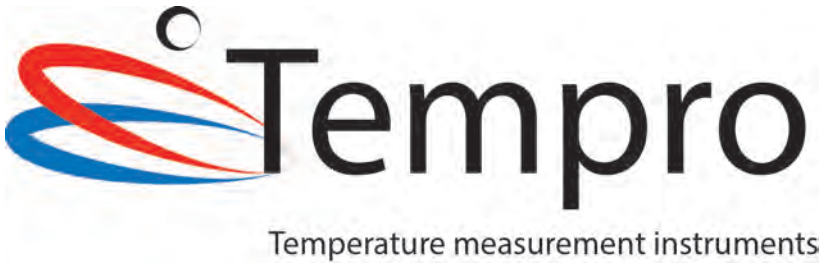
KeyTag Manager User Guide.

Release 009 – 18/02/2017



KEYTAG RECORDERS

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2. Presentation & Installation:

2.1. Introduction to KeyTag Manager

KeyTag Manager is a multi-platform desktop application with smart interfaces, elegantly designed to work with the KeyTag Kt1 series data loggers.
This software facilitates fast creation of reports in formats such as PDF, CSV, and Text files including graph, histogram, summary, data, and more… This software is fully inclusive of data loggers configuration, viewer, alarm manager, and MKT (Mean Kinetic Temperature) and report creator.

2.2. Highlights

- ✓ Absolutely free
- ✓ Configure, Viewer, Report all in one
- ✓ Create mission templates
- ✓ Multi-platform: Windows, Mac OSX
- ✓ Auto Upgrade
- ✓ Export data in various formats
- ✓ Analyze data
- ✓ Customizable reports
- ✓ Upgrade data logger's firmware

2.3. Download

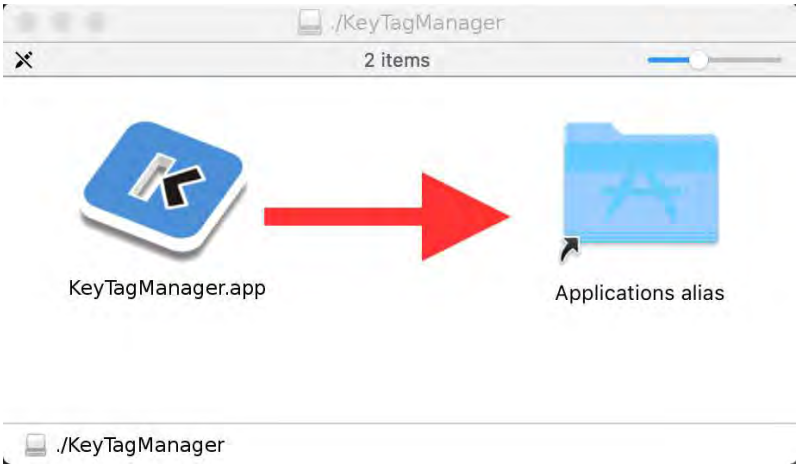
Click the link to download your copy of KeyTag Manager for free:
http://www.tempro.be/software_download.html

2.4. Installation for Windows:

Extract your copy of KeyTagManagerSetup (*.exe) launch the installation wizard and follow the steps. This installation process will add a shortcut on the desktop.

2.5. Installation for Mac OSX:

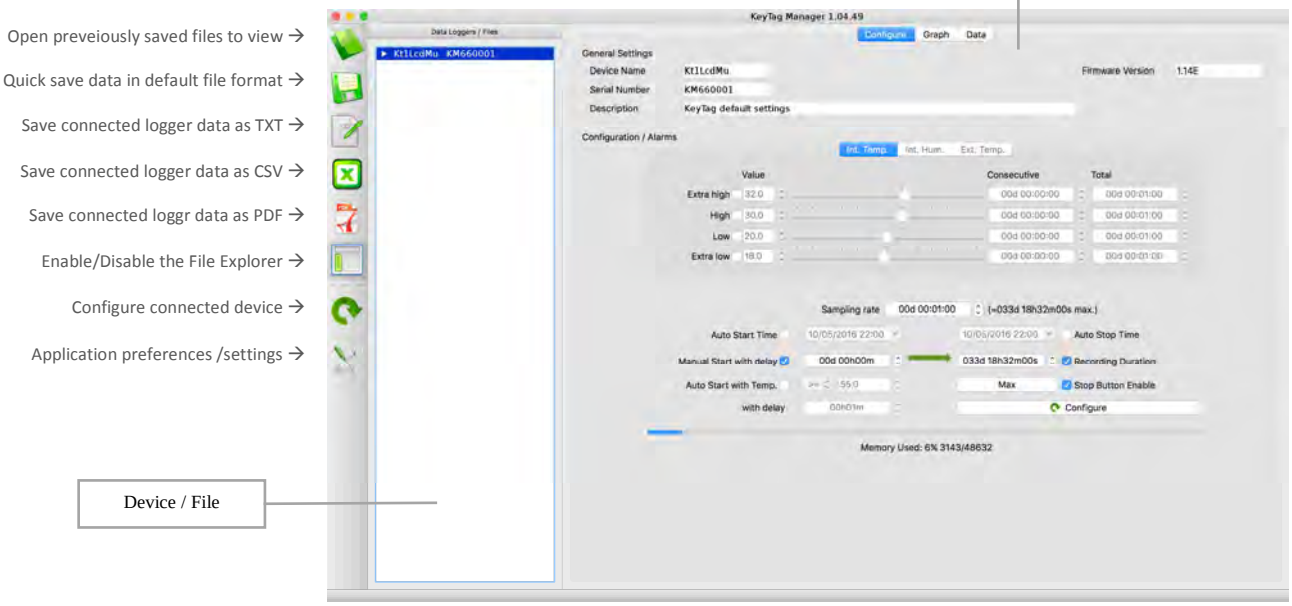
Double click on your copy of KeyTagManager.dmg file. This will mount the file and open a window containing the KeyTagManager application. Just move the application into the Application folder. The KeyTagManager application can be launched directly from the Application folder.



3. Application View

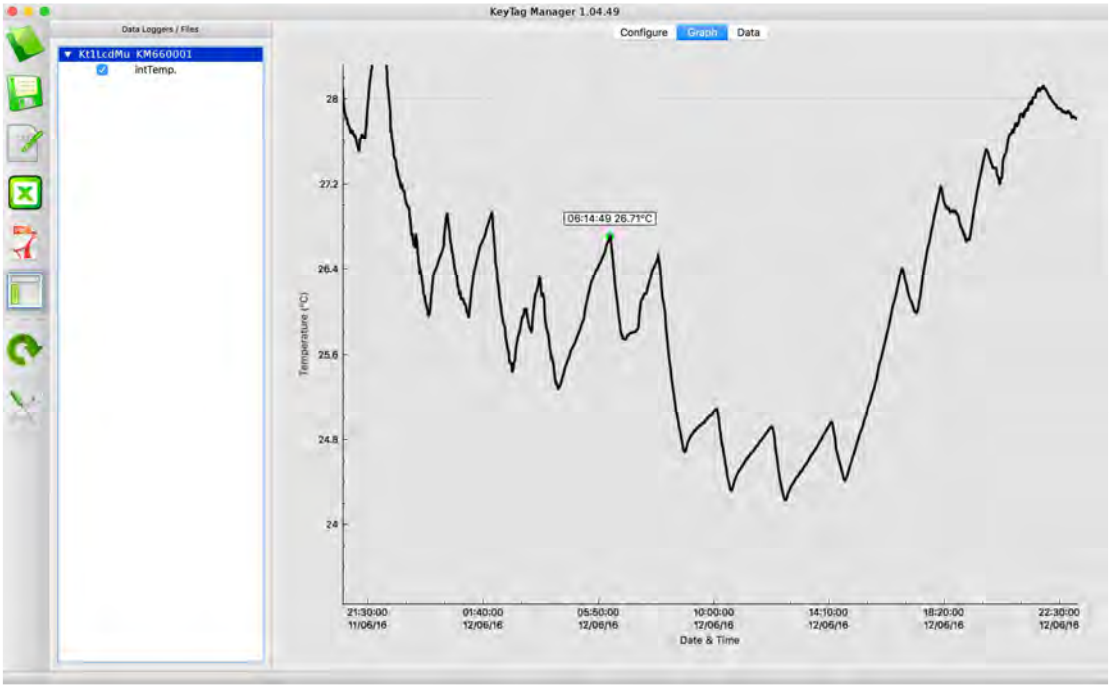
3.1. Quick Icons & Configuration View

To perform quick basic functions.



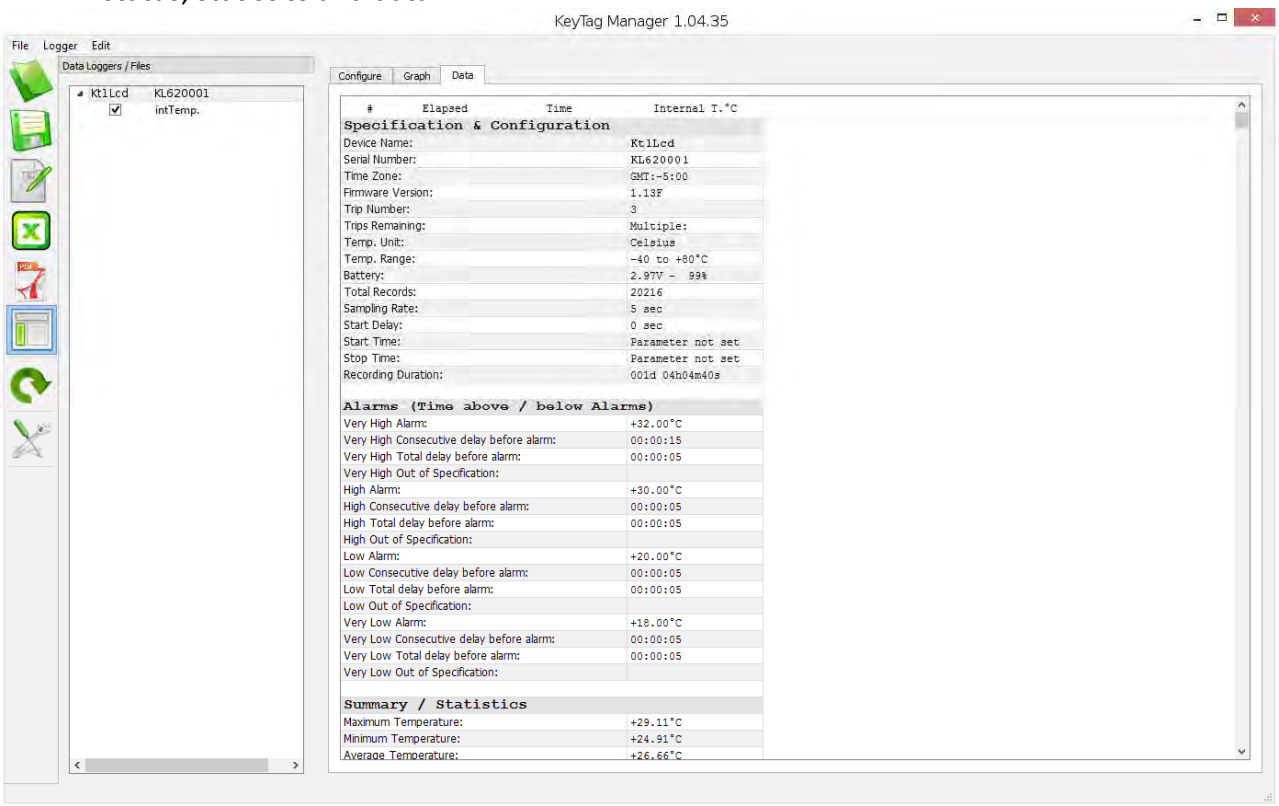
3.2. Graph View

Advanced graph viewer with zoom on both axes or each axes individually, themes…

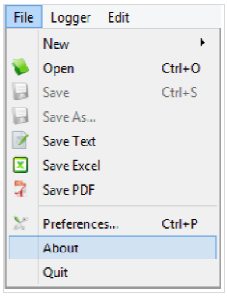


3.3. Data View

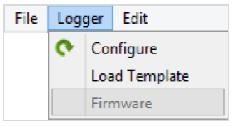
Fully customizable summary view of the data including the logger configuration, the alarms status, statistics and data.



3.4. Menu

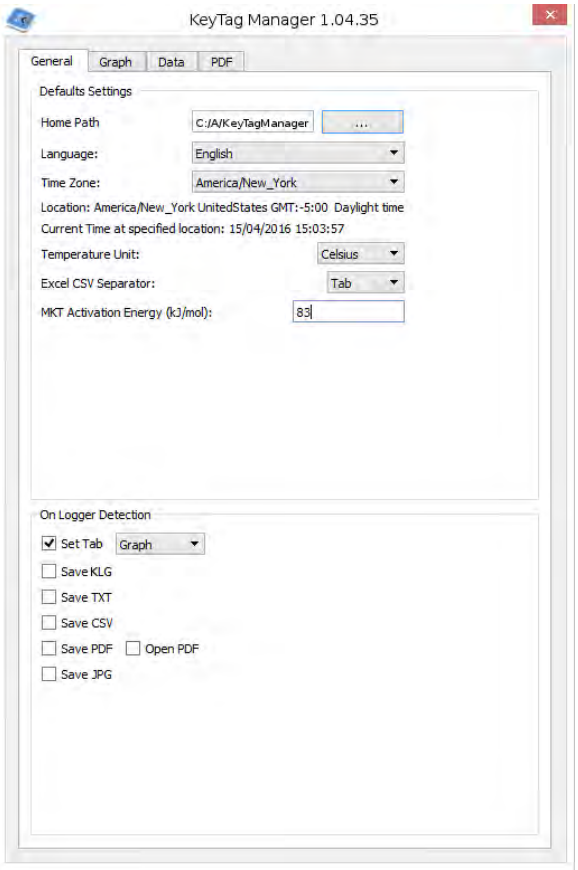


→ Create *new* Profile/Template in advance
→ Open previously saved files to view
→ Quick save data in default file format
→ Save data in optional file formates
→ Save connected logger data as TXT
→ Save connected logger data as CSV
→ Save connected logger data as PDF
→ Application preferences /settings
→ About application
→ Quit application



→ Configure connected logger
→ Fetch template to quick program
→ Upgrade Firmware of connected unit

3.5. Preferences General Tab



- **Home Path:** Select the default directory where files will be saved.
- **Language:** Current language.
- **Time Zone:** Selection based on country / city or UTC format.
- **Temperature Units:** Selection Celsius / Fahrenheit
- **Excel CSV Separator:** Select the default separator character used in the CSV generation files.
- **MKT Activation Energy:** Set the activation energy value:

MKT is expressed as:

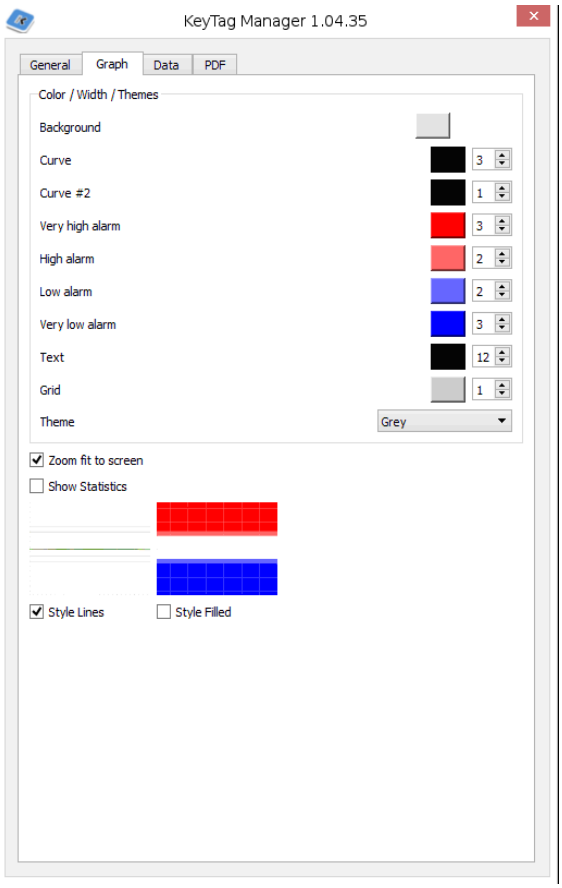
$$-ln\left(\frac{e^{-\Delta H/RT1}+e^{-\Delta H/RT2}+\ldots+e^{-\Delta H/RTn}}{n}\right)^{\Delta H/R}$$

Where.
ΔH = activation energy (typically from 60 to 100 kJ/mol for solids and liquids)
R = 8.314472 J/mol-K (universal gas constant)
T = temperature in degrees K
n = the number of sample periods over which data is collected

Note : ln is the natural log and e^x is the natural log base.

- **On Logger Detection:** Auto generate and save the desired file format in the default folder, as soon as the logger is connected.

