and a start delay is active. The word **DELAY** is also shown, together with the time in hours and minutes until the start.
- If **REC●** is shown, the UHADO-16 is recording temperature and humidity 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 UHADO-16 has finished recording temperature and humidity data.

Time Value and Time Indicators

The time value display is used to show one of the following:

- the current time
- the time remaining until the logger starts recording (for a delayed start)
- a duration, for example of an alarm

The time indicators identify which of those is displayed as follows:

- If **TIME** is shown, the time value represents the current time in hours and minutes (24- hour format).
- If **DELAY** is shown, the time value represents a start delay, or the time remaining until a date/time start will occur.
- If **DURATION** is shown, the time value represents the duration, for example the time above the upper alarm limit.

The word **boot** appears in place of the clock if new firmware is being uploaded to the UHADO-16.

The word **USb** appears when the unit is plugged into a USB port.

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.

Temperature Units

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

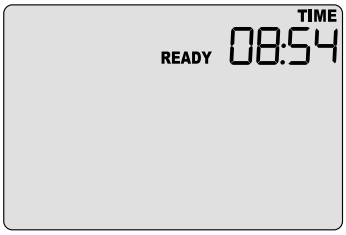
Operating the Logger

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

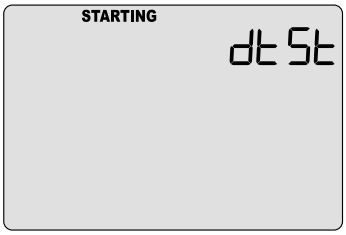
After configuration with LogTag® Analyzer for a push button start the word **READY** is shown, together with the current time in 24-hour format.



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

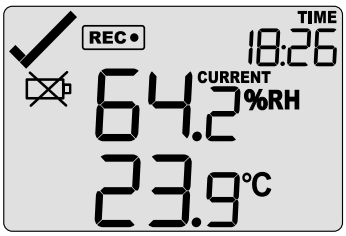
The logger can also be configured to start at a specific time and date. You will see the letters dtSt instead of the clock.



Pre-start readings and start delay options are not available for a date/time start.

Low Battery

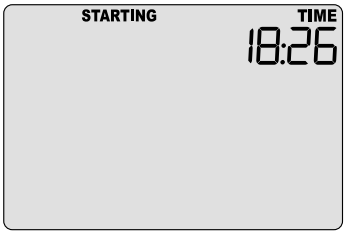
If at any time during the operation the logger has a low battery, the low battery symbol is shown.



Please see Battery Replacement for further details.

Starting the Logger

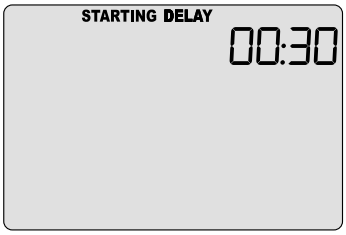
Push button start



Press and hold the **START/CLEAR/STOP** button until **STARTING** is shown. The UHADO-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** is shown instead of the REC● symbol, once you have started the logger.



The delay time is shown in hours and minutes. The time counts down and the UHADO-16 starts recording when it reaches 0:00. If the start delay is longer than 199 hours 59 minutes, the clock will show 199:59 until the remaining delay is shorter than 199 hours 59 minutes.

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

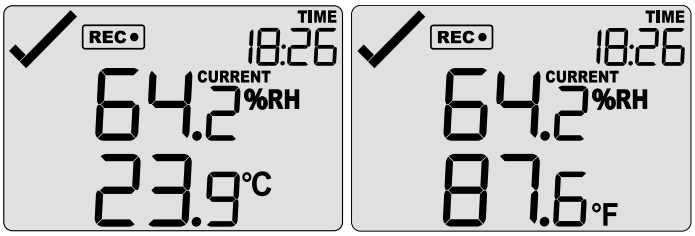
Automatic date/time start

If you configured the UHADO-16 for a date/time start, it will record temperature values as soon as the entered 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 humidity and temperature values. 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.

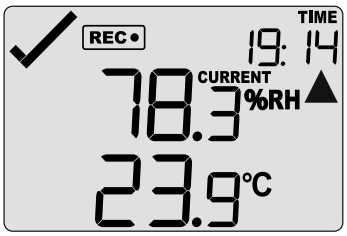
Readings above or below alarm thresholds

If the most recently recorded humidity or temperature is above or below one of the alarm thresholds, an alarm marker will be shown on the display.

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

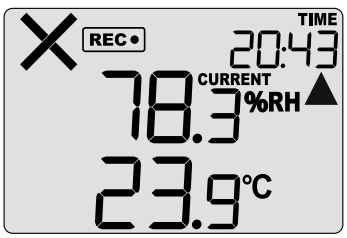
> ⚠ The presence of an alarm marker on the display does NOT indicate an alarm event. It only shows that the most recent humidity or temperature recorded was above or below the corresponding alarm threshold value. If an alarm marker is shown, but the display still shows a tick, a delayed alarm is configured.

In this example, the most recently recorded humidity is above the upper alarm threshold and no alarm was triggered:



An alarm was triggered

If an alarm event occurred the alarm indicator ✕ is displayed in the upper left corner of the display.



Marking a reading with an inspection mark

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

If the Allow stopping with the Stop button feature is enabled, a mark will also be registered when you press the **REVIEW/MARK** button, but do not complete the process of stopping the logger. An inspection mark will also be recorded if you clear an alarm.

Reviewing Min/Max values

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

After each subsequent press of the **REVIEW/MARK** button, the next review screen is shown.

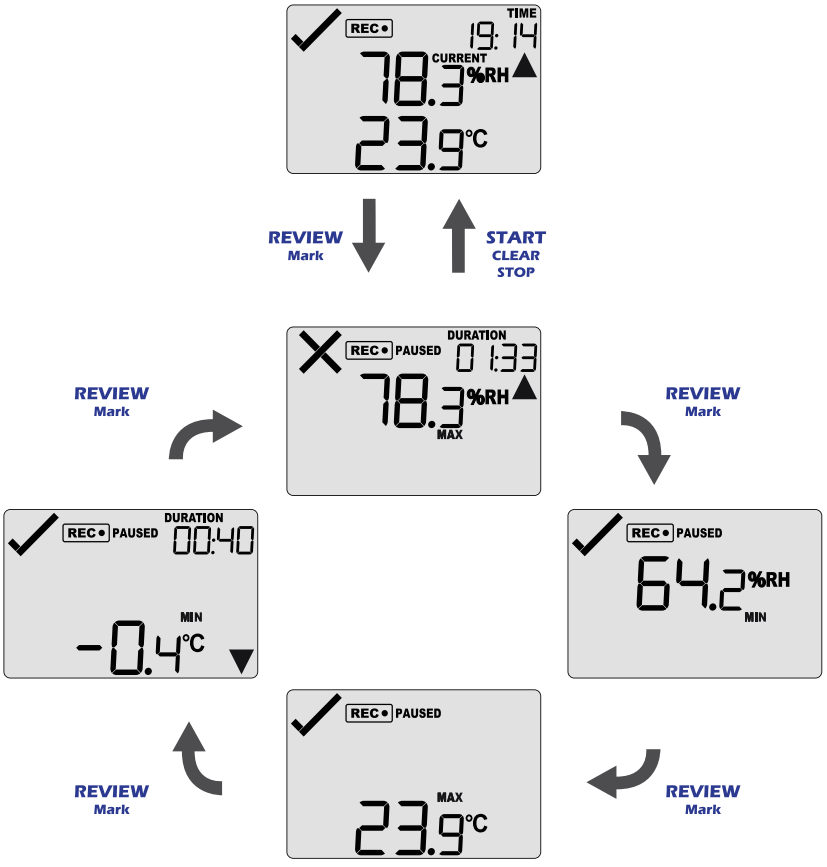
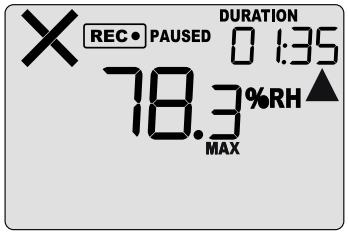


Figure 6: Review cycle

You can exit the review screens at any time by pressing **START/CLEAR/STOP** button or by waiting 30 seconds without pressing any button.

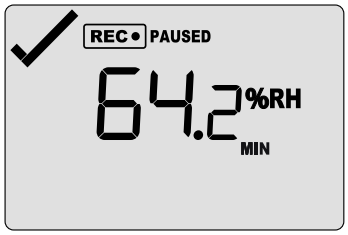
The standard recording screen will be shown.



After the first press of the **REVIEW/MARK** button, the highest recorded humidity during the trip so far is shown, indicated by **MAX** and the %RH unit. If this humidity was above or below one of the alarm thresholds, the corresponding alarm threshold arrow is also shown. If a duration value is shown, it indicates the amount of time the recorded readings were above the threshold. If the duration above the threshold was longer than allowed for the alarm trigger condition, the cross is shown to indicate this duration caused an alarm.

The example screen shows the following:

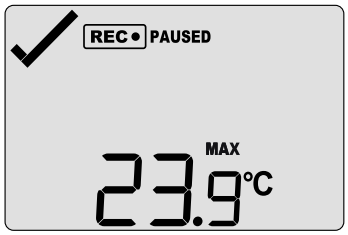
- The maximum humidity recorded was 78.3 %RH, which was above the upper threshold, shown by the upper alarm threshold arrow.
- In total, humidity values were recorded to be above the threshold for 1 hour and 35 minutes. This duration was longer than the allowed time, so an alarm was generated as a result, indicated by the cross.



After the second press of the **REVIEW/MARK** button, the lowest recorded humidity during the trip is shown, indicated by **MIN** and the %RH unit. If this humidity was above or below one of the alarm thresholds, the corresponding alarm threshold arrow is also shown. If a duration value is shown, it indicates the amount of time the recorded readings were below the threshold. If the duration below the threshold was longer than allowed for the alarm trigger condition, the cross is shown to indicate this duration caused an alarm.

The example screen shows the following:

- The minimum humidity recorded was 64.2 %RH, which was within the allowed thresholds.
- None of the alarm threshold arrows is shown, neither is a duration value.
- The tick is shown, as no alarm was triggered.



After the third button press, the highest recorded temperature during the trip so far is shown, indicated by **MAX** and a temperature unit. If this temperature was above or below one of the primary alarm thresholds, the corresponding alarm threshold arrow is also shown.

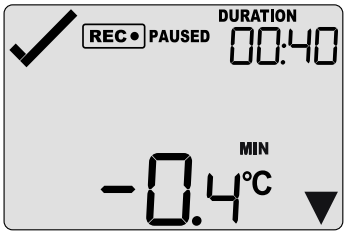
If a duration value is shown, it indicates the amount of time the recorded readings were above the threshold. If the duration above the threshold

was longer than allowed for the alarm trigger condition, the cross is shown to indicate this duration caused an alarm.

The example screen shows:

- The highest recorded temperature was 23.9 °C, which was within the allowed thresholds.
- None of the alarm threshold arrows is shown, neither is a duration value.
- The tick is shown, as no alarm was triggered.

Pressing **REVIEW/MARK** for a fourth time will show the lowest recorded temperature during the trip so far, indicated by **MIN** and a temperature unit. If this temperature was above or below one of the primary alarm thresholds, the corresponding alarm threshold arrow is also shown.



If a duration value is shown, it indicates the amount of time the recorded readings were above the threshold. If the duration above the threshold was longer than allowed for the alarm trigger condition, the cross is shown to indicate this duration caused an alarm.

The example screen shows:

- The minimum temperature recorded was -0.4 °C, which was below the allowed primary threshold.
- In total, temperature values were recorded to be below the threshold for 40 minutes. This duration was shorter than the allowed time, so no alarm was generated as a result, indicated by the tick.