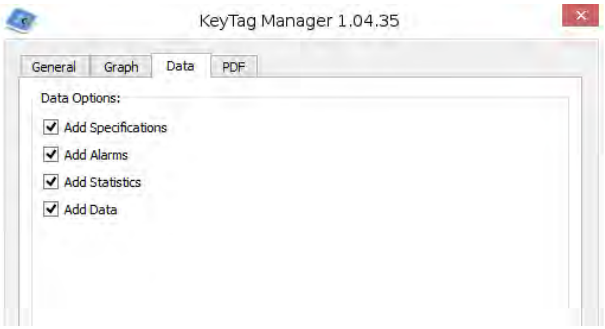
3.6. Preferences Graph Tab



- **Color / Width /Themes:** Customize all aspects of the graph such as background / traces color and thickness.
- **Theme:** Three preset themes to choose from. Options are: white, grey and black.
- **Zoom fit to screen:** Default zoom for the graph to fit all data onto one screen.
- **Show Statistics:** Show the basic statistics (max, average, min..) on the graph.
- **Style Lines:** Select the alarm thresholds shown as lines for areas.

3.7. Preferences Data Tab

Select the information needed to be viewed in the data window.



- **Add Specifications:** Add the device and configurations information.
- **Add Alarms:** Add the alarms settings such as thresholds, delays…
- **Add Statistics:** Add the basic statistics information such as min, average, max, MKT…
- **Add Data:** Add the all the recorded data.

3.8. Preferences PDF Tab

Customize PDF generated by data logger and by KeyTag Manager according to requirement. Choose graph colors for alarms, curve & alarm lines thickness.

- **PDF Color / Width:** Customize the curve and alarm's thresholds color and thickness.
- **PDF Options:** Select which data you would like to be added in the PDF generated by the application.

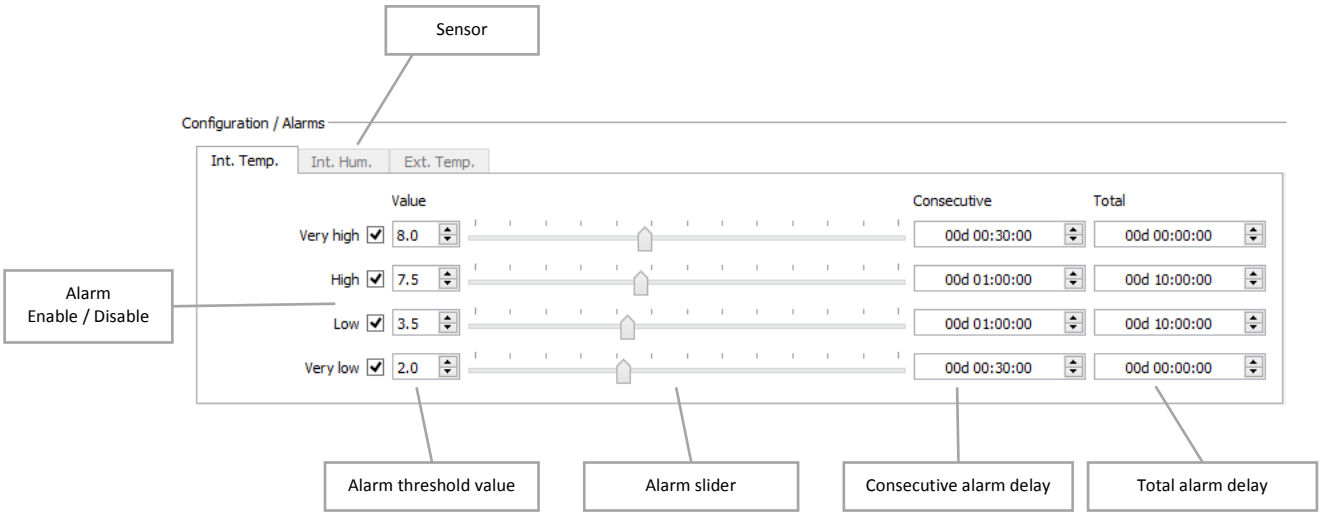
4. Configuration

4.1. General Settings

Device Name: Data Logger's model. Read only.
Serial Number: Data Logger's unique serial number.
Firmware Version: Current logger's firmware version
Description: User read write description. The length of this field is related to the connected device specifications.

4.2. Alarms

- Up to four alarm thresholds with smart delay management.
- Each alarm threshold has a consecutive and/or a total delay before alarm.
- The resolution of the alarms thresholds is 0.1°C in the whole range of the connected data logger
- Alarms can be enabled or disabled using the checkbox button. Therefore it is possible to configure a data logger without any alarm, or with 1, 2, 3 or up to 4 alarms thresholds.
- The alarm thresholds are inclusive:
  ex: High Alarm Temperature >= 7.5°C is out of specification.
  ex: Low Alarm Temperature <= 3.5°C is out of specification.



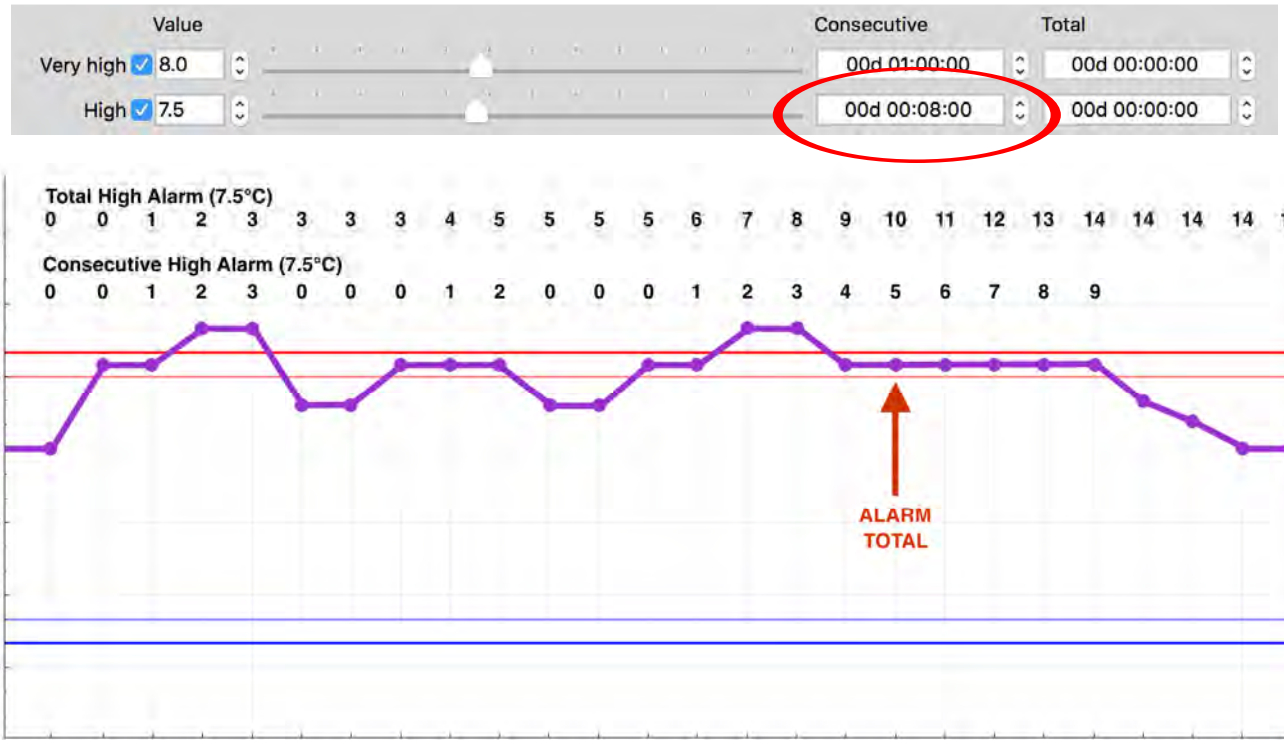
4.3. Delay before alarm

The delay before alarm is the mechanism that triggers the alarm according to the pre-set sensor value, the duration of “out of specification”, and the type of delay.

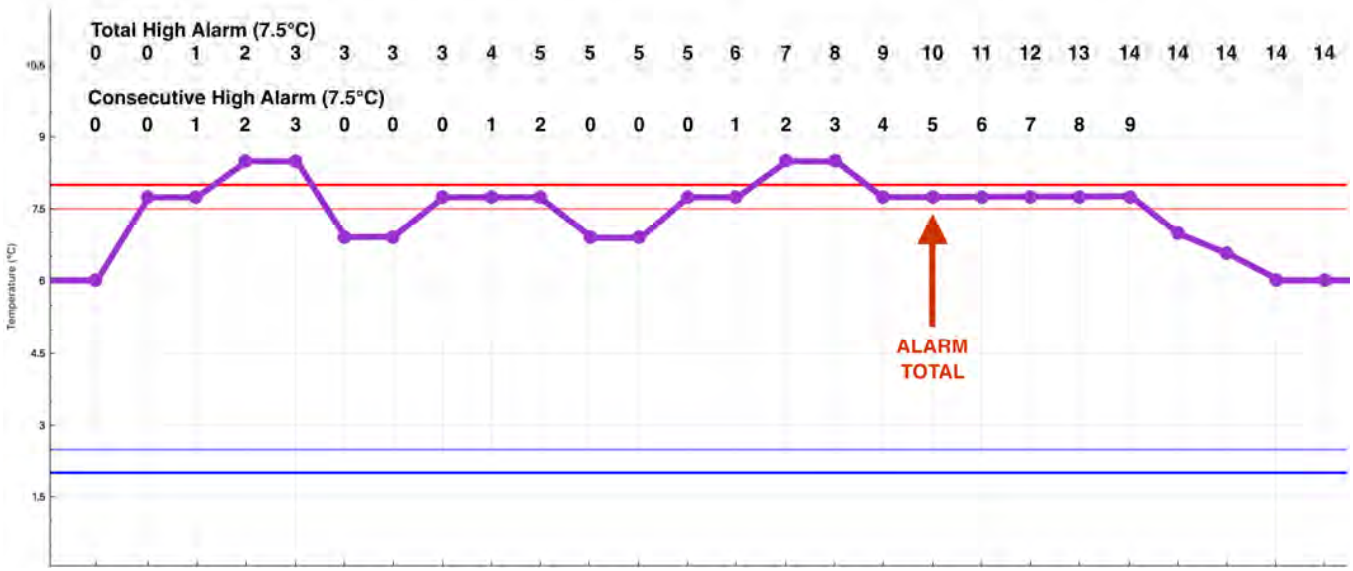
The consecutive alarm delay is a counter that tracks the duration between when the sensor value is above or below the alarm threshold (above for high & extra high alarm, and below for low and extra low). If the sensor value comes back to normal before it has reached the consecutive delay, this counter is reset to zero. This consecutive alarm delay will trigger an alarm if this one is out of specification for the set duration without going back to normal. If set to zero, this delay is disabled.

The total alarm delay is a counter that counts the duration of when the sensor value is above or below the alarm threshold (above for high & very high alarm, and below for low and very low).
If the sensor value comes back to normal before it has reached the consecutive delay, this counter is not reset to zero. It will maintain the out of specification duration and restart counting when the sensor value will go again out of specification. This total alarm delay will trigger an alarm as soon as the expired time of all added violations has reached the set duration. If set to zero, this delay is disabled.

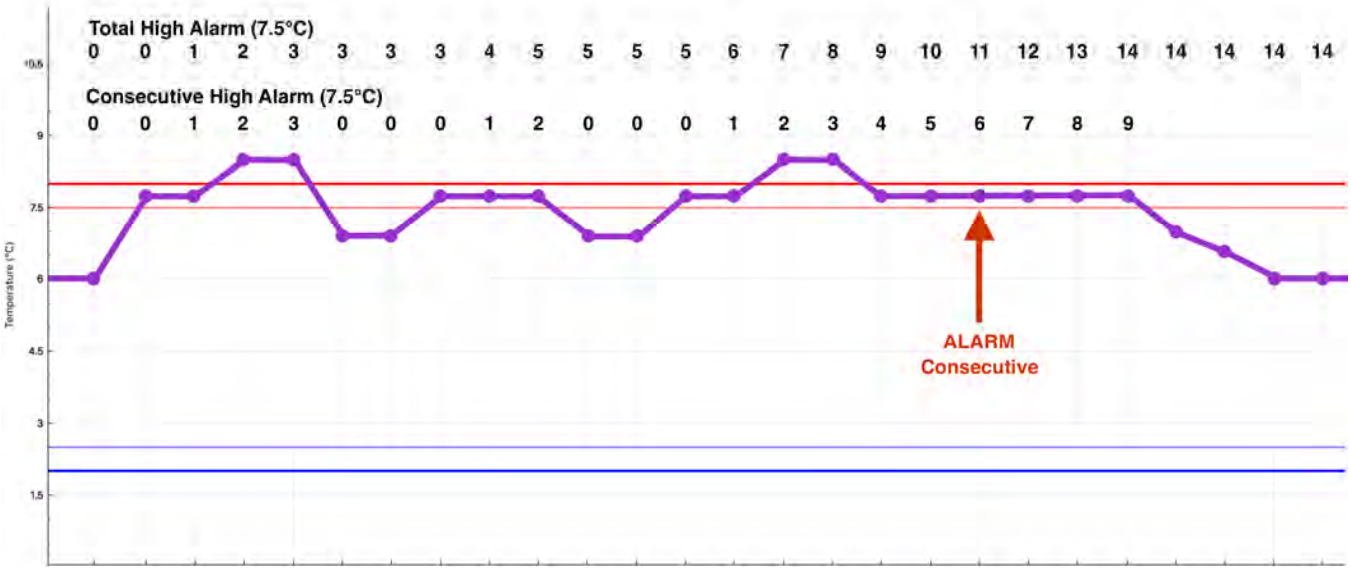
Example: For a high alarm threshold set to 7.5°C with a consecutive delay of 8 minutes and no total alarm. The sampling rate is 1 minute. The alarm is triggered when the consecutive delay reaches 8 minutes. As we can see in this example, the counter is reset to zero twice when the temperature goes below 7.5°C.



Example for a high alarm threshold set to 7.5°C with a total delay of 10 minutes and no consecutive delay. The sampling rate is 1 minute. The alarm is triggered when the total delay reaches 10 minutes. As we can see in this example, the counter stopped counting when the temperature goes back below 7.5°C and continues when above 7.5°C.



Example for a high alarm threshold set to 7.5°C with a consecutive delay of 6 minutes and a total delay of 12 minutes. The sampling rate is 1 minute.
In this scenario we have both, the consecutive, and the total delay set respectively to 6 and 12 minutes. In that example, the alarm is triggered when the consecutive delay reaches 6 minutes.



4.4. Start, Stop & Sampling rate

The sampling rate is the record period. The delay between when each record is stored in memory.

A KeyTag logger can start and stop in different ways:

- Manual start pressing the Start button; with or without delay.
- Automatic start at a preset date and time.
- Automatic start when a pre set temperature threshold is achieved with a consecutive delay.
- Automatic stop after a record duration
- Automatic stop at a desired time and date.

Manual and automatic start can be enabled at the same time. In that particular case the logger will start automatically at the desired time and date, but user can override this by pressing the start button manually.

Sampling rate: from 5 seconds to 24H

Manual Start + delay: enable / disable the manual start by pressing the start button with/without delay up to 99 days. The delay is a period of time where the logger is not yet recording, but waiting. This delay is commonly used when the device is placed in a cooler and it needs a certain time to cool down to the product's temperature. This will avoid false alarms.

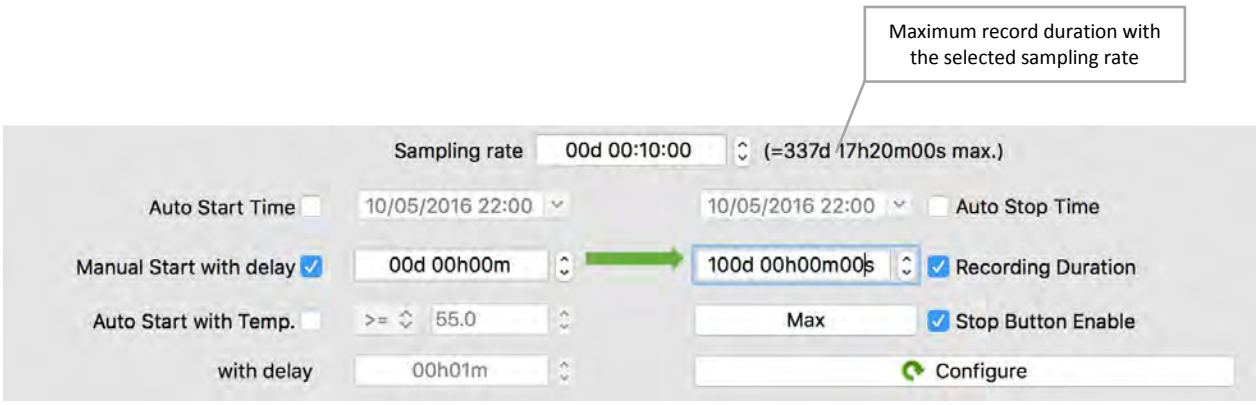
Auto Start Time: enable/disable the automatic start at a preset date & time.

Auto Stop Time: enable/disable the automatic stop at a preset date & time.