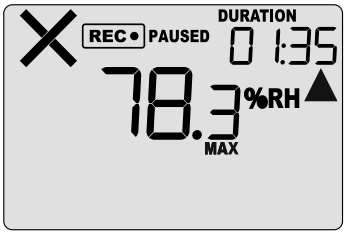
⚠ The highest temperature or humidity value shown can still be below the lower alarm threshold. Thus, a lower alarm threshold arrow can still show for the highest temperature. Similarly, this applies in reverse to the lowest temperature or humidity.

Resetting the Trip Minimum/Maximum Temperature and Humidity Values

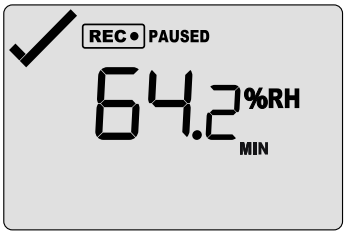
The currently stored Min/Max temperature and humidity values can be reset at any time while the unit is recording, but not once the unit has been stopped.

To reset the values, follow this procedure:

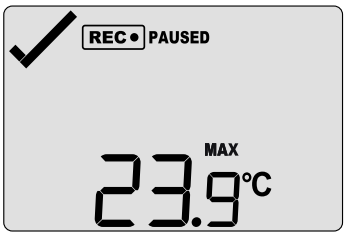
- Press **REVIEW/MARK** to display the trip maximum humidity value.



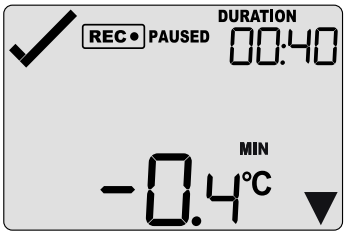
- Press **REVIEW/MARK** to display the trip minimum humidity value.



- Press **REVIEW/MARK** to display the trip maximum temperature value.

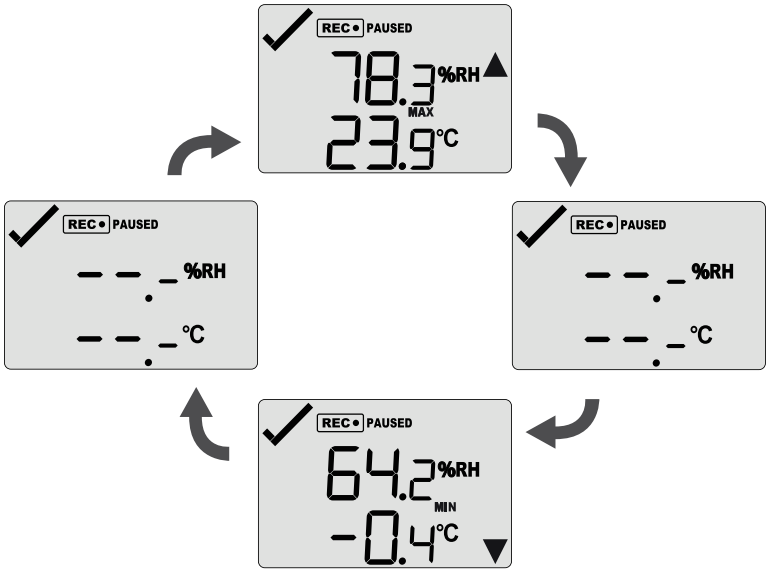


- Press **REVIEW/MARK** again to display the trip minimum temperature value.



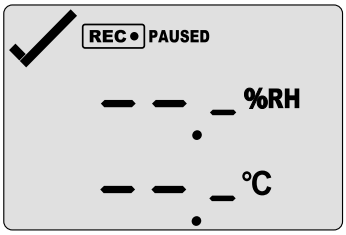
> ⚠ You can only complete the next steps if you are viewing the Minimum temperature screen!

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



During the cycle, the buzzer will sound a series of short beeps.

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



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

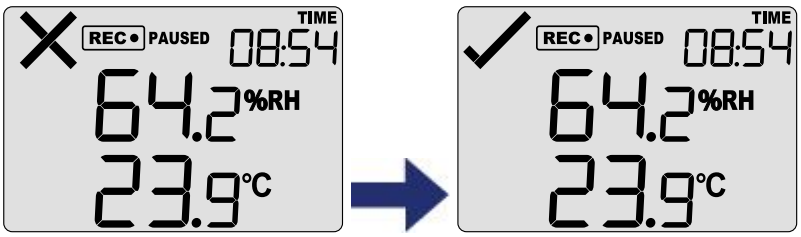
- If you keep holding the **REVIEW/MARK** button, the currently stored min/max values will be retained.
- Releasing the button within the 5-second period after the initial press switches to the first review screen.

The logger will now track new min/max values. A min/max reset mark will be recorded in the logged data. As soon as the next reading is taken, both minimum and maximum temperature and humidity values will be updated.

You will be able to see in the chart in LogTag® Analyzer and in 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 UHADO-16 can be configured so you can clear an alarm from the display. To do this, press and hold the **START/CLEAR/STOP** 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 UHADO-16 has stopped recording. Alarms resulting from an accumulation of readings can also not be cleared.

Audible Alarm

The UHADO-16 is fitted with a buzzer. You can choose to activate the buzzer when an alarm event has been registered to provide extra feedback. This is enabled or disabled in the Advanced Settings when configuring the logger with LogTag® Analyzer.

> ⚠ Please note, that continual activation of the audible alarm will reduce the working life of the battery. When an alarm event is triggered, the alarm should be cleared as soon as possible.

The alarm will sound once every four seconds for the first 24 hours, then sound less frequently to preserve battery life[6] until the alarm is cleared, the unit stops or is re-configured.

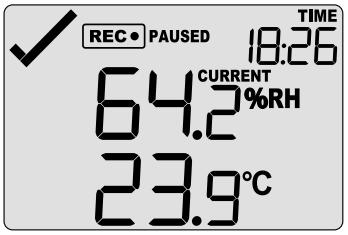
> The buzzer will temporarily turn off when you are reviewing data.

6 The interval at which the alarm sounds will increase to 8 seconds when the clock passes midnight for a second time (i.e. the alarm will sound every 4 seconds between 24 and 48 hours, depending on when during the day the alarm was first triggered). When the clock passes midnight a third time, the interval changes to 12 seconds until the alarm is cleared.

Paused Readings

During configuration of the UHADO-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.

Pausing readings is useful, for example, when you wish to review readings during the logger's operation (or clear an alarm), but you do not wish to trigger an alarm as a result of you handling the product.



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 REC 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.

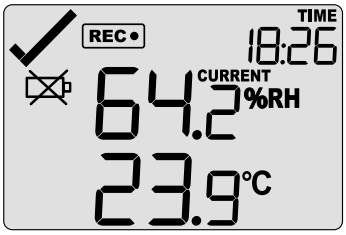
This function is appropriate in applications where you don't need to look at the display frequently, such as in transit monitoring applications, as the logger uses less battery power when the display is not turned on.

Pressing any button will re-activate the display.

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

Battery Low while recording

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



At this point you must replace the battery (see Battery Replacement on page 42).

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

Stopping the UHADO-16

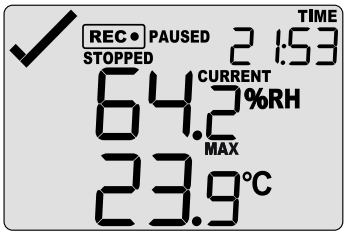
Automatically

The UHADO-16 automatically stops recording humidity and 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.

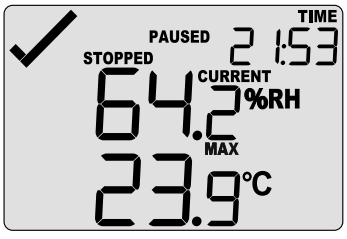
Manually

You can configure a UHADO-16 so it can be stopped with the **REVIEW/MARK** 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 **REVIEW/MARK** button. The **STOPPED** symbol shows in addition to for 2 seconds.



The symbol turns off after 2 seconds. If you release the button during this time, the logger stops taking temperature readings.



If the button is released while REC is still on, or you wait until it **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 and humidity reading. The **PAUSED** symbol also shows if this feature is enabled.

⚠ Any pending alarm must be cleared before the logger can be stopped.

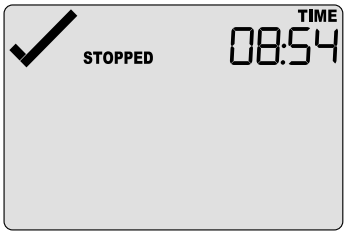
Logger has stopped

Once the logger has stopped, the display will show:

- the **STOPPED** symbol
- the OK indicator (✓) if no alarm was recorded
- the alarm indicator (✕) 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 humidity or temperature reading.

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

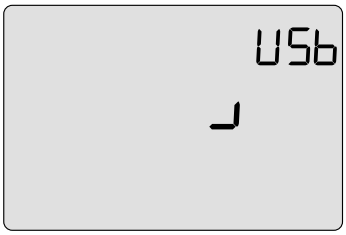


Here, the logger has stopped, and an upper alarm was recorded during the trip.

Plugging the UHADO-16 into a USB port

As soon as you plug the UHADO-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.

> ⚠ These files are re-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.

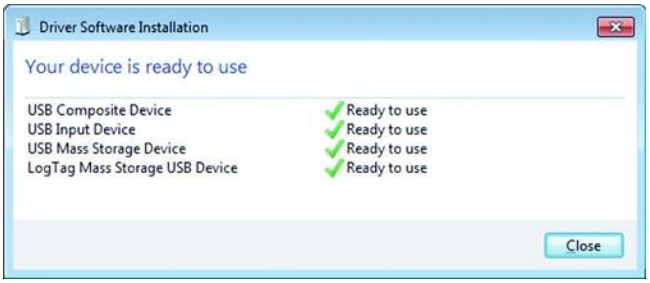
Microsoft Windows

Up to four drivers will now be installed, depending on the UHADO-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 UHADO-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



OSX 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 UHADO-16 using either of these operating systems, unless you use virtualization software such as Fusion or VirtualBox to create a hosted Windows environment. You need to discuss these options with your network administrator.

⚠ While a UHADO-16 is plugged into USB, no temperature or humidity 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 UHADO-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 please copy them to a permanent storage location on your computer, such as the Documents folder (they are not automatically copied).
The data on the logger are retained, so each time you plug the UHADO-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.