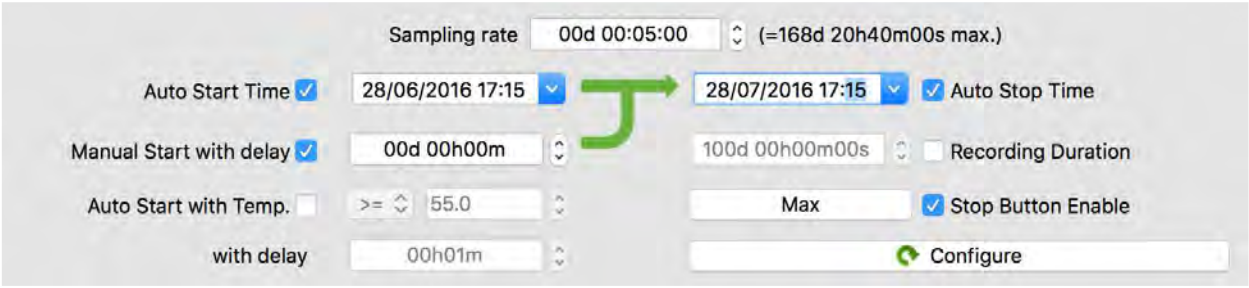
Auto Start Temp. + delay: enable/disable the automatic start with a temperature threshold with/without consecutive delay.

Record Duration: enable/disable the stop after a total record duration. From 5 seconds to 1 year.

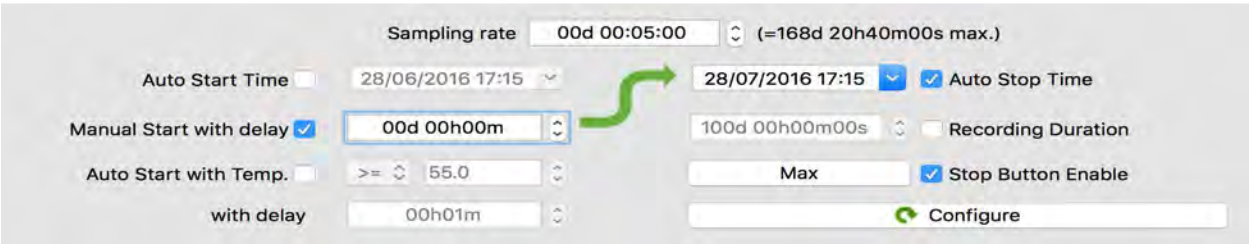
Max button: Automatically set the record duration to its maximum according the connected device's memory capacity.



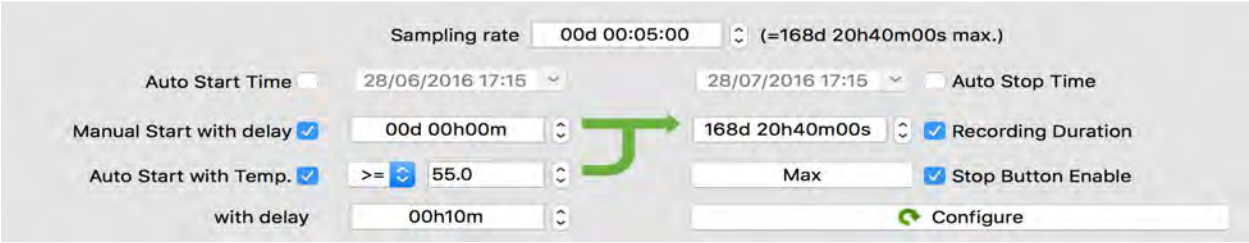
In this example, the logger will start manually by pressing the start button without any delay. The sampling rate is 10 minutes and the logger will stop automatically after 100 days.



In this example, the logger will start automatically at 17H15 on June 28th 2016.
It can also be started manually by pressing the start button without any delay.
The sampling rate is 5 minutes and the logger will stop automatically at 17H15 on July 28th 2016.



In this example, the logger will start manually by pressing the start button with a delay of 30 minutes. The sampling rate is 5 minutes and the logger will stop automatically at 17H15 on June 28th 2016.

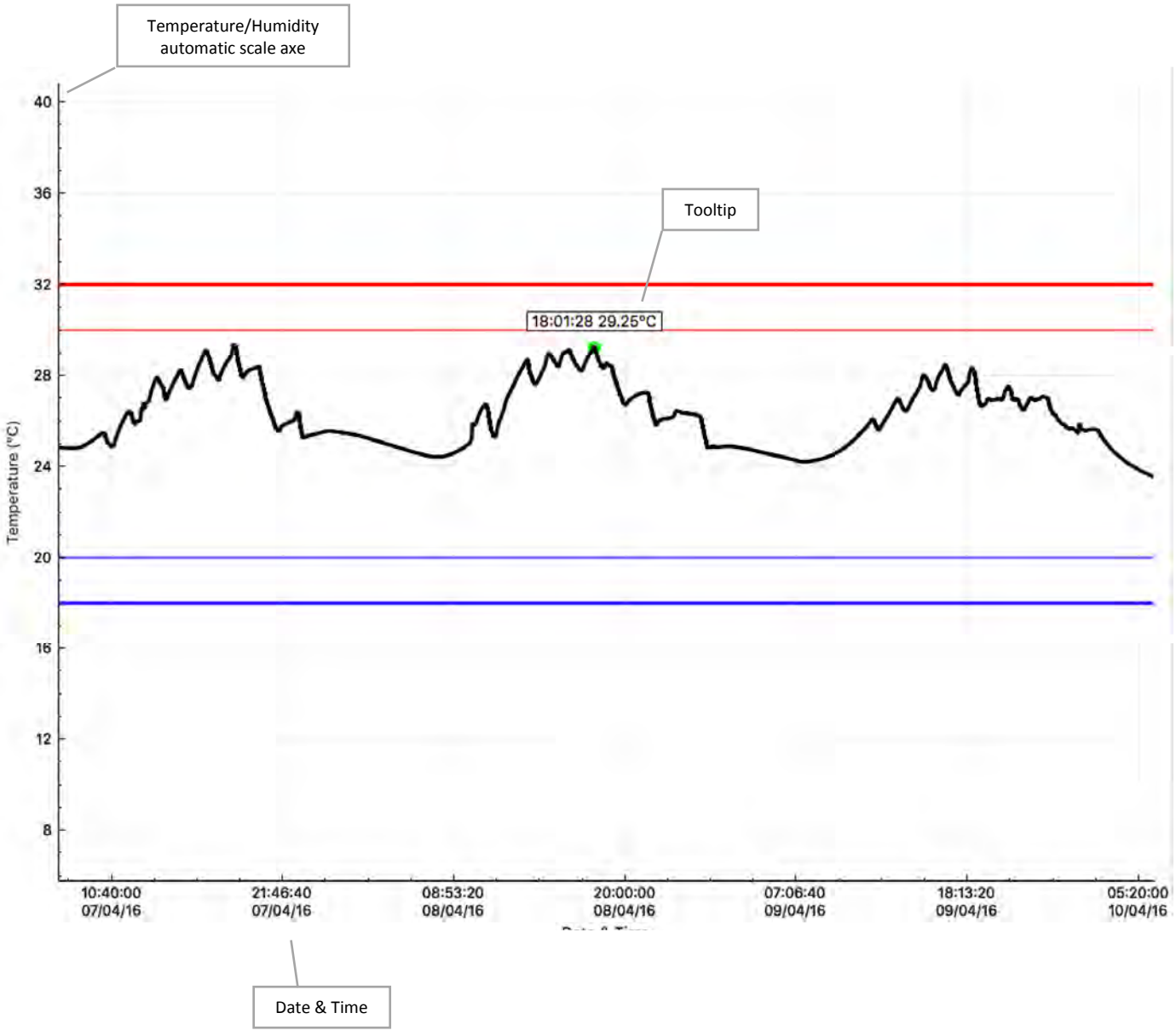


In this example, the logger will start manually by pressing the start button without any delay, or will start automatically if the temperature is greater or equal to 55°C for 10 minutes consecutive. The sampling rate is 5 minutes and the logger will stop automatically after 168 days, 20 hours and 40 minutes.

5. Graph

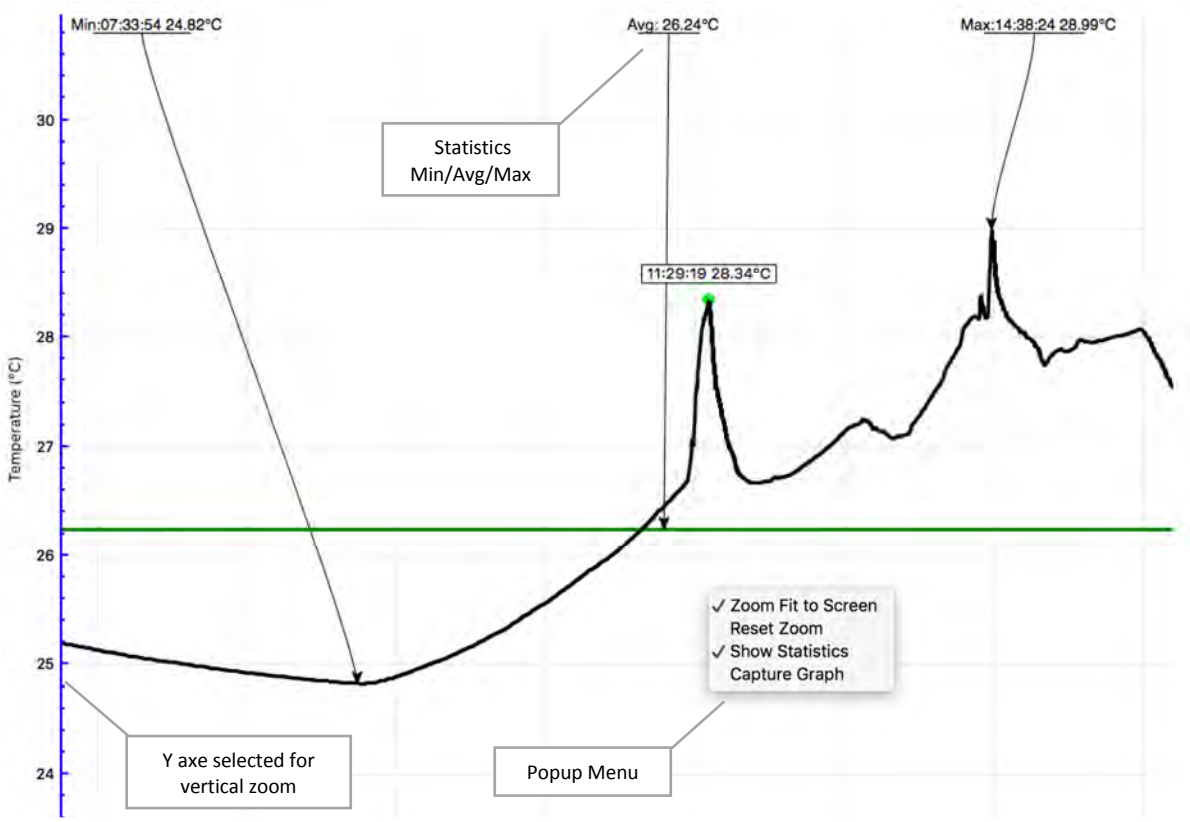
5.1. Presentation

The graph tool is a smart, fast, and smooth graphic interface to navigate, isolate, and view all the relevant information in the records. The appearance is also customizable from the Settings/ Graph section.



5.2. Navigation

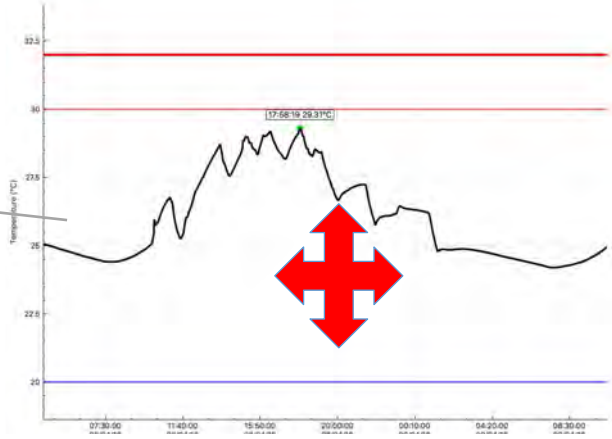
- Mouse left click and hold to move the graph.
- Mouse scroll wheel or two fingers slide for MAC users to zoom in and out.
- Select the X or Y axis to zoom vertically or horizontally.
- Mouse right click to open a quick pop-up menu.
    - **Zoom Fit to Screen:** Adjust the vertical axis to fit the graph or keep the full sensor range.
    - **Reset Zoom:** Go back to the initial zoom.
    - **Show Statistics:** Show the minimum, average, and maximum value pointed with arrows.
    - **Capture Graph:** Copy the graph into the clipboard.



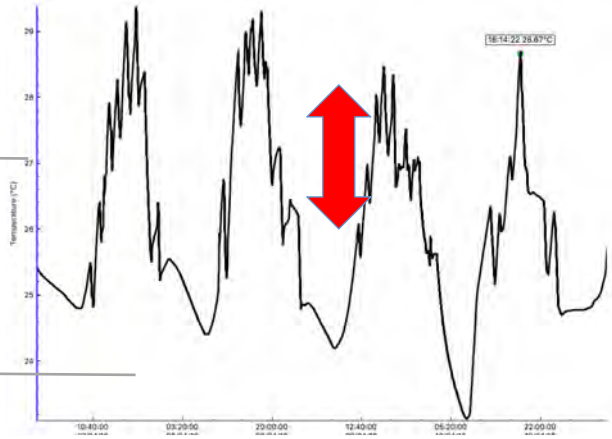
5.3. Zoom

This powerful zoom function allows zooming in and out on both X&Y axes, and also to select the desired axis for zooming only on one axis, X or Y.

The default zoom works on X & Y axes

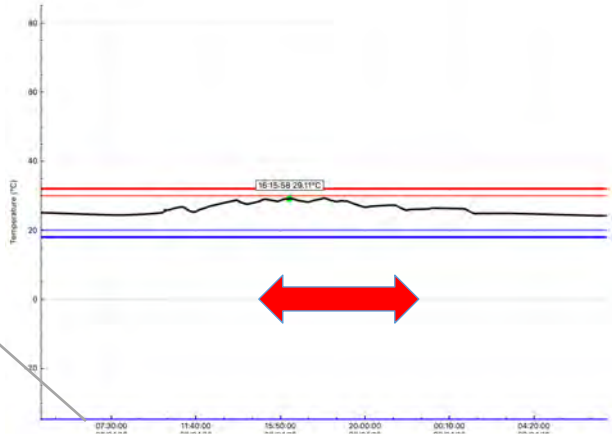


Select the Y axis to set the zoom mode only on the Y axis



Click anywhere inside the graph to deselect the X or Y zoom mode.

Select the X axis to set the zoom mode only on the X axis



6. Data

6.1. Presentation

The data section is a customizable summary containing all the configuration, statistics, alarm status and recorded data. This summary is composed of four sections that can be enabled or disabled from the Settings/Data section:

1. Specification & Configuration
2. Alarms
3. Summary & Statistics
4. Data

#	Elapsed	Time	Internal T.°C
Specification & Configuration			
Device Name:			KtlLcdMu
Serial Number:			KM630001
Time Zone:			GMT:-5:00
Firmware Version:			1.14B
Trip Number:			7
Trips Remaining:			Multiple:
Temp. Unit:			Celsius
Temp. Range:			-40 to +80°C
Battery:			3.00V - 100%
Total Records:			14394
Sampling Rate:			00:01:00
Start Delay:			0 sec
Start Time:			Parameter not set
Stop Time:			Parameter not set
Recording Duration:			009d 23h54m00s
Alarms (Time above / below Alarms)			
Very High Alarm:			+32.00°C
Very High Consecutive delay before alarm:			00:00:00
Very High Total delay before alarm:			00:01:00
Very High Out of Specification:			
High Alarm:			+30.00°C
High Consecutive delay before alarm:			00:00:00
High Total delay before alarm:			00:01:00
High Out of Specification:			
Low Alarm:			+20.00°C
Low Consecutive delay before alarm:			00:00:00
Low Total delay before alarm:			00:01:00
Low Out of Specification:			
Very Low Alarm:			+18.00°C
Very Low Consecutive delay before alarm:			00:00:00
Very Low Total delay before alarm:			00:01:00
Very Low Out of Specification:			
Summary / Statistics			
Maximum Temperature:			+37.03°C
Minimum Temperature:			+8.84°C
Average Temperature:			+25.54°C
Mean Kinetic Temperature:			+25.52°C
Active Bookmarks:			0
Started by:			Manual
Stopped by:			
Status:			Recording
Trip Duration:			9d 23:54:00
Time within Specifications:			09d 23:54:00
Started Time:			01/04/16 13:41:37
Stopped Time:			
Memory Used:			29% 14394/48632
Downloaded at:			17/04/16 14:25:00
Data			
1	000 00:00:00	01/04/2016 13:41:37	29.10
2	000 00:01:00	01/04/2016 13:42:37	29.55
3	000 00:02:00	01/04/2016 13:43:37	29.97
4	000 00:03:00	01/04/2016 13:44:37	29.84
5	000 00:04:00	01/04/2016 13:45:37	29.69
6	000 00:05:00	01/04/2016 13:46:37	29.58
7	000 00:06:00	01/04/2016 13:47:37	29.50
8	000 00:07:00	01/04/2016 13:48:37	29.48
9	000 00:08:00	01/04/2016 13:49:37	29.48
10	000 00:09:00	01/04/2016 13:50:37	29.48
11	000 00:10:00	01/04/2016 13:51:37	29.49
12	000 00:11:00	01/04/2016 13:52:37	29.51
13	000 00:12:00	01/04/2016 13:53:37	29.54
14	000 00:13:00	01/04/2016 13:54:37	29.54
15	000 00:14:00	01/04/2016 13:55:37	29.56

6.2. Specification & Configuration

Full summary including device information & configuration.