Interpreting the Data

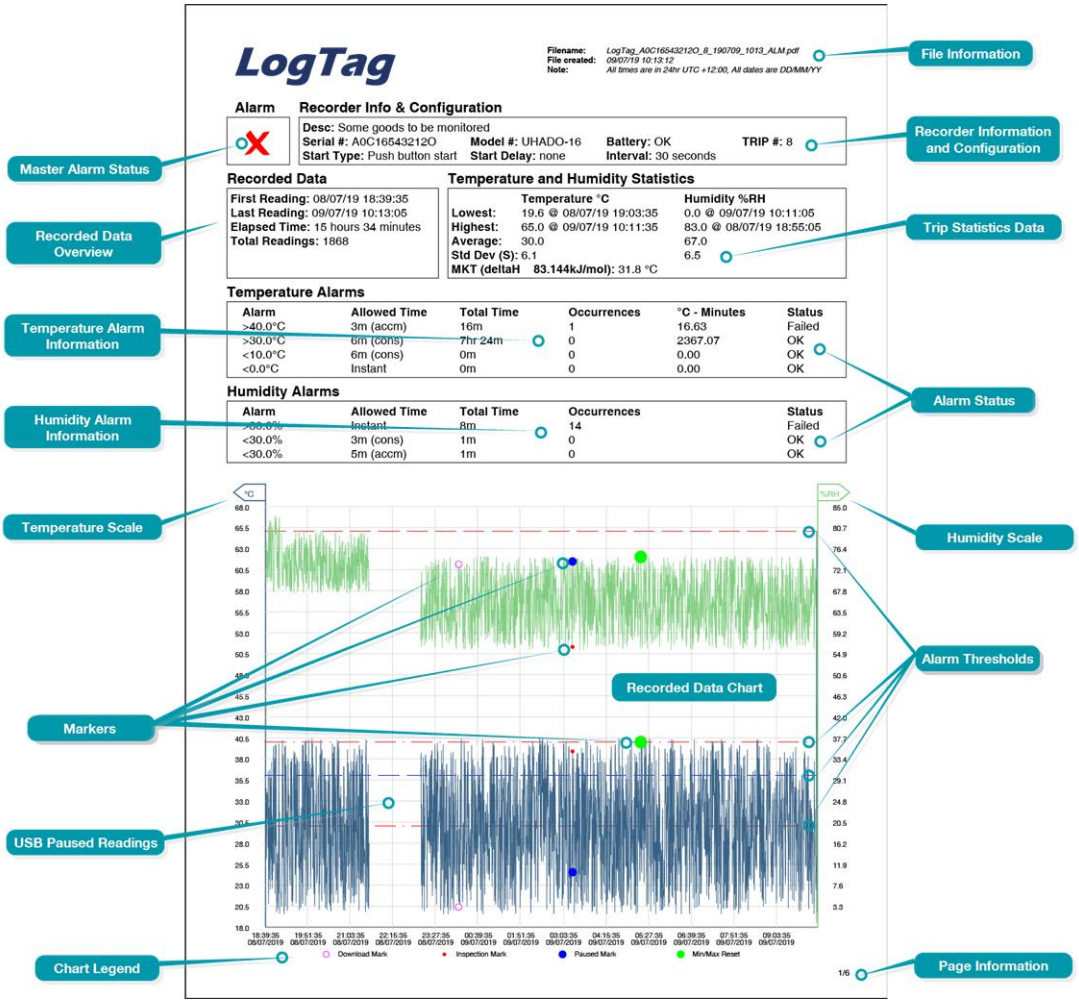


Figure 7: *Sample report page with Multiple Alarm Thresholds*

Data Evaluation - Report with multiple alarms

> ⚠ The UHADO-16 only generates this PDF if it is connected to a PC via the USB cable. If connected via a 3-pin USB interface, data must be downloaded using LogTag® Analyzer. In this case, an on-board PDF is not generated.

Master Alarm Status

This shows at a glance if the UHADO-16 recorded alarm conditions during the trip (showing a red ✗) or if no alarms were recorded (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 Alarms

This section summarizes the alarm trigger conditions and occurrences during the trip, including:

- direction (whether it is an upper or lower alarm)
- 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

Up to 4 alarms will be shown here, as configured with LogTag® Analyzer.

Humidity Alarms

This section summarizes the alarm trigger conditions and occurrences during the trip, including:

- direction (whether it is an upper or lower alarm)
- alarm threshold humidity 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

Up to 4 alarms will be shown here, as configured with LogTag® Analyzer.

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 UHADO-16 has been downloaded (o) or where an inspection mark has been placed with the **START/CLEAR/STOP** or **REVIEW/MARK** button (•). It also shows Paused marks (•) where a button press has prevented readings from being used for statistics and alarm calculations, and Min/Max reset marks (•) when the minimum and maximum recorded trip values have been reset.

USB Paused Readings

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

Legend

Shows the symbols for download marks, inspections marks, min/max reset 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 and humidity data collected during the trip. It shows minimum and maximum values, when these occurred and also shows average, standard deviation and MKT values.