#	Elapsed	Time	Internal T.°C
Specification & Configuration			
Device Name:			Kt1Lcd
Serial Number:			KL620001
Time Zone:			GMT:-5:00
Firmware Version:			1.14A
Trip Number:			9
Trips Remaining:			Multiple:
Temp. Unit:			Celsius
Temp. Range:			-40 to +80°C
Battery:			3.00V - 100%
Total Records:			18015
Sampling Rate:			5 sec
Start Delay:			0 sec
Start Time:			Parameter not set
Stop Time:			Parameter not set
Recording Duration:			001d 01h01m15s

Device Name: Data Logger's model. Read only.
Serial Number: Data Logger's unique serial number.
Time Zone: Selected time zone during the configuration + DST (Daylight Saving Time).
Firmware Version: Current logger's firmware version.
Trip Number: This is the trip counter. Counted at each logger's Start. Read only.
Trips Remaining: Indicates the remaining number of trips available or Multiple for multi-use loggers.
Temp. Unit: Selected unit of measure for temperature (Celsius or Fahrenheit) during the configuration.
Temp. Range: This is the logger's sensor range. In this example this is a temperature sensor with a range from -40°C to +80°C.
Battery: Current battery voltage and power level indication in %.
Total Records: Current number of records stored in the logger's memory.
Sampling Rate: Configured time period between each record sampling.
Start Delay: Configured manual start delay.
Start Time: Automatic configuration start time and date.
Stop Time: Automatic configuration stop time and date.
Record Duration: Total configuration record duration.

6.3. Alarms

Full summary including alarms information & configuration.

Alarms (Time above / below Alarms)	
Very High Alarm:	+8.00°C
Very High Consecutive delay before alarm:	00:30:00
Very High Total delay before alarm:	00:00:00
Very High Out of Specification:	01d 00:31:20
High Alarm:	+7.50°C
High Consecutive delay before alarm:	01:00:00
High Total delay before alarm:	10:00:00
High Out of Specification:	01d 00:01:20
Low Alarm:	+2.50°C
Low Consecutive delay before alarm:	01:00:00
Low Total delay before alarm:	10:00:00
Low Out of Specification:	
Very Low Alarm:	+2.00°C
Very Low Consecutive delay before alarm:	00:30:00
Very Low Total delay before alarm:	00:00:00
Very Low Out of Specification:	

Very High Alarm: Configuration threshold for the very high alarm.
Very High Consecutive delay before alarm: Consecutive delay above the very high threshold before the very high alarm is triggered.
Very High Total delay before alarm: Cumulative delay above the very high threshold before the very high alarm is triggered.
Very High Out of Specification: Total duration above the very high threshold.

Very High Alarm: Configuration threshold for the high alarm.
Very High Consecutive delay before alarm: Consecutive delay above the very high threshold before the high alarm is triggered.
Very High Total delay before alarm: Cumulative delay above the very high threshold before the high alarm is triggered.
Very High Out of Specification: Total duration above the high threshold.

Low Alarm: Configuration threshold for the low alarm.
Low Consecutive delay before alarm: Consecutive delay below the low threshold before the low alarm is triggered.
Low Total delay before alarm: Cumulative delay below the low threshold before the low alarm is triggered.
Low Out of Specification: Total duration below the low threshold.

Very Low Alarm: Configuration threshold for the very low alarm.
Very Low Consecutive delay before alarm: Consecutive delay below the very low threshold before the very low alarm is triggered.
Very Low Total delay before alarm: Cumulative delay below the very low threshold before the very low alarm is triggered.
Very Low Out of Specification: Total duration below the very low threshold.

6.4. Summary & Statistics

Summary in regards with the trip statistics, duration and times.

Summary / Statistics	
Maximum Temperature:	+37.03°C
Minimum Temperature:	+8.84°C
Average Temperature:	+25.54°C
Mean Kinetic Temperature:	+25.52°C
Active Bookmarks:	0
Started by:	Manual
Stopped by:	
Status:	Recording
Trip Duration:	9d 23:54:00
Time within Specifications:	09d 23:54:00
Started Time:	01/04/16 13:41:37
Stopped Time:	
Memory Used:	29% 14394/48632
Downloaded at:	17/04/16 14:25:00

Maximum Temperature: Maximum temperature during the whole trip.
Minimum Temperature: Minimum temperature during the whole trip.
Average Temperature: Average temperature during the whole trip.
Mean Kinetic Temperature: MKT of the whole trip using the activation energy set during the configuration.
Active Bookmarks: Number of marker, manually activated by the users.
Started by: How the logger has been started:

- Manual: by pressing the Start button
- Start Timer: by automatic start with time & date.
- Temperature: by automatic start on temperature threshold.

Stopped by: How the logger has been stopped:

- Manual: by pressing the Stop button
- Memory full: the logger reached it maximum memory capacity.
- Reset: the logger went to reset.
- Stop Timer: by automatic stop with time & date.

Status: Current status of the logger:

- Ready: Logger is configured and ready to be started.
- In Start Delay: Logger has been started and actually in started delay countdown.
- Recording: Logger is started in recording.
- Stopped: Logger is not recording anymore. This is end of the trip.

Trip Duration: Current trip duration from the first to the last record.
Time within Specifications: Total duration within the alarm thresholds. (No alarms).
Started Time: Date & Time of the first record
Stopped Time: Date & Time of the last record when the trip is finished.
Memory Used: Indicate the memory usage in % and the number of record in memory / memory size.
Downloaded at: Date & Time of the logger's download.

6.5. Data

The data table contains the records with time stamps.

#	Elapsed	Time	Internal T.°C
Data			
1	000 00:00:00	15/04/2016 22:28:39	28.59
2	000 00:00:05	15/04/2016 22:28:44	28.86
3	000 00:00:10	15/04/2016 22:28:49	28.89
4	000 00:00:15	15/04/2016 22:28:54	28.88
5	000 00:00:20	15/04/2016 22:28:59	28.89
6	000 00:00:25	15/04/2016 22:29:04	28.85
7	000 00:00:30	15/04/2016 22:29:09	28.81
8	000 00:00:35	15/04/2016 22:29:14	28.78
9	000 00:00:40	15/04/2016 22:29:19	28.73
10	000 00:00:45	15/04/2016 22:29:24	28.71

#: Record number starting from #1.

Elapsed: Elapsed time from the first record ddd HH:MM:SS

- ddd: days
- HH: hours
- MM: minutes
- SS: seconds

Time: Record's date & time based on the configuration's time zone.

Internal T.°C Sensor identification in preset temperature unit. (ex: Int.l Temp. in degree Celsius).

7. Reports Generation

7.1. KLG Files

KLG is KeyTag's proprietary file format, which contains:

- The data logger information such as type, serial, firmware version…
- The configuration menus including the start & stop conditions, alarms settings…
- All the records.

This file can be saved manually or automatically when the logger is connected.
The data can be accessed after multiple generations/uses of the logger. All data is maintained until the maximum capacity is reached.
This allows the generation of reports without having the logger connected.

7.2. TXT Files

The generated TXT file is basic text file coded with standard ASCII characters and use a TAB character as a separator.
Contains in columns:

- **#:** Record number starting from #1.
- **Elapsed:** Elapsed time from the first record ddd HH:MM:SS
  - ddd: days
  - HH: hours
  - MM: minutes
  - SS: seconds
- **Time:** Record's date & time based on the configuration's time zone.
- **Internal T.**°C Sensor identification a& temperature unit. (ex: Internal Temperature in degree Celsius).

#	Elapsed	Date	Time	Internal T.°C
1	000 00:00:00	01/04/2016	13:41:37	29.10
2	000 00:01:00	01/04/2016	13:42:37	29.55
3	000 00:02:00	01/04/2016	13:43:37	29.97
4	000 00:03:00	01/04/2016	13:44:37	29.84
5	000 00:04:00	01/04/2016	13:45:37	29.69
6	000 00:05:00	01/04/2016	13:46:37	29.58
7	000 00:06:00	01/04/2016	13:47:37	29.50
8	000 00:07:00	01/04/2016	13:48:37	29.48

7.3. CSV Files

The generated CSV file is a standard Excel format coded with ASCII characters and using a specific character for the column separation. This separator character in accessible from the Settings/General. Also the default separator if different in some countries.
Ex. Europe uses”;“semicolon while USA uses “,” comma

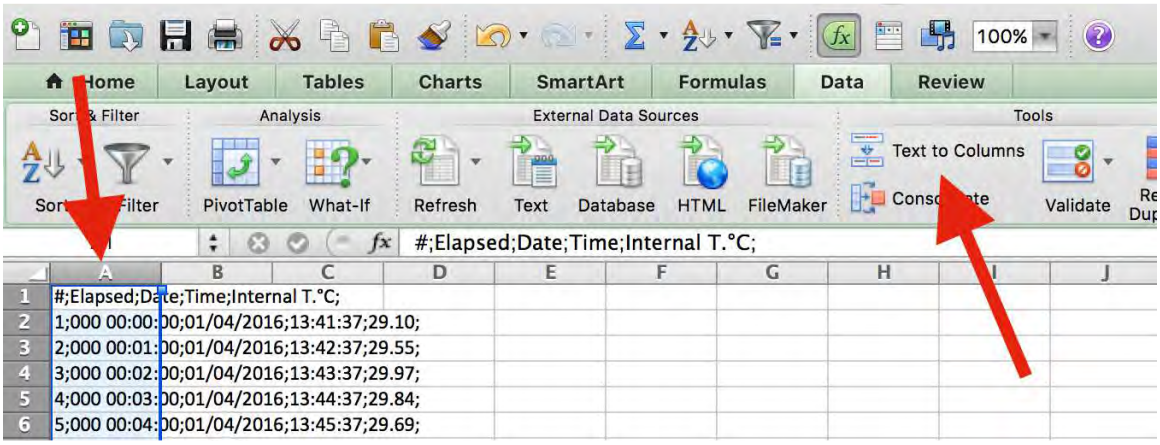
Contains in columns:

- **#:** Record number starting from #1.
- **Elapsed:** Elapsed time from the first record ddd HH:MM:SS
  - ddd: days
  - HH: hours
  - MM: minutes
  - SS: seconds
- **Time:** Record’s date & time based on the configuration’s time zone.
- **Internal T.**°C Sensor identification a& temperature unit. (ex: Internal Temperature in degree Celsius).

	A	B	C	D	E
1	#	Elapsed	Date	Time	Internal T.°C
2	1	000 00:00:00	1/4/16	13:41:37	29.1
3	2	000 00:01:00	1/4/16	13:42:37	29.55
4	3	000 00:02:00	1/4/16	13:43:37	29.97
5	4	000 00:03:00	1/4/16	13:44:37	29.84
6	5	000 00:04:00	1/4/16	13:45:37	29.69
7	6	000 00:05:00	1/4/16	13:46:37	29.58
8	7	000 00:06:00	1/4/16	13:47:37	29.5

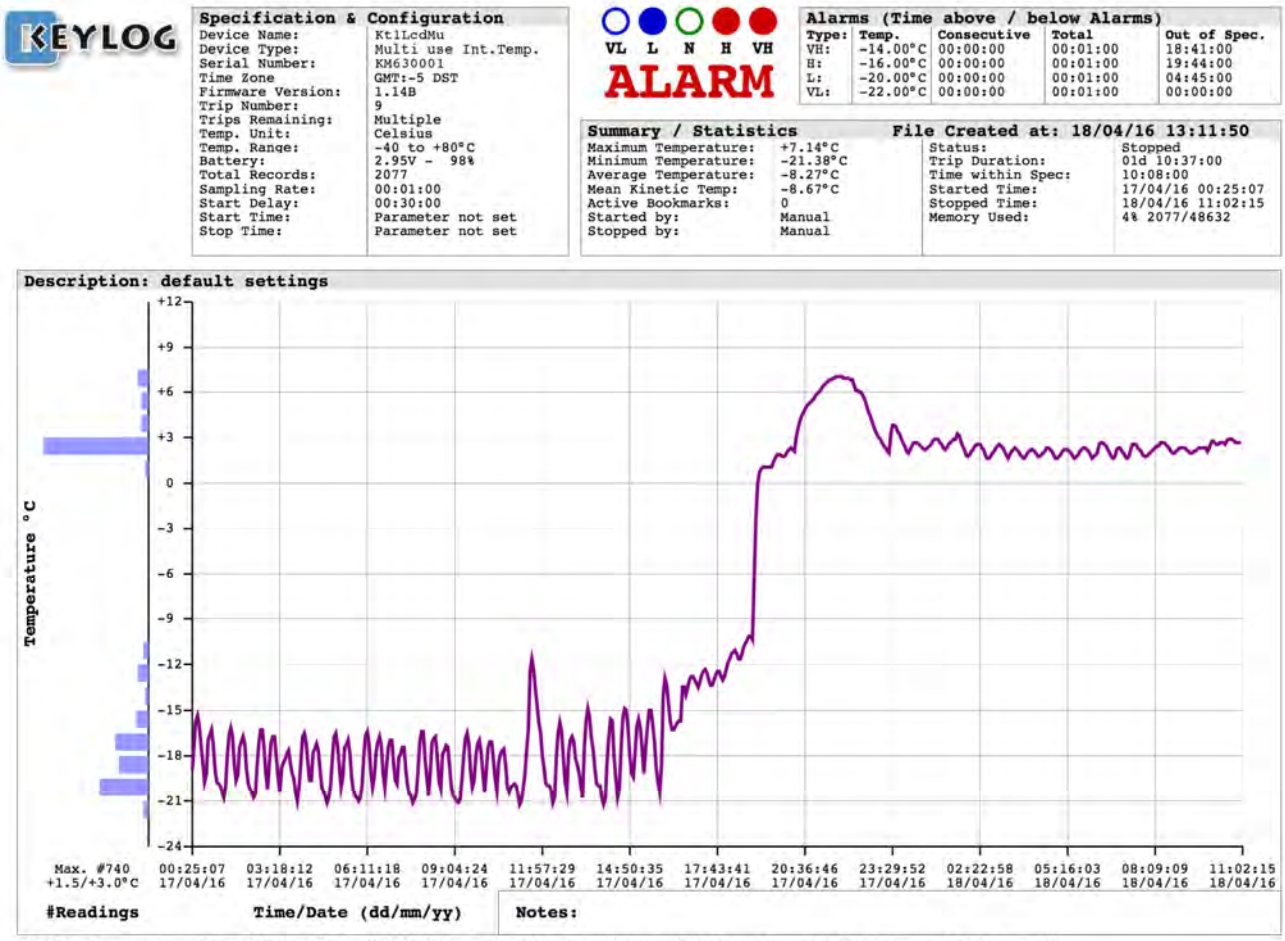
How to adjust columns in Excel with the wrong separator:

- Double click on the CSV file to open this file in Excel.
- If the wrong separator is used, all columns will appear to be packed into the first column.
  Select the first column and click on Text to Column in the DATA section.
  Then chose the correct separator.



7.4. PDF Files

The generated PDF file contains all the relevant information in regards to the configuration, alarms, statistics, graph, and histogram… This PDF can be customized from the Settings/PDF section, with one page PDF to multi pages including the data.



KEYLOG

Specification & Configuration	
Device Name:	Kt1LcdMu
Device Type:	Multi use Int.Temp.
Serial Number:	KM630001
Time Zone	GMT:-5 DST
Firmware Version:	1.14B
Trip Number:	9
Trips Remaining:	Multiple
Temp. Unit:	Celsius
Temp. Range:	-40 to +80°C
Battery:	2.95V - 98%
Total Records:	2077
Sampling Rate:	00:01:00
Start Delay:	00:30:00
Start Time:	Parameter not set
Stop Time:	Parameter not set

VL L N H VH

ALARM

Alarms (Time above / below Alarms)				
Type:	Temp.	Consecutive	Total	Out of Spec.
VH:	-14.00°C	00:00:00	00:01:00	18:41:00
H:	-16.00°C	00:00:00	00:01:00	19:44:00
L:	-20.00°C	00:00:00	00:01:00	04:45:00
VL:	-22.00°C	00:00:00	00:01:00	00:00:00

Summary / Statistics		File Created at: 18/04/16 13:11:50	
Maximum Temperature:	+7.14°C	Status:	Stopped
Minimum Temperature:	-21.38°C	Trip Duration:	01d 10:37:00
Average Temperature:	-8.27°C	Time within Spec:	10:08:00
Mean Kinetic Temp:	-8.67°C	Started Time:	17/04/16 00:25:07
Active Bookmarks:	0	Stopped Time:	18/04/16 11:02:15
Started by:	Manual	Memory Used:	4% 2077/48632
Stopped by:	Manual		

Description: default settings

Deze Kt1Lcd met een nauwkeurigheid van +/-0,3°C van -40°C tot 80°C (+/-0,6°F van -40°F tot 176°F) en een oplossing van 0,01°C (°F) is gekalibreerd in de kalibratiekamer van Askey Dataloggers BV.
De gebruikte referentie-apparatuur is herleidbaar naar internationale standaarden. Apparaat:#LM660048

(p.1)

#	ELAPSED	Time	T°C
00001	000 00:00:00	17/04/2016 00:25:07	-20.32
00002	000 00:01:00	17/04/2016 00:26:07	-20.04
00003	000 00:02:00	17/04/2016 00:27:07	-19.53
00004	000 00:03:00	17/04/2016 00:28:07	-18.88
00005	000 00:04:00	17/04/2016 00:29:07	-18.26
00006	000 00:05:00	17/04/2016 00:30:07	-17.68
00007	000 00:06:00	17/04/2016 00:31:07	-17.18
00008	000 00:07:00	17/04/2016 00:32:07	-16.64
00009	000 00:08:00	17/04/2016 00:33:07	-16.14
00010	000 00:09:00	17/04/2016 00:34:07	-15.68
00011	000 00:10:00	17/04/2016 00:35:07	-15.34
00012	000 00:11:00	17/04/2016 00:36:07	-15.41
00013	000 00:12:00	17/04/2016 00:37:07	-15.70
00014	000 00:13:00	17/04/2016 00:38:07	-16.02
00015	000 00:14:00	17/04/2016 00:39:07	-16.32
00016	000 00:15:00	17/04/2016 00:40:07	-16.59
00017	000 00:16:00	17/04/2016 00:41:07	-16.91
00018	000 00:17:00	17/04/2016 00:42:07	-17.30
00019	000 00:18:00	17/04/2016 00:43:07	-17.69
00020	000 00:19:00	17/04/2016 00:44:07	-18.07
00021	000 00:20:00	17/04/2016 00:45:07	-18.43
00022	000 00:21:00	17/04/2016 00:46:07	-18.80
00023	000 00:22:00	17/04/2016 00:47:07	-19.12
00024	000 00:23:00	17/04/2016 00:48:07	-19.43
00025	000 00:24:00	17/04/2016 00:49:07	-19.71
00026	000 00:25:00	17/04/2016 00:50:07	-19.98
00027	000 00:26:00	17/04/2016 00:51:07	-20.27
00028	000 00:27:00	17/04/2016 00:52:07	-20.42
00093	000 01:32:00	17/04/2016 01:57:07	-19.80
00094	000 01:33:00	17/04/2016 01:58:07	-19.16
00095	000 01:34:00	17/04/2016 01:59:07	-18.51
00096	000 01:35:00	17/04/2016 02:00:07	-17.91
00097	000 01:36:00	17/04/2016 02:01:07	-17.42
00098	000 01:37:00	17/04/2016 02:02:07	-17.12
00099	000 01:38:00	17/04/2016 02:03:07	-17.09
00100	000 01:39:00	17/04/2016 02:04:07	-17.02
00101	000 01:40:00	17/04/2016 02:05:07	-16.98
00102	000 01:41:00	17/04/2016 02:06:07	-16.71
00103	000 01:42:00	17/04/2016 02:07:07	-16.79
00104	000 01:43:00	17/04/2016 02:08:07	-17.17
00105	000 01:44:00	17/04/2016 02:09:07	-17.60
00106	000 01:45:00	17/04/2016 02:10:07	-18.05
00107	000 01:46:00	17/04/2016 02:11:07	-18.48
00108	000 01:47:00	17/04/2016 02:12:07	-18.88
00109	000 01:48:00	17/04/2016 02:13:07	-19.23
00110	000 01:49:00	17/04/2016 02:14:07	-19.58
00111	000 01:50:00	17/04/2016 02:15:07	-19.79
00112	000 01:51:00	17/04/2016 02:16:07	-19.92
00113	000 01:52:00	17/04/2016 02:17:07	-20.01
00114	000 01:53:00	17/04/2016 02:18:07	-20.07
00115	000 01:54:00	17/04/2016 02:19:07	-20.10
00116	000 01:55:00	17/04/2016 02:20:07	-20.13
00117	000 01:56:00	17/04/2016 02:21:07	-20.19
00118	000 01:57:00	17/04/2016 02:22:07	-20.32
00119	000 01:58:00	17/04/2016 02:23:07	-20.50
00120	000 01:59:00	17/04/2016 02:24:07	-20.69
00185	000 03:04:00	17/04/2016 03:29:07	-18.34
00186	000 03:05:00	17/04/2016 03:30:07	-18.27
00187	000 03:06:00	17/04/2016 03:31:07	-18.22
00188	000 03:07:00	17/04/2016 03:32:07	-18.15
00189	000 03:08:00	17/04/2016 03:33:07	-18.09
00190	000 03:09:00	17/04/2016 03:34:07	-17.83
00191	000 03:10:00	17/04/2016 03:35:07	-17.61
00192	000 03:11:00	17/04/2016 03:36:07	-17.79
00193	000 03:12:00	17/04/2016 03:37:07	-18.14
00194	000 03:13:00	17/04/2016 03:38:07	-18.42
00195	000 03:14:00	17/04/2016 03:39:07	-18.66
00196	000 03:15:00	17/04/2016 03:40:07	-18.84
00197	000 03:16:00	17/04/2016 03:41:07	-18.98
00198	000 03:17:00	17/04/2016 03:42:07	-19.09
00199	000 03:18:00	17/04/2016 03:43:07	-19.20
00200	000 03:19:00	17/04/2016 03:44:07	-19.29
00201	000 03:20:00	17/04/2016 03:45:07	-19.46
00202	000 03:21:00	17/04/2016 03:46:07	-19.67
00203	000 03:22:00	17/04/2016 03:47:07	-19.91
00204	000 03:23:00	17/04/2016 03:48:07	-20.14
00205	000 03:24:00	17/04/2016 03:49:07	-20.42
00206	000 03:25:00	17/04/2016 03:50:07	-20.66
00207	000 03:26:00	17/04/2016 03:51:07	-20.88
00208	000 03:27:00	17/04/2016 03:52:07	-21.00
00209	000 03:28:00	17/04/2016 03:53:07	-21.00
00210	000 03:29:00	17/04/2016 03:54:07	-20.95
00211	000 03:30:00	17/04/2016 03:55:07	-20.90
00212	000 03:31:00	17/04/2016 03:56:07	-20.82
00277	000 04:36:00	17/04/2016 05:01:07	-19.85
00278	000 04:37:00	17/04/2016 05:02:07	-19.29
00279	000 04:38:00	17/04/2016 05:03:07	-18.77
00280	000 04:39:00	17/04/2016 05:04:07	-18.24
00281	000 04:40:00	17/04/2016 05:05:07	-17.80
00282	000 04:41:00	17/04/2016 05:06:07	-17.31
00283	000 04:42:00	17/04/2016 05:07:07	-16.89
00284	000 04:43:00	17/04/2016 05:08:07	-16.66
00285	000 04:44:00	17/04/2016 05:09:07	-16.51
00286	000 04:45:00	17/04/2016 05:10:07	-16.46
00287	000 04:46:00	17/04/2016 05:11:07	-16.79
00288	000 04:47:00	17/04/2016 05:12:07	-17.26
00289	000 04:48:00	17/04/2016 05:13:07	-17.74
00290	000 04:49:00	17/04/2016 05:14:07	-18.18
00291	000 04:50:00	17/04/2016 05:15:07	-18.65
00292	000 04:51:00	17/04/2016 05:16:07	-19.05
00293	000 04:52:00	17/04/2016 05:17:07	-19.40
00294	000 04:53:00	17/04/2016 05:18:07	-19.75
00295	000 04:54:00	17/04/2016 05:19:07	-20.05
00296	000 04:55:00	17/04/2016 05:20:07	-20.38
00297	000 04:56:00	17/04/2016 05:21:07	-20.67
00298	000 04:57:00	17/04/2016 05:22:07	-20.78
00299	000 04:58:00	17/04/2016 05:23:07	-20.52
00300	000 04:59:00	17/04/2016 05:24:07	-19.97
00301	000 05:00:00	17/04/2016 05:25:07	-19.34
00302	000 05:01:00	17/04/2016 05:26:07	-18.71
00303	000 05:02:00	17/04/2016 05:27:07	-18.11
00304	000 05:03:00	17/04/2016 05:28:07	-17.64

Reports Generation

Specification & Configuration	
Device Name:	Kt1LcdMu
Device Type:	Multi use Int.Temp.
Serial Number:	KM630001
Time Zone	GMT:-5 DST
Firmware Version:	1.14B
Trip Number:	9
Trips Remaining:	Multiple
Temp. Unit:	Celsius
Temp. Range:	-40 to +80°C
Battery:	2.95V - 98%
Total Records:	2077
Sampling Rate:	00:01:00
Start Delay:	00:30:00
Start Time:	Parameter not set
Stop Time:	Parameter not set

Device Name: Data Logger's model. Read only.
Serial Number: Data Logger's unique serial number.
Time Zone: Selected time zone during the configuration + DST (Daylight Saving Time).
Firmware Version: Current logger's firmware version.
Trip Number: This is the trip counter. Counted at each logger's Start. Read only.
Trips Remaining: Indicates the remaining number of trips available or Multiple for multi-use loggers.
Temp. Unit: Selected temperature unit of measure (Celsius or Fahrenheit) during the configuration.
Temp. Range: This is the logger's sensor range. In this example this is a temperature sensor with a range from -40°C to +80°C.
Battery: Current battery voltage and power level indication in %.
Total Records: Current number of records stored in the logger's memory.
Sampling Rate: Configured period between each record sampled.
Start Delay: Configured manual start delay.
Start Time: Automatic configuration start time and date.
Stop Time: Automatic configuration stop time and date.

Alarms (Time above / below Alarms)				
Type:	**Temp.**	**Consecutive**	**Total**	**Out of Spec.**
VH:	-14.00°C	00:00:00	00:01:00	18:41:00
H:	-16.00°C	00:00:00	00:01:00	19:44:00
L:	-20.00°C	00:00:00	00:01:00	04:45:00
VL:	-22.00°C	00:00:00	00:01:00	00:00:00

Type: Very High, High, Low and Very Low.
Temp: Alarm threshold.
Consecutive: Consecutive delay (see detail in ¶6.3)
Total: Cumulative delay (see detail in ¶6.3)
Out of Specification: Total duration out of the alarm threshold.

Summary / Statistics		File Created at: 18/04/16 13:11:50	
Maximum Temperature:	+7.14°C	Status:	Stopped
Minimum Temperature:	-21.38°C	Trip Duration:	01d 10:37:00
Average Temperature:	-8.27°C	Time within Spec:	10:08:00
Mean Kinetic Temp:	-8.67°C	Started Time:	17/04/16 00:25:07
Active Bookmarks:	0	Stopped Time:	18/04/16 11:02:15
Started by:	Manual	Memory Used:	4% 2077/48632
Stopped by:	Manual		

M

Maximum Temperature: Maximum temperature during the whole trip.
Minimum Temperature: Minimum temperature during the whole trip.
Average Temperature: Average temperature during the whole trip.
Mean Kinetic Temperature: MKT of the whole trip using the activation energy set during the configuration.
Active Bookmarks: Number of marker, manually activated by the users.
Started by: How the logger has been started:

- Manual: by pressing the Start button
- Start Timer: by automatic start with time & date.
- Temperature: by automatic start on temperature threshold.

Stopped by: How the logger has been stopped:

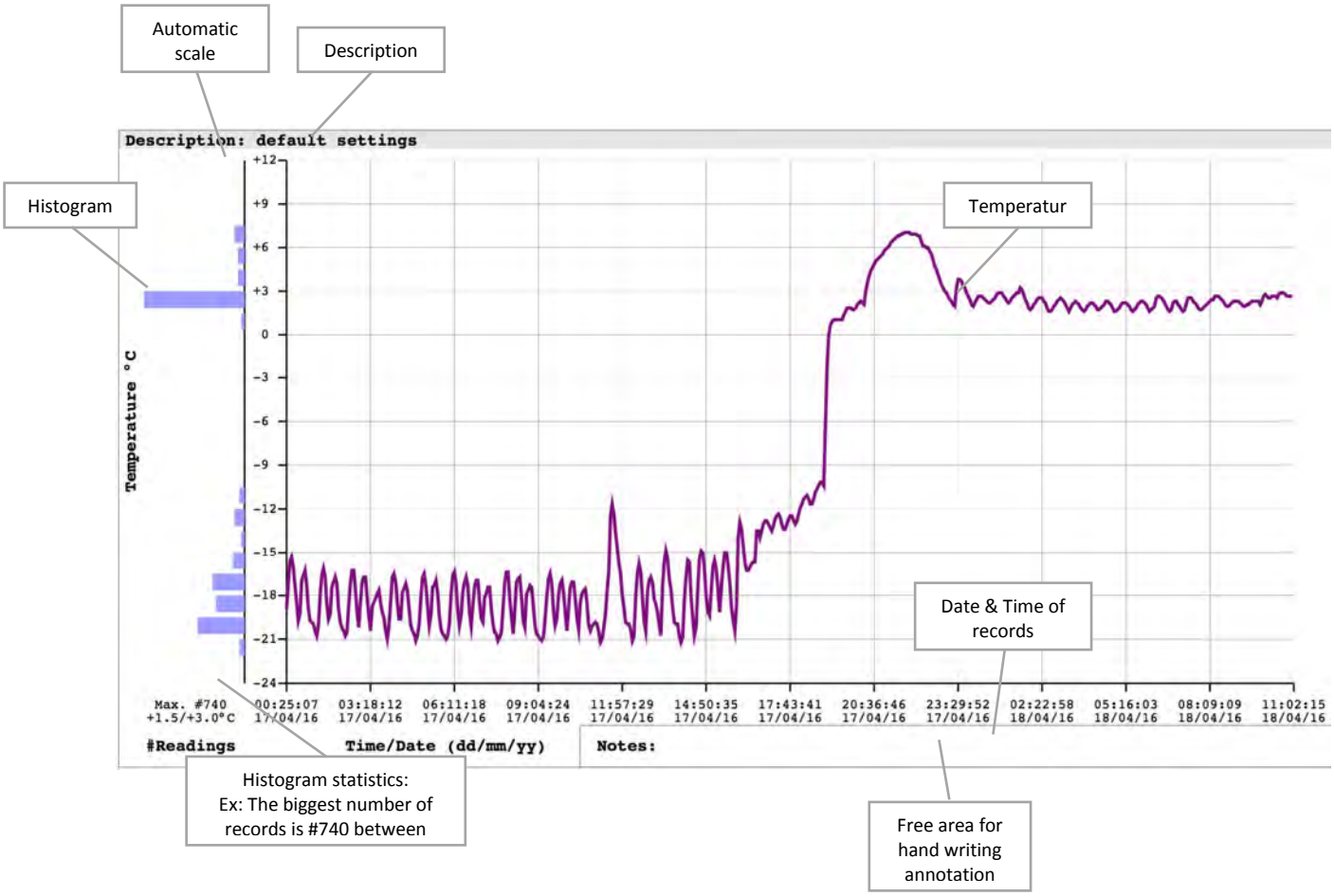
- Manual: by pressing the Stop button
- Memory full: the logger reached it maximum memory capacity.
- Reset: the logger went to reset.
- Stop Timer: by automatic stop with time & date.

Status: Current status of the logger:

- Ready: Logger is configured and ready to be started.
- In Start Delay: Logger has been started and actually in started delay countdown.
- Recording: Logger is started in recording.
- Stopped: Logger is not recording anymore. This is end of the trip.

Trip Duration: Current trip duration from the first to the last record.
Time within Specifications: Total duration within the alarm thresholds without alarms.
Started Time: Date & Time of the first record
Stopped Time: Date & Time of the last record if the trip is finished.
Memory Used: Indicate the memory usage in % and the number of record in memory/memory size.
File Created at: Document creation Date & Time.