Humidity Scale

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

Recorded Data Chart

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

Upper Threshold values

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 values

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

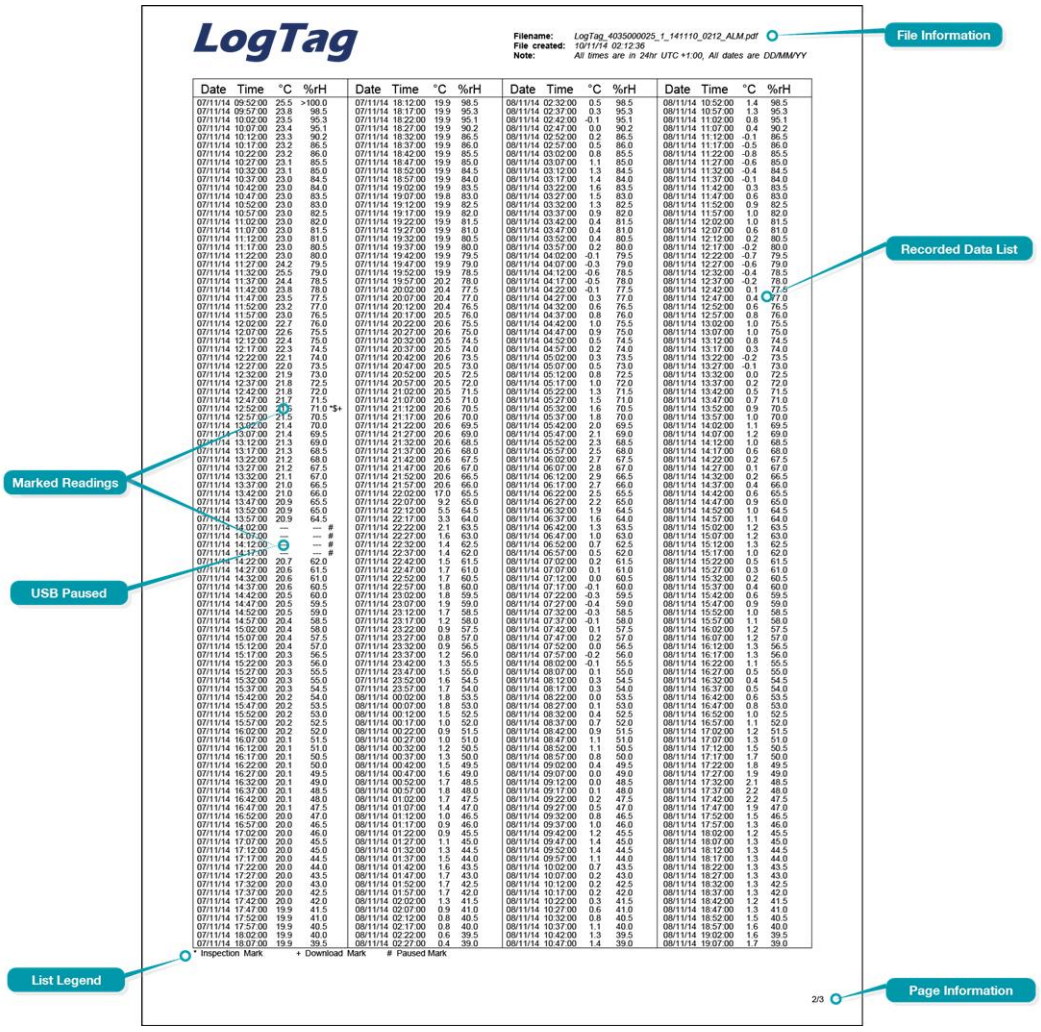


Figure 8: Sample Data List

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 & humidity 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 UHADO-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 readings were paused as a result of a button press.
- A **#** symbol will be shown where the logger was plugged into a USB port at the time it would otherwise have taken a reading.
- A % symbol will be shown when the min/max readings were reset.

USB Paused Readings

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

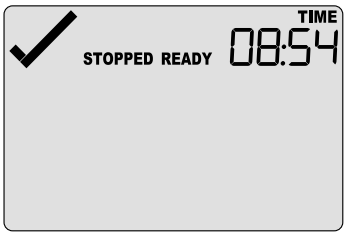
Legend

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

Resetting the Logger

You can reset a UHADO-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 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/CLEAR/STOP** button. The **READY** symbol will flash.
- When the **READY** symbol remains permanently on, release the button within 2 seconds. The **STOPPED** symbol will turn off and the logger is now ready to be started again.

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

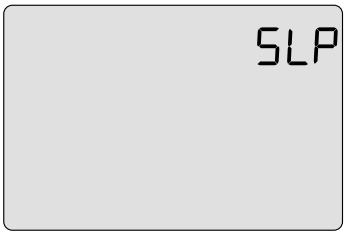
Hibernating a UHADO-16

When hibernated, the logger's power consumption is near zero and the life of the battery is greatly extended.

This is useful for conserving battery life when the logger is not used for extended periods.

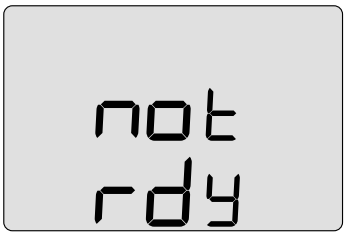
UHADO-16 loggers are placed into Hibernation using LogTag® Analyzer by clicking **Hibernate** on the **LogTag** menu.

The display shows **SLP** for a few seconds, before turning itself off.



A hibernated logger has no active display; however, a button press will wake the logger up briefly. The display will show:

- the low battery symbol ⌧ if the battery requires replacing
- the text not rdy if the battery is OK, and the logger can be re-activated at a later point



To use the logger again for recording data, it must be re-configured with LogTag® Analyzer.

Maintenance

The UHADO-16 USB PDF Temperature and Humidity Logger with Display typically needs little maintenance during normal operation.

Recalibration

All temperature and humidity products made by LogTag Recorders can be calibrated and adjusted. How often you re-calibrate your UHADO-16 logger depends on your application, but LogTag Recorders recommend at least annual calibration and battery replacement for this model, more frequently for demanding applications. LogTag Recorders offer calibration and adjustment software to ISO 17025 accredited laboratories. Please discuss this requirement with your calibration lab or advise your laboratory to contact the LogTag® Support team.

Cleaning

The sensor in the UHADO-16 is sensitive to chemicals. Therefore, it is recommended that you clean the product with a damp cloth, only using clean (distilled) water.

⚠ Under no circumstances should you use any alcohol or solvent based cleaning materials, as their vapors will greatly affect the accuracy of the sensor, or potentially damage it, even when not in direct contact.

Please refer to Humidity Reconditioning for information regarding the susceptibility of the sensor to chemical vapors and contaminants, and how these can be counteracted.

Battery replacement

Using the UHADO-16 when the battery is low can cause recorded readings to be inaccurate, or, at the worst, lead to a loss of readings.

When the battery indicates low on the display, during configuration or download, replace it immediately with a high-quality CR2032 cell from a reputable manufacturer. For battery replacement instructions please refer to Battery Replacement on page 42.

Filter replacement

In some applications, the air filter disc can become clogged or damaged. We do not advise cleaning the disc while still in the logger. Instead, we recommend a filter replacement, as described in Filter Replacement on page 46.

Water ingress

Please carefully observe the IP rating (IP61) of your unit and remember that none of the LogTag® products can be immersed into liquids. If the product has been immersed by accident, please immediately remove the battery and contact your distributor for further instructions.

Contact Cleaning

Keep the three metal contacts at the back of the logger clean and free from tape residue, dirt or other contaminants, which usually result in communications problems. If required, clean the contacts with a soft pencil eraser, but do not use abrasive materials as you may permanently damage them.