Reports Generation



#	ELAPSED	Time	T° C
00001	000 00:00:00	17/04/2016 00:25:07	-20.32
00002	000 00:01:00	17/04/2016 00:26:07	-20.04
00003	000 00:02:00	17/04/2016 00:27:07	-19.53
00004	000 00:03:00	17/04/2016 00:28:07	-18.88
00005	000 00:04:00	17/04/2016 00:29:07	-18.26
00006	000 00:05:00	17/04/2016 00:30:07	-17.68
00007	000 00:06:00	17/04/2016 00:31:07	-17.18
00008	000 00:07:00	17/04/2016 00:32:07	-16.64
00009	000 00:08:00	17/04/2016 00:33:07	-16.14
00010	000 00:09:00	17/04/2016 00:34:07	-15.68
00011	000 00:10:00	17/04/2016 00:35:07	-15.34
00012	000 00:11:00	17/04/2016 00:36:07	-15.41
00013	000 00:12:00	17/04/2016 00:37:07	-15.70
00014	000 00:13:00	17/04/2016 00:38:07	-16.02
00015	000 00:14:00	17/04/2016 00:39:07	-16.32
00016	000 00:15:00	17/04/2016 00:40:07	-16.59
00017	000 00:16:00	17/04/2016 00:41:07	-16.91
00018	000 00:17:00	17/04/2016 00:42:07	-17.30

#	ELAPSED	Time	T° C
00093	000 01:32:00	17/04/2016 01:57:07	-19.80
00094	000 01:33:00	17/04/2016 01:58:07	-19.16
00095	000 01:34:00	17/04/2016 01:59:07	-18.51
00096	000 01:35:00	17/04/2016 02:00:07	-17.91
00097	000 01:36:00	17/04/2016 02:01:07	-17.42
00098	000 01:37:00	17/04/2016 02:02:07	-17.12
00099	000 01:38:00	17/04/2016 02:03:07	-17.09
00100	000 01:39:00	17/04/2016 02:04:07	-17.02
00101	000 01:40:00	17/04/2016 02:05:07	-16.98
00102	000 01:41:00	17/04/2016 02:06:07	-16.71
00103	000 01:42:00	17/04/2016 02:07:07	-16.79
00104	000 01:43:00	17/04/2016 02:08:07	-17.17
00105	000 01:44:00	17/04/2016 02:09:07	-17.60
00106	000 01:45:00	17/04/2016 02:10:07	-18.05
00107	000 01:46:00	17/04/2016 02:11:07	-18.48
00108	000 01:47:00	17/04/2016 02:12:07	-18.88
00109	000 01:48:00	17/04/2016 02:13:07	-19.23
00110	000 01:49:00	17/04/2016 02:14:07	-19.58

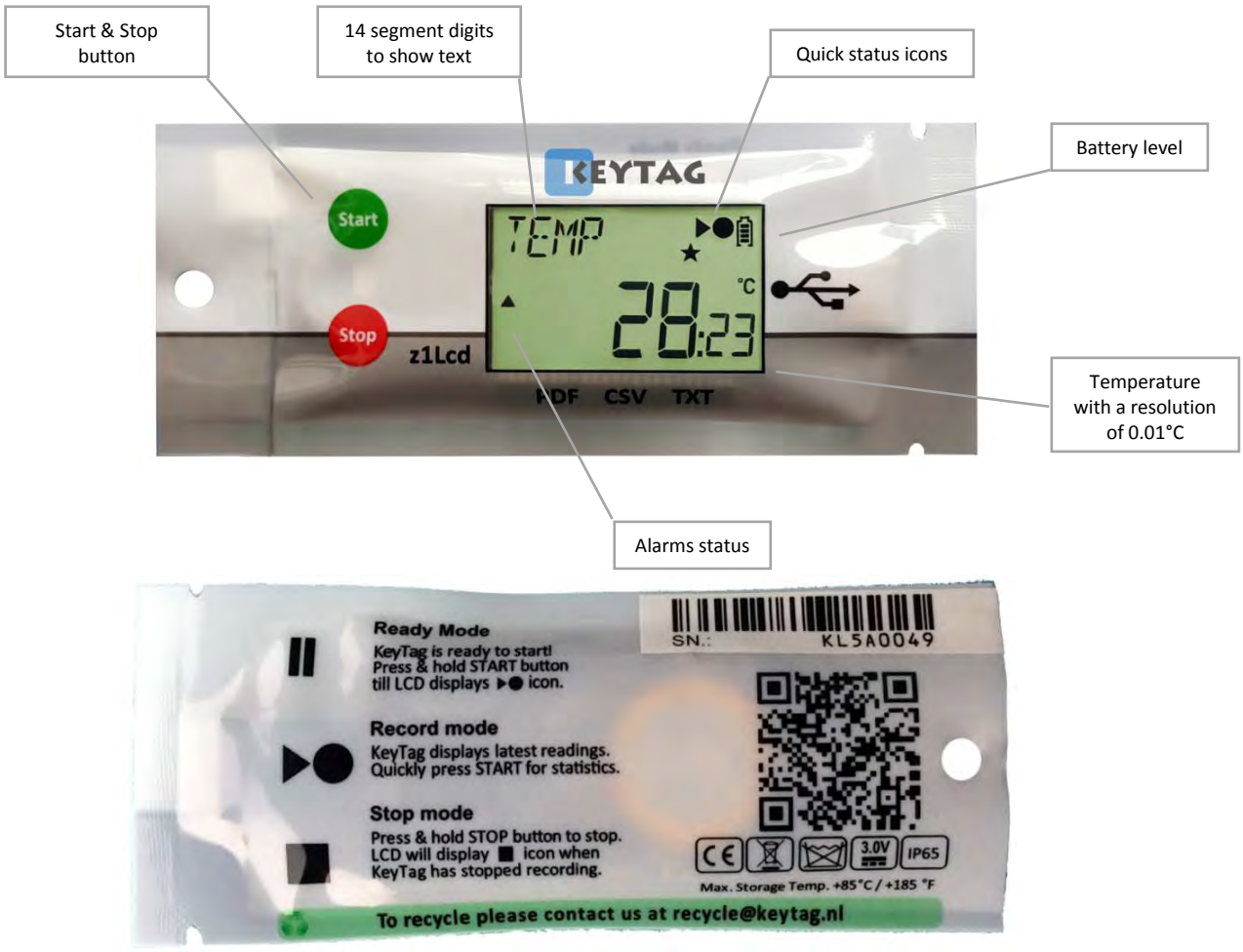
#	ELAPSED	Time	T° C
00185	000 03:04:00	17/04/2016 03:29:07	-18.34
00186	000 03:05:00	17/04/2016 03:30:07	-18.27
00187	000 03:06:00	17/04/2016 03:31:07	-18.22
00188	000 03:07:00	17/04/2016 03:32:07	-18.15
00189	000 03:08:00	17/04/2016 03:33:07	-18.09
00190	000 03:09:00	17/04/2016 03:34:07	-17.83
00191	000 03:10:00	17/04/2016 03:35:07	-17.61
00192	000 03:11:00	17/04/2016 03:36:07	-17.79
00193	000 03:12:00	17/04/2016 03:37:07	-18.14
00194	000 03:13:00	17/04/2016 03:38:07	-18.42
00195	000 03:14:00	17/04/2016 03:39:07	-18.66
00196	000 03:15:00	17/04/2016 03:40:07	-18.84
00197	000 03:16:00	17/04/2016 03:41:07	-18.98
00198	000 03:17:00	17/04/2016 03:42:07	-19.09
00199	000 03:18:00	17/04/2016 03:43:07	-19.20
00200	000 03:19:00	17/04/2016 03:44:07	-19.29
00201	000 03:20:00	17/04/2016 03:45:07	-19.46
00202	000 03:21:00	17/04/2016 03:46:07	-19.67

#	ELAPSED	Time	T° C
00277	000 04:36:00	17/04/2016 05:01:07	-19.8
00278	000 04:37:00	17/04/2016 05:02:07	-19.2
00279	000 04:38:00	17/04/2016 05:03:07	-18.7
00280	000 04:39:00	17/04/2016 05:04:07	-18.2
00281	000 04:40:00	17/04/2016 05:05:07	-17.8
00282	000 04:41:00	17/04/2016 05:06:07	-17.3
00283	000 04:42:00	17/04/2016 05:07:07	-16.8
00284	000 04:43:00	17/04/2016 05:08:07	-16.6
00285	000 04:44:00	17/04/2016 05:09:07	-16.5
00286	000 04:45:00	17/04/2016 05:10:07	-16.4
00287	000 04:46:00	17/04/2016 05:11:07	-16.7
00288	000 04:47:00	17/04/2016 05:12:07	-17.2
00289	000 04:48:00	17/04/2016 05:13:07	-17.7
00290	000 04:49:00	17/04/2016 05:14:07	-18.1
00291	000 04:50:00	17/04/2016 05:15:07	-18.6
00292	000 04:51:00	17/04/2016 05:16:07	-19.0
00293	000 04:52:00	17/04/2016 05:17:07	-19.4
00294	000 04:53:00	17/04/2016 05:18:07	-19.7

8. Kt1LcdSu

8.1. Presentation

Kt1LcdSu is a single use temperature data logger with a rich LCD.
This data logger has all the smart features seen above in the KeyTag Manager sections.
Manual and Automatic Start & Stop on Date / Time / Temperature threshold…



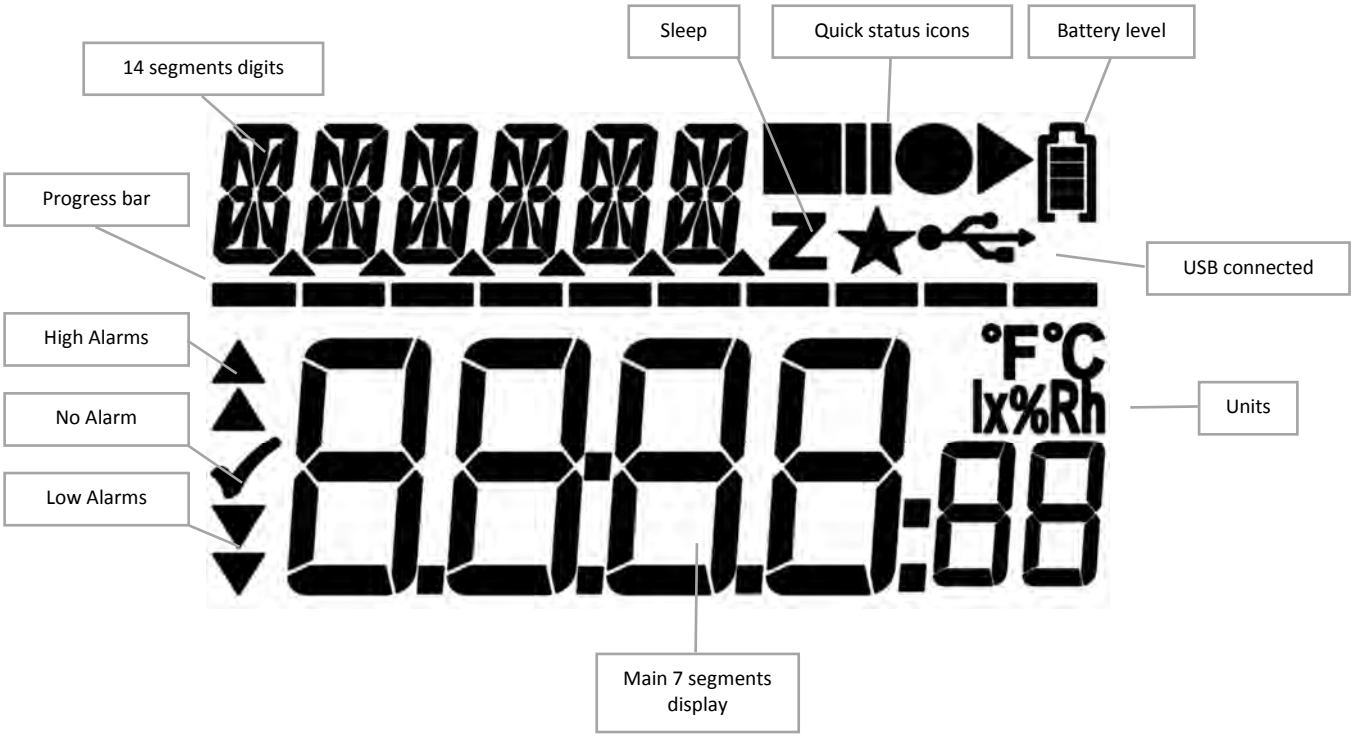
	USB on-board (No strings attached!): Tear the sleeve and slide to expose the USB port, plug and view the data.
	Built in PDF (Auto-generated): When connected to computer, Kt1Lcd auto - generates detailed pdf report.
	Customize PDF report (tailored contents): Control, manage & customize generated pdf report, enable / disable fields, contents.
	CSV and TXT reports (auto-generated): Easiest way to view data, in the event if PDF reader software is not available.
	Multi-functional LCD (1 click information: Smart display designed to view most of the trip info. With just press of a button.
	Extra large memory: Able to take over 20,000 records.
	Protected (waterproof): With the IP rating of IP67, packed & sealed in durable plastic. Completely food safe.
	Extended battery life: Ultra low current consumption to last more than 2 years on shelf and monitoring.
	Bookmark: Easily mark multiple records and review them when downloaded.
	Multi-alarms (visual): Four alarms configurations, two for high thresholds and two for low thresholds.
	Firmware Upgrade: Continuously improving & adding the features
	Multi operating systems support: Kt1Lcd is supported by Windows (XP, Vista, 7, 8 & 10), Mac OS, Linux and Android devices.

8.2. Specifications

Logger Type	Single Use Temperature Data Logger
Sensor	Thermistor (Internal)
Memory Capacity	>20,000 records
Measurement Range	-40°C to +80°C
Accuracy	±0.3°C from -40°C to +80°C
Resolution	0.01°C
Time Accuracy	±15 minutes / year
Button	2
Start Option	Manual Start with / without delay Start with Time & Date Start at temperature threshold with/without delay
Stop Option	Stop after a period Stop with date and time Manual stop
Marked Readings	x8 Markers
Log Interval	From 5 Sec to 24 Hours
Total Alarms	4
Alarm Type	Consecutives and / or Total Alarm
Sensor Response Time	< 7 minutes
Battery	3V, CR2032
Display	LCD reflective 30x17mm with 14 digits segments
Connection / Interface	USB Mass Storage Device Direct Plug in to PC
Auto Generated File Types	KLG, TXT, CSV, PDF
Export File Types	KLG, TXT, CSV, PDF
Software Support	KeyTag Manager
Compatibility	Windows, Mac OSX, Linux
Calibration	Yes
Certificates	RoHS
Dimensions	44x107x7mm
Weight	17g
Packaging / Material	FDA 21 CFR 177.1520
Protection Class	IP 67, Waterproof

8.3. LCD Display

Kt1Lcd series data logger uses a reflective LCD display with high contrast and wide view angle. The 14 digits segment allows the flexibility to display dynamic words using up to six characters.



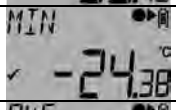
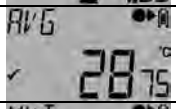
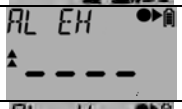
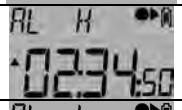
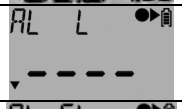
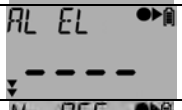
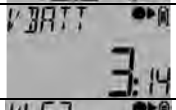
8.4. LCD Quick Status Icons

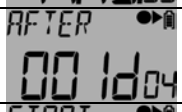
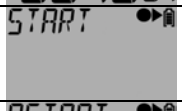
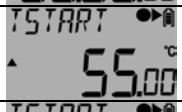
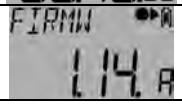
Kt1Lcd LCD contains icons to quickly inform about the current state.

	READY: Configured and ready to start. Press Start button.
	RECORD: Started, in record mode.
	STOPPED: End of the trip. Doesn't record anymore.

8.5. LCD Display Modes

Kt1Lcd series data logger offers various menu on the LCD display with Start & Stop button to navigate up and down into the different screen.

	Standard display when recording Temperature at 2 decimal places, record, battery status & alarm status.
	Displaying Maximum temperature.
	Displaying Minimum temperature.
	Displaying Average temperature.
	Displaying MKT (Mean Kinetic Temperature)
	Extremely HIGH Alarm status. There is no EH alarm so information is blank. Indicate the EH alarm threshold when the logger is in READY mode.
	High Alarm status. Total duration above the high threshold is 2h34m50s. Indicate the H alarm threshold when the logger is in READY mode.
	LOW Alarm status. There is no L alarm so information is blank. Indicate the L alarm threshold when the logger is in READY mode.
	Extremely LOW Alarm status. There is no VL alarm so information is blank. Indicate the EL alarm threshold when the logger is in READY mode.
	Number of records Total number records stored in memory. Ex: 20000
	Current Date With the format: dd/mm/yy
	Current Time With the 24H format: HH:MM:SS
	Battery voltage status Displaying real-time battery voltage: Low batt.<2.50V
	Serial Number This is a unique serial number.
	Firmware version (Ex: 1.14a) Press and hold the STOP button will reset the logger.
	Sampling rate. HH:MM:SS (Ex: 00 hours, 5 minutes, 0 seconds)
	Stop conditions header. The enabled stop conditions will be scrolling every 2 seconds.
	Auto Stop Date. dd:mm:yy

	Auto Stop Time. HH:MM:SS
	Recording duration. The logger will Stop after this duration. (Ex: 1 day, 4 hours)
	Stat conditions header. The enabled start conditions will be scrolling every 2 seconds.
	Auto Start Date. dd:mm:yy
	Auto Start Time. HH:MM:SS
	Manual Start with Delay. HH:MM:SS (or ex: 001d23, 1 day and 23 hours)
	Auto Start with Temperature and delay. Ex: The logger will start if the temperature is >= 55°C
	Auto Start with Temperature and delay. HH:MM:SS Ex: The logger will start if the temperature is >= 55°C for 10 minutes.
	Firmware version (Ex: 1.14a) Press and hold the STOP button will reset the logger.

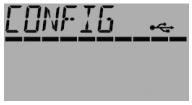
8.6. How to configure the Kt1LcdSu

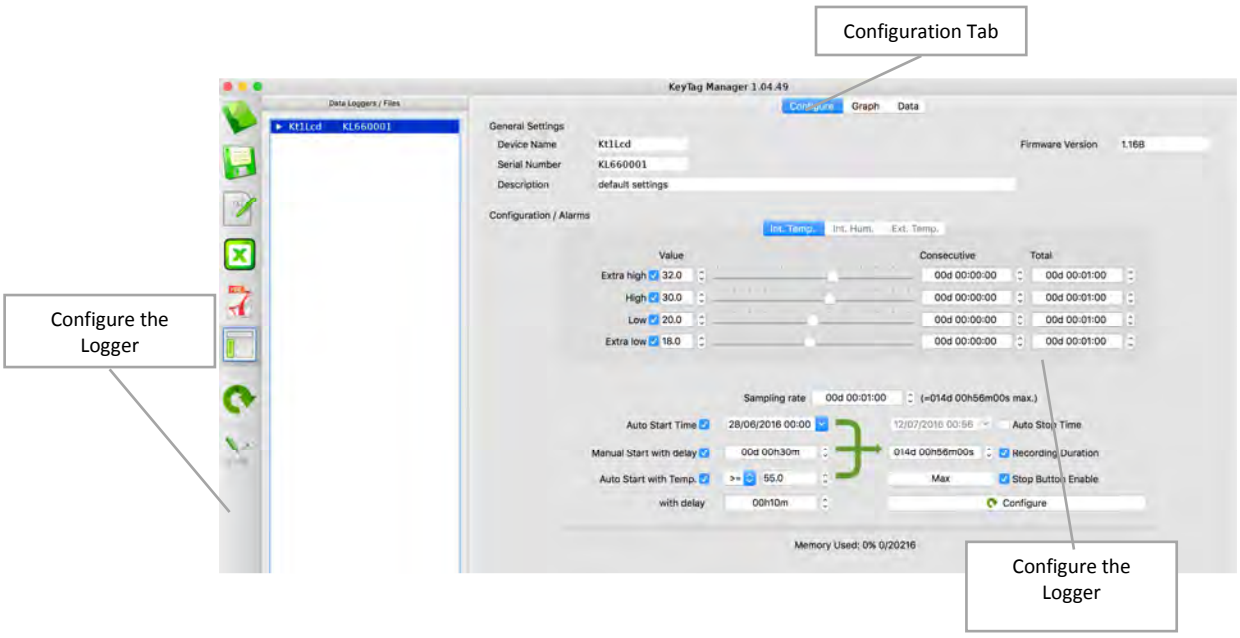
Step by step process to configure the Kt1LcdSu Data Logger.

- On the computer: Launch the KeyTag Manager application.
- Make sure that the default settings (from the Settings section) are correct.
  - Language
  - Time zone
  - Temperature Units
  - Excel CSV separator
  - MKT Activation Energy (default: 83kJ/mol)
- Connect the Kt1LcdSu to the computer using the USB connection.
- The logger is detected and visible in the Data Loggers / Files section.
- Select the configuration Tab
- Enter the description
- Enable the alarm check boxes required in the mission
  - Set the alarm threshold
  - Set the consecutive alarm delay if needed or set to zero to disable
  - Set the total alarm delay if needed or set to zero to disable
- Set the sampling rate.
- Set the Start condition(s):
  - Auto Start Time
  - Manual Start + Delay
  - Auto Start with Temperature + Delay
- Set the Stop condition
  - Auto Stop Time
  - Recording Duration (Press the Max button to auto set the maximum duration)
- Click on the Configuration button.

  The following Configuration message will appear on the logger's LCD.
- The logger is configured and ready to be started.

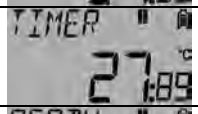
  You can now disconnect the logger





8.7. How to Start the Kt1LcdSu

Step by step process to start the Kt1LcdSu Data Logger.

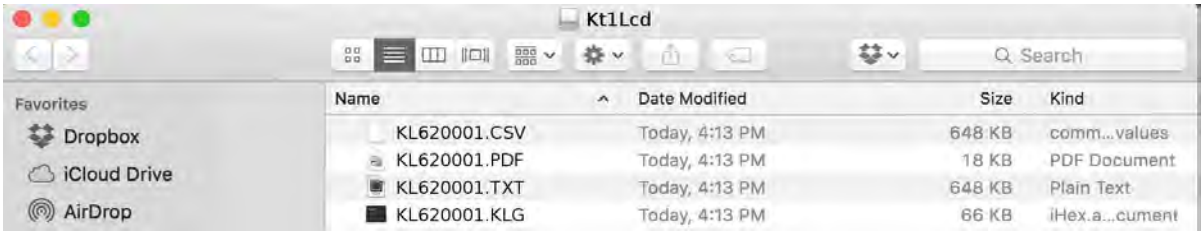
	Make sure the logger has been configured and in Ready mode.
	If the logger has been configured with the Auto Start Time, the LCD display will show TIMER instead of READY.
	Press and hold the Start button for 8 seconds until the loggers switch to the Record mode. A progress bar will appear during this process.
	If the logger has been configured with a start delay. This count down will run until the end and then the logger will start .
	The logger is now in record mode.

8.8. How to Read the Kt1LcdSu

Relevant information is always available on the LCD display in real time.
Use the Start and Stop button to navigate in the menu. (see ¶8.5)

To download the report on the computer, just connect the logger and check the external the mass storage device which appear in the explorer (for Windows) or directly mounted and visible on the desktop (for MAC).
The following files are available:

- *.KLG: KeyTag format, needs KeyTag Manager. (See: ¶7.1)
- *.CSV: Excel CSV File (See: ¶7.2)
- *.TXT: Text file (See: ¶7.3)
- *.PDF: PDF File (See: ¶7.4)



The alternative way is to use KeyTag Manager. (see ¶5, ¶6 & ¶7)

8.9. How to Stop the Kt1LcdSu

Step by step process to stop the Kt1LcdSu Data Logger.

	The logger is in record mode.
	Press and hold the Stop button for 8 seconds until the loggers switch to the Stop mode. A progress bar will appear during this process.
	The logger is now in stopped mode and doesn't record anymore.

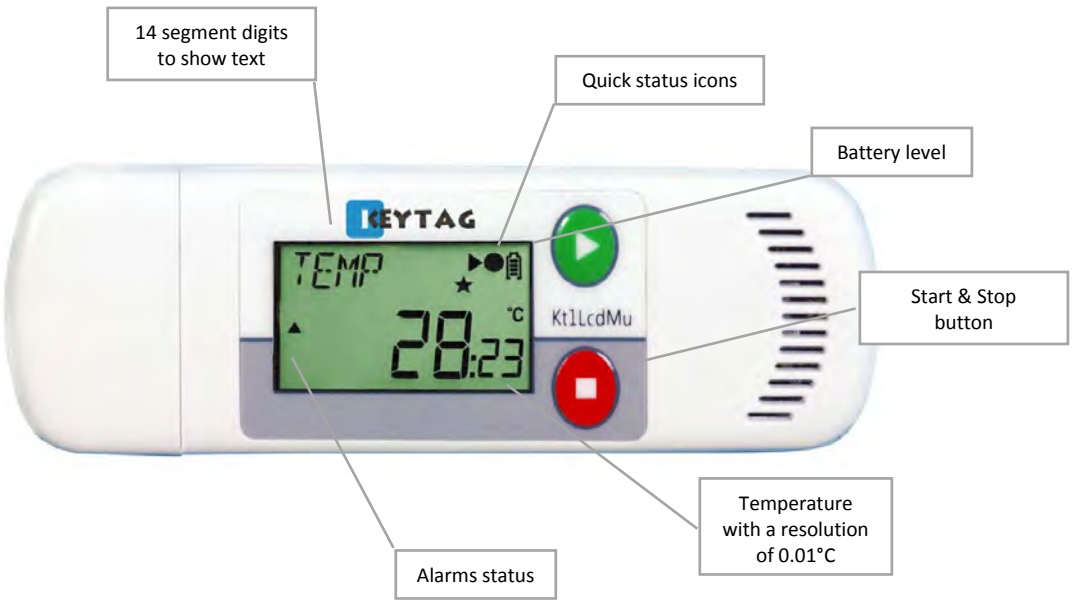
9. Kt1LcdMu, Kt1LcdMuH, Kt1LcdMuE

9.1. Presentation

The KeyTag Kt1LcdMu/H/E is an extremely accurate multi-use data logger for internal and external temperature and humidity, with a detailed, multi-screen display. In addition to things like current date and time, serial number, firmware version, battery power, etc... the display also shows you information on logging interval, how it starts (manual, time, temperature) and stops (period, time or manual), start delay, running or stopped state, various alarm levels and alarm states, minimum, maximum, average and Mean Kinetic Temperature, etc — all by a simple click of the button.

Once plugged into the USB port, the logger works like a USB stick that holds the automatically generated KLG, TXT, CSV and PDF files. No KeyTag software needed.

Where other suppliers choose to accompany their loggers with a basic manufacturers certificate, mentioning specifications based on theoretical calculations and prefabrication tests, every KeyTag Kt1 will be individually calibrated before it leaves our lab. Its unique, traceable calibration certificate can be found 'in the cloud' by clicking a link on the PDF generated by the logger.



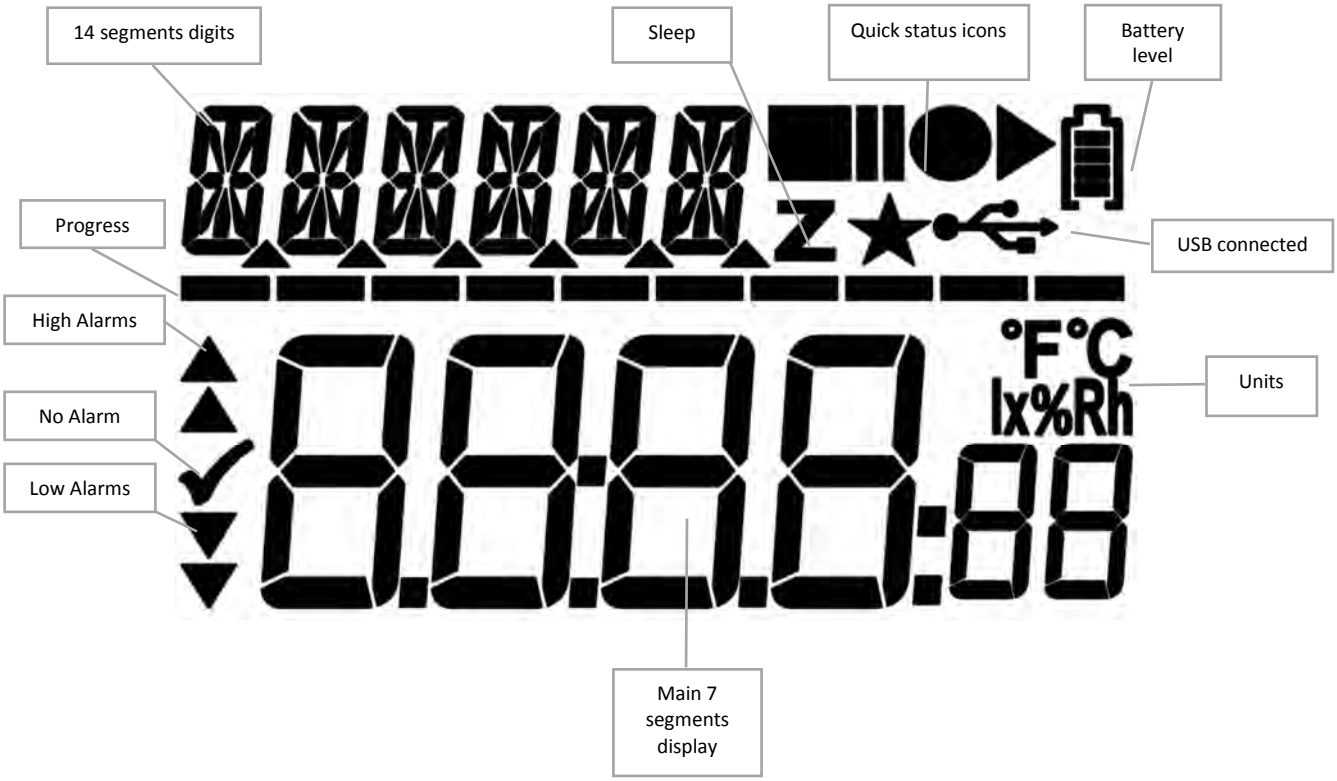
	USB on-board (No strings attached!): Direct connection to USB port, plug and view the data.
	Built in PDF (Auto-generated): When connected to computer, Kt1LcdMu auto generates a detailed PDF report.
	Customize PDF report (tailored contents): Control, manage & customize generated PDF report, enable / disable fields, contents.
	CSV and TXT reports (auto-generated): Easiest way to view data, in the event if PDF reader software is not available.
	Multi-functional LCD (1 click information: Smart display designed to view most of the mission info. With just press of a button.
	Extra large memory: Able to take over 45,000 records.
	Replaceable standard battery CR2032: Ultra low current consumption to last more than 2 years on shelf and monitoring.
	Bookmark: Easily mark multiple records and review them when downloaded.
	Multi-alarms (visual): Four alarms configurations, two for high thresholds and two for low thresholds.
	Firmware Upgrade: Continuously improving & adding the features
	Multi operating systems support: Kt1LcdMu is supported by Windows (XP, Vista, 7, 8 & 10), Mac OS, Linux and Android devices.

9.2. Specifications

Logger Type	Multi-use Temperature Data Logger
Sensor	Temperature / Humidity / Light / 3D Accelerometer (Shocks)
Memory Capacity	>45,000 records
Measurement Range	-40°C to +80°C
Accuracy	±0.3°C from -40°C to +80°C
Resolution	0.01°C
Time Accuracy	±15 minutes / year
Button	2
Start Option	Manual Start with / without delay Start with Time & Date Start at temperature threshold with/without delay
Stop Option	Stop after a period Stop with date and time Manual stop
Marked Readings	Yes, 8x Markers
Log Interval	From 5 Sec to 24 Hours
Total Alarms	4
Alarm Type	Consecutives and / or Total Alarm
Sensor Response Time	< 7 minutes
Battery	Replaceable 3V, CR2032
Display	LCD reflective 30x17mm with 14 digits segments
Connection / Interface	USB Mass Storage Device Direct Plug in to PC
Auto Generated File Types	KLG, TXT, CSV, PDF
Export File Types	KLG, TXT, CSV, PDF
Software Support	KeyTag Manager
Compatibility	Windows, Mac OSX, Linux
Calibration	Yes
Certificates	RoHS
Dimensions	35x103x11mm
Weight	28g
Packaging / Material	Polycarbonate ABS, FDA 21 CFR 177.1520
Protection Class	IP 65

9.3. LCD Display

Kt1Lcd series data logger uses a reflective LCD display with high contrast and wide view angle. The 14 digits segment allows the flexibility to display dynamic words using up to six characters.



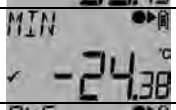
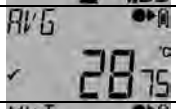
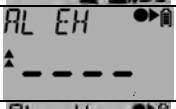
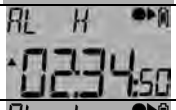
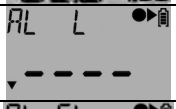
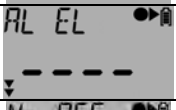
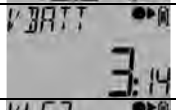
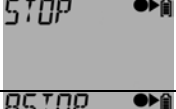
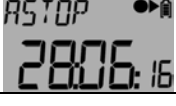
9.4. LCD Quick Status Icons

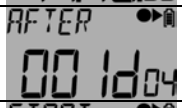
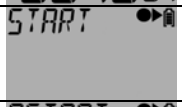
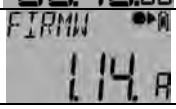
Kt1Lcd LCD contains icons to quickly inform about the current state.

	**READY:**	Configured and ready to start. Press Start button.
	**RECORD:**	Started, in record mode.
	**STOPPED:**	End of the trip. Doesn't record anymore.

9.5. LCD Display Modes

Kt1Lcd series data logger offers various menu on the LCD display with Start & Stop button to navigate up and down into the different screen.