Technical Specifications

Model Number	UHADO-16
Temperature Measurement Range	-30 °C to +70 °C (-22 °F to +158 °F)
Operating Temperature Range	-30 °C to +70 °C (-22 °F to +158 °F)
Humidity Measurement Range	0 %RH to 100 %RH (non-condensing)[1]
Operating Humidity Range	0 %RH to 100 %RH (non-condensing)
Storage Range	0 °C to +40 °C (+32 °F to +104 °F), 0 %RH to 65 %RH
Rated Temperature Resolution	0.1 °C (0.1 °F) across entire range
Rated Temperature Accuracy	• Better than ±0.5 °C (±0.9 °F) for 0 °C to +50 °C (32 °F to 122 °F) • Please refer to the rated temperature accuracy chart on page 44 for other ranges
Rated Humidity Resolution	0.1 %RH across the entire range
Rated Humidity Accuracy @ 25 °C	• Better than ±3 %RH between 20 %RH and 80 %RH • Please refer to the rated humidity accuracy charts on page 44 for other ranges
Sensor Type	Digital RH and Temperature sensor
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 @ 10min logging or • 168 days @ 15min logging.
Statistics memory	for displaying statistics on LCD • Max/Min values • Alarm duration values.
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	• up to two configurable upper temperature alarms • up to two configurable lower temperature alarms • single upper and lower humidity alarm • OK tick and Alarm cross on display, linked to alarms • Audible alarm and red alert LED, linked to 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 (EN 61000-6-1:2005 & EN 61000-6-3:2006) • Includes electrostatic discharge as prescribed in EN 61000-4-2 • Complies with FCC Part 15 Subparts A and B
Environmental	IEC 60529: IP61 with USB seal fitted when hung vertically
Case Material	Polycarbonate
Power source	CR2032 3V user replaceable coin cell, non-rechargeable
Battery life	Typically 1 year of operation with normal use (15 minute logging, statistics reviewed on the display no more than once daily for no longer than 30 seconds each time, download data monthly) provided logger is kept within the storage temperature range when not in use.
Size	93mm(H) x 54.5mm (W) x 8.6mm (T) including USB protection seal
Weight	41g
PDF features	• compliant with standard 1.6 and later • Single page report with chart, trip and alarm summary • Multi page report with list of readings including date/time

[1] Please refer to Humidity Operating Range for additional information regarding the operating and measurement range of the sensor

Calibration	Factory calibration certificate
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 3.1r6 or later to configure and download • LogTag® Online version 1.0.7 or later is needed for real time operation • PDF reader software to access onboard PDF files
USB compatibility	USB 2.0, type A plug
Accessories	Wall holder, USB Interface, micro-USB lead

Appendix 1 - Battery Replacement

Prepare the Logger

- Download the unit to save any stored data.
- Hibernate the unit in LogTag® Analyzer.

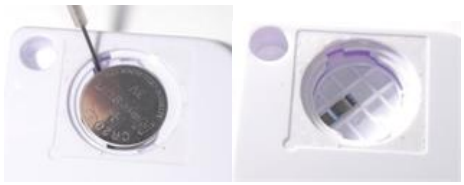
> ⚠ Failing to hibernate the logger may result in serious memory corruption. As a result you may no longer be able to use this product.

Remove the old battery

- Carefully remove the rear label covering the battery door using a small-bladed screwdriver or knife:

- Use a coin to turn the battery door anti-clockwise; remove it from the case:

- Remove the battery using a small-bladed screwdriver, as shown:



Insert the new battery

> Only use batteries from a reputable manufacturer! Check the temperature range of the battery and make sure it covers the range of the UHADO-16.

- Put a new CR2032 cell into the battery compartment as shown; the right-hand edge of the battery is inserted first against the contact:

- Press firmly down on the left-hand side of the battery to click the battery into place:

- Replace the battery door; turn clockwise to lock it into place.

- Cover the battery door with either a new label (Part # 100-000502) or reuse the old one.

- Re-configure the logger with LogTag® Analyzer.

> ⚠ Please recycle or dispose of the old battery according to your local environmental regulations.

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Appendix 2 - Humidity Reconditioning

Exposure to Chemicals

Humidity and temperature sensors are highly accurate environmental sensors exposed to the environment, which makes them susceptible to pollutants. While using or storing these sensors in the field in ambient environment is typically of no consequence, pollutants can affect the sensors' performance.

The sensor shall not get in close contact with volatile chemicals such as solvents or other organic compounds. Ketenes, Acetone, Ethanol, Isopropyl Alcohol, Toluene and others are known to cause drift of the humidity reading – irreversibly in most of the cases.

Acids and bases may also affect the sensor irreversibly and shall be avoided, including, but not limited to, HCl, H_2SO_4, HNO_3 and NH_3. Ozone and H_2O_2 in high concentration also have the same effect and therefore shall be avoided.

Please note, that above examples does not represent a complete list of harmful substances.

Applications in extreme environments

Some applications require the exposure of humidity and temperature sensors to harsh environments. This must be carefully tested and qualified. LogTag® qualifies its humidity and temperature logging products to work properly within ambient clean air – qualification for use in harsh environment is the user's responsibility.

Reconditioning Procedure

As stated above, extreme conditions or exposure to solvent vapors may offset the sensor. Depending on exposure levels and duration, the following reconditioning procedure may bring the sensor back to calibration state, or lessen the effects:

1. Hibernate the unit.
2. Remove the battery and the battery door.
3. Bake the unit at a temperature of 65 °C in less than 5 %RH for 24 hours.
4. Re-hydrate the unit at 20 °C to 30 °C in 75 %RH for 12 hours.
5. Replace the battery and battery door.

In addition, a re-calibration of the unit may be required.

Appendix 3 - Accuracy

Temperature accuracy

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

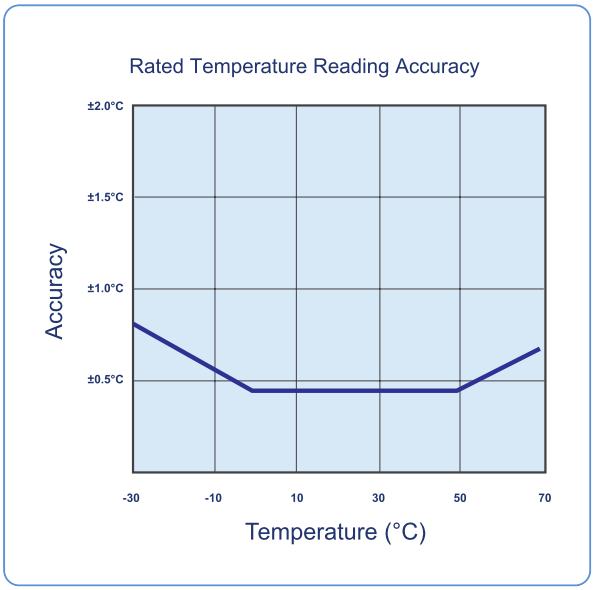


Figure 9: *Rated Temperature Accuracy Chart*

Humidity Accuracy

The following graph shows the typical rated humidity accuracy of a UHADO-16 at 25 °C:

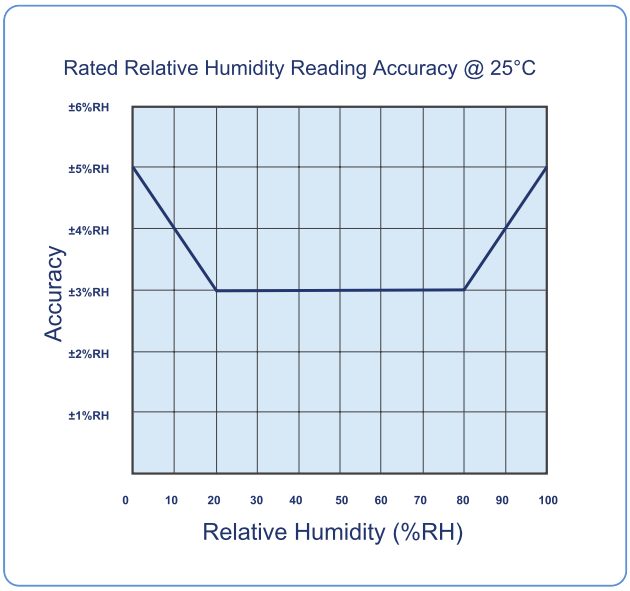


Figure 10: *Rated Humidity Accuracy Chart*

Humidity Accuracy Offsets

If the UHADO-16 is operated at a temperature other than 25 °C, additional offsets may have to be applied, which are listed in the graph below:

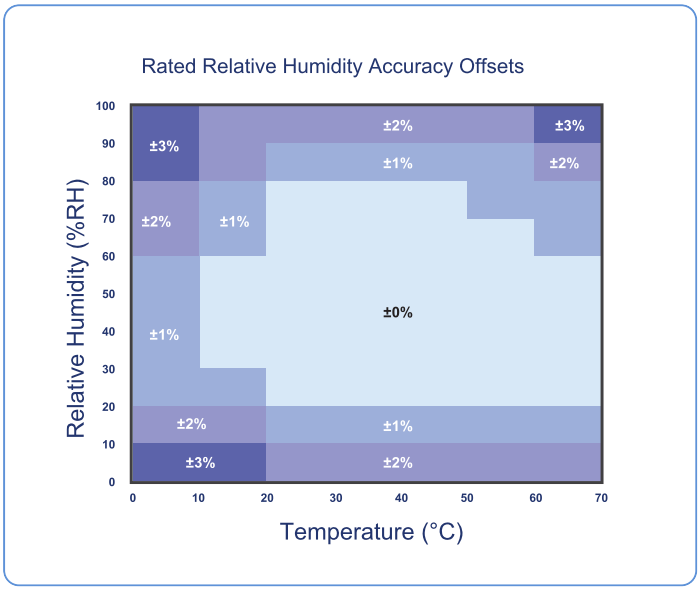


Figure 11: *Rated Humidity Accuracy Offset Chart*

Humidity Operating Range

Long term exposure of the UHADO-16 to conditions outside the normal range shown below, especially at humidity values above 80 %RH, may temporarily offset the RH signal (+3%RH after 60h exposure). After the environmental conditions return to normal, the sensor will slowly return towards calibration state by itself. Prolonged exposure to extreme conditions may accelerate ageing.

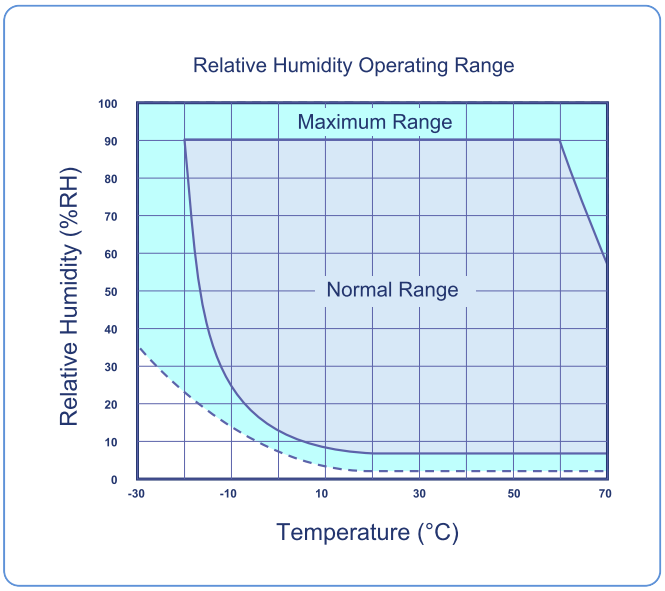


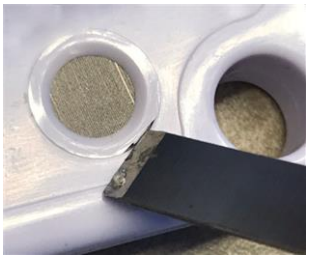
Figure 12: *Rated Humidity Operating Range*

Appendix 4 - Filter Replacement

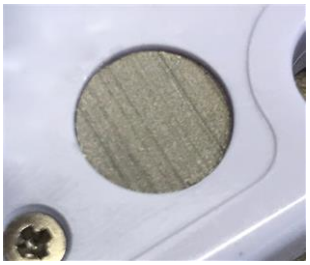
The UHADO-16 air filter is made from a 0.15 mm thick stainless steel (316) fine mesh with a 10-micron pore size, cut into a 10 mm diameter disc. This filter provides excellent consistency for airflow yet has the ability to block liquid water. It does not absorb moisture and is chemically resistant.

If, however, the filter does become clogged or damaged it can be replaced:

- Lift up the label in the corner next to the lug.
- Remove the retaining ring. The retaining ring holds the disc in place and incorporates a cut-out section that allows it to be pried out using a thin sharp knife or scalpel.



- The filter disc is now exposed and can be easily removed with a gentle shake.



- Replace the disk, replace the retaining ring and re-attach the label.

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