	Standard display when recording Temperature at 2 decimal places, record, battery status & alarm status.
	Displaying Maximum temperature.
	Displaying Minimum temperature.
	Displaying Average temperature.
	Displaying MKT (Mean Kinetic Temperature)
	Extremely HIGH Alarm status. There is no EH alarm so information is blank. Indicate the EH alarm threshold when the logger is in READY mode.
	High Alarm status. Total duration above the high threshold is 2h34m50s. Indicate the H alarm threshold when the logger is in READY mode.
	LOW Alarm status. There is no L alarm so information is blank. Indicate the L alarm threshold when the logger is in READY mode.
	Extremely LOW Alarm status. There is no VL alarm so information is blank. Indicate the EL alarm threshold when the logger is in READY mode.
	Number of records Total number records stored in memory. Ex: 20000
	Current Date With the format: dd/mm/yy
	Current Time With the 24H format: HH:MM:SS
	Battery voltage status Displaying real-time battery voltage: Low batt.<2.50V
	Serial Number This is a unique serial number.
	Firmware version (Ex: 1.14a) Press and hold the STOP button will reset the logger.
	Sampling rate. HH:MM:SS (Ex: 00 hours, 5 minutes, 0 seconds)
	Stop conditions header. The enabled stop conditions will be scrolling every 2 seconds.
	Auto Stop Date. dd:mm:yy

	Auto Stop Time. HH:MM:SS
	Recording duration. The logger will Stop after this duration. (Ex: 1 day, 4 hours)
	Stat conditions header. The enabled start conditions will be scrolling every 2 seconds.
	Auto Start Date. dd:mm:yy
	Auto Start Time. HH:MM:SS
	Manual Start with Delay. HH:MM:SS (or ex: 001d23, 1 day and 23 hours)
	Auto Start with Temperature and delay. Ex: The logger will start if the temperature is >= 55°C
	Auto Start with Temperature and delay. HH:MM:SS Ex: The logger will start if the temperature is >= 55°C for 10 minutes.
	Firmware version (Ex: 1.14a) Press and hold the STOP button will reset the logger.

9.6. How to configure the Kt1LcdMu

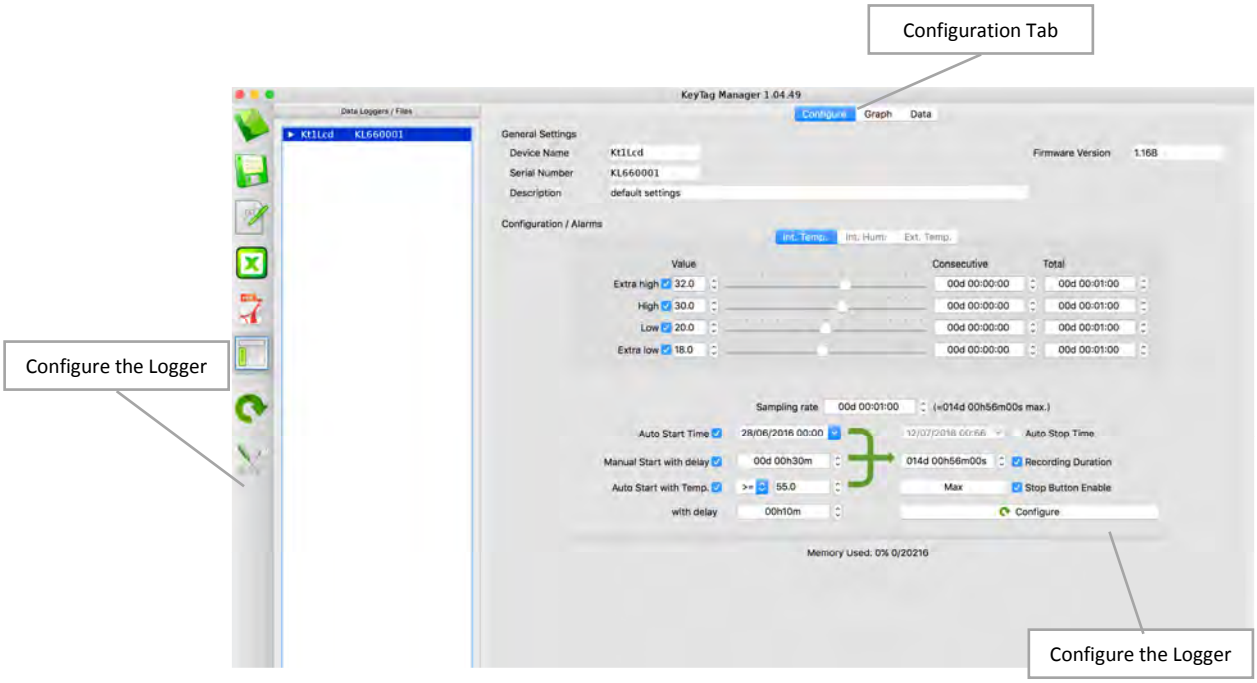
Step by step process to configure the Kt1LcdMu Data Logger.

- On the computer: Launch the KeyTag Manager application.
- Make sure that the default settings (from the Settings section) are correct.
  - Language
  - Time zone
  - Temperature Units
  - Excel CSV separator
  - MKT Activation Energy (default: 83kJ/mol)
- Connect the Kt1LcdMu to the computer using the USB connection.
- The logger is detected and visible in the Data Loggers / Files section.
- Select the configuration Tab
- Enter the description
- Enable the alarm check boxes required in the mission
  - Set the alarm threshold
  - Set the consecutive alarm delay if needed or set to zero to disable
  - Set the total alarm delay if needed or set to zero to disable
- Set the sampling rate.
- Set the Start condition(s):
  - Auto Start Time
  - Manual Start + Delay
  - Auto Start with Temperature + Delay
- Set the Stop condition
  - Auto Stop Time
  - Recording Duration (Press the Max button to auto set the maximum duration)
- Click on the Configuration button.

  The following Configuration message will appear on the logger's LCD.

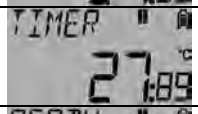
- The logger is configured and ready to be started.

  You can now disconnect the logger



9.7. How to Start the Kt1LcdMu

Step by step process to start the Kt1LcdMu Data Logger.

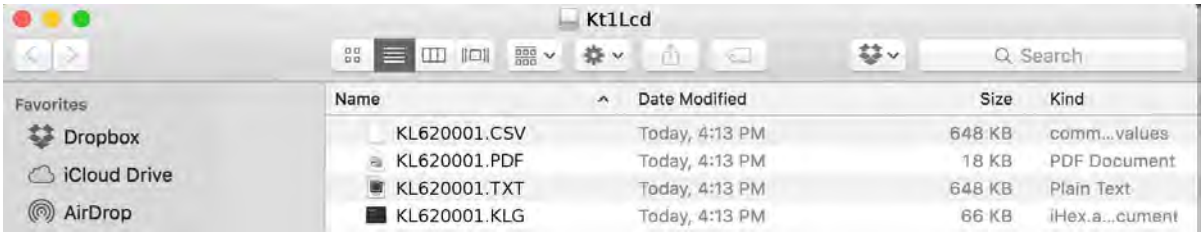
	Make sure the logger has been configured and in Ready mode.
	If the logger has been configured with the Auto Start Time, the LCD display will show TIMER instead of READY.
	Press and hold the Start button for 8 seconds until the loggers switch to the Record mode. A progress bar will appear during this process.
	If the logger has been configured with a start delay. This count down will run until the end and then the logger will start .
	The logger is now in record mode.

9.8. How to Read the Kt1LcdMu

Relevant information is always available on the LCD display in real time.
Use the Start and Stop button to navigate in the menu. (see ¶9.5)

To download the report on the computer, just connect the logger and check the external the mass storage device which appear in the explorer (for Windows) or directly mounted and visible on the desktop (for MAC). The following files are available:

- *.KLG: KeyTag format, needs KeyTag Manager. (See: ¶7.1)
- *.CSV: Excel CSV File (See: ¶7.2)
- *.TXT: Text file (See: ¶7.3)
- *.PDF: PDF File (See: ¶7.4)



The alternative way is to use KeyTag Manager. (see ¶5, ¶6 & ¶7)

9.9. How to Stop the Kt1LcdMu

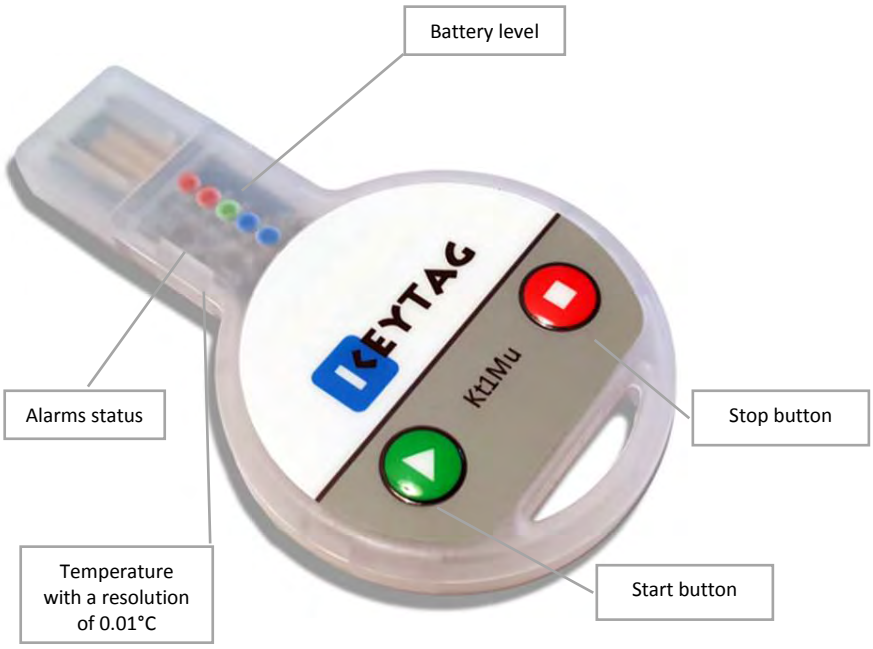
Step by step process to stop the Kt1LcdMu Data Logger.

	The logger is in record mode.
	Press and hold the Stop button for 8 seconds until the loggers switch to the Stop mode. A progress bar will appear during this process.
	The logger is now in stopped mode and doesn't record anymore.

10. Kt1Mu, Kt1MuH

10.1. Presentation

Kt1Mu(H) is an extremely accurate and low cost multi-use data logger for temperature and humidity, with 5X LED — blue for low alarms, green for no alarm and red for high alarms, visual indication of the current status (recording, stopped, battery level). The battery (non-replaceable) has a shelf life of 1 to 2 years for regular usage. When not in use, the logger is automatically placed in sleep mode to save the battery.
Once plugged into the USB port, the logger works like a USB stick that holds the automatically generated KLG, TXT, CSV and PDF files. No KeyTag software needed.
Where other suppliers choose to accompany their loggers with a basic manufacturers certificate, mentioning specifications based on theoretical calculations and prefabrication tests, every KeyTag Kt1 will be individually calibrated before it leaves our lab. Its unique, traceable calibration certificate can be found 'in the cloud' by clicking a link on the PDF generated by the logger.



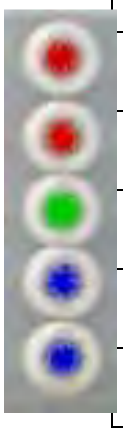
10.1. Specifications

Logger Type	Multi-use Temperature & Humidity Data Logger
Sensor	Temperature / Humidity
Memory Capacity	>13,000 records
Measurement Range	-40°C to +80°C
Accuracy	±0.3°C over the complete measuring range
Resolution	0.01°C
Time Accuracy	±15 minutes / year
Button	2
Start Option	Manual start with or without delay Auto Start on date and time Auto Start on set temperature with or without delay
Stop Option	Auto Stop after a set period Auto Stop on date and time Manual Stop
Marked Readings	Yes, 8x Markers
Log Interval	From 5 Sec to 24 Hours
Total Alarms	4
Alarm Type	Consecutives and / or Total Alarm
Sensor Response Time	< 1 minute
Battery	Not replaceable
Battery life:	1 to 2 years for a normal usage
Display	5X LED — blue, green, red
Connection / Interface	USB Mass Storage Device Direct Plug in to PC
Auto Generated File Types	KLG, TXT, CSV, PDF
Export File Types	KLG, TXT, CSV, PDF
Software Support	KeyTag Manager
Compatibility	Windows, Mac OSX, Linux
Calibration	Individual calibration certificate per logger
Certificates	RoHS
Dimensions	78 x 48 x 9 mm
Weight	16g
Packaging / Material	ABS, FDA 21 CFR 177.1520
Protection Class	IP 30

LED Display

Kt1Mu series data logger uses 5 x LED to indicate:

- Alarms
- Current state
- Battery level



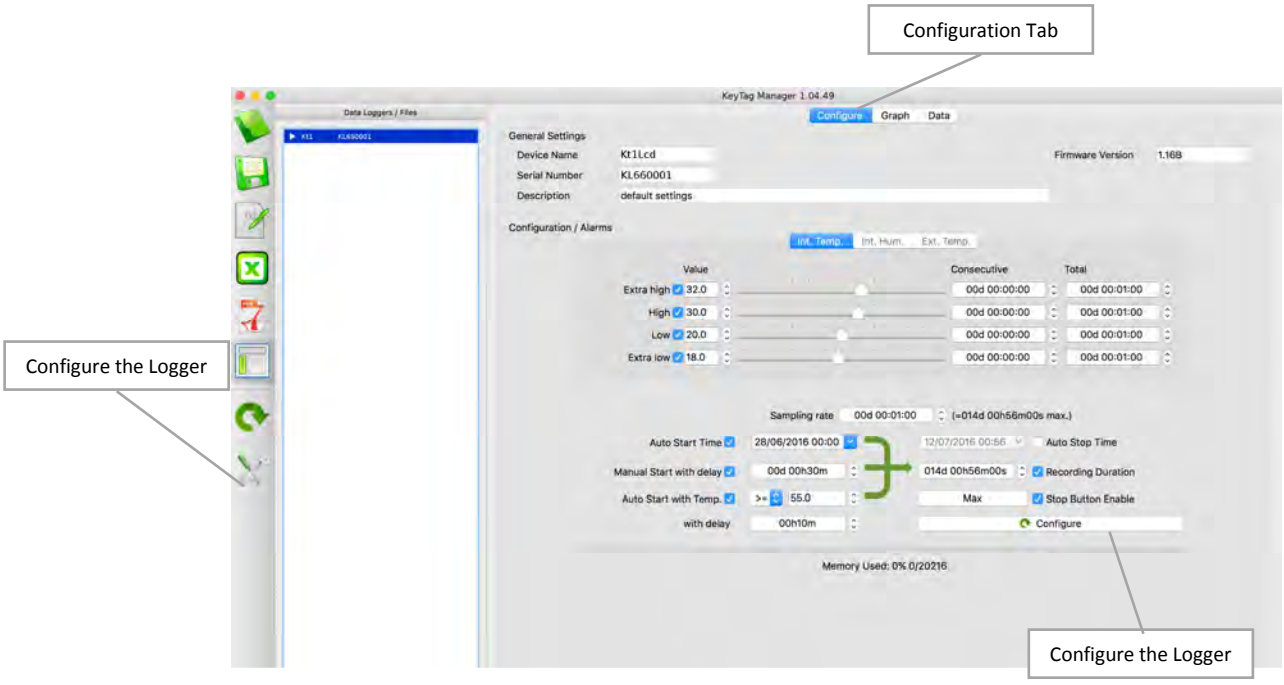
Alarms	Battery Level Press and hold the 2 buttons
Very High alarm	Medium
High alarm	
No alarm	High
Low alarm	
Very Low alarm	Low

Led	State
No blink	Press any button to awake the LEDs. After a period of 2 minutes, LED goes back to sleep mode.
1 flash / 10 sec.	The LED indicate the alarm status. Logger is Ready or Stopped.
2 flashes / 5 sec	The LED indicate the alarm status. Logger is in Record mode.

10.2. How to configure the Kt1Mu

Step by step process to configure the Kt1Mu Data Logger.

- On the computer: Launch the KeyTag Manager application.
- Make sure that the default settings (from the Settings section) are correct.
  - Language
  - Time zone
  - Temperature Units
  - Excel CSV separator
  - MKT Activation Energy (default: 83kJ/mol)
- Connect the Kt1Mu to the computer using the USB connection.
  Quick press any button to awake the logger if necessary.
- The logger is detected and visible in the Data Loggers / Files section.
- Select the configuration Tab
- Enter the description
- Enable the alarm check boxes required in the mission
  - Set the alarm threshold
  - Set the consecutive alarm delay if needed or set to zero to disable
  - Set the total alarm delay if needed or set to zero to disable
- Set the sampling rate.
- Set the Start condition(s):
  - Auto Start Time
  - Manual Start + Delay
  - Auto Start with Temperature + Delay
- Set the Stop condition
  - Auto Stop Time
  - Recording Duration (Press the Max button to auto set the maximum duration)
- Click on the Configuration button.
  The following Configuration message will appear on the logger's LCD.
- The logger is configured and ready to be started.
  You can now disconnect the logger



10.3. How to Start the Kt1Mu

Step by step process to start the Kt1Mu Data Logger.

Green LED: 1 flash / 8 sec	Quick press any button to awake the logger if necessary. Make sure the logger has been configured and in “Ready Mode”.
LED scroll up from blue to red	Press and hold the Start button for 8 seconds until the loggers switch to the Record mode. A visual progress will appear during this process.
2 flashes / 5 sec	The logger is now in “Record Mode”.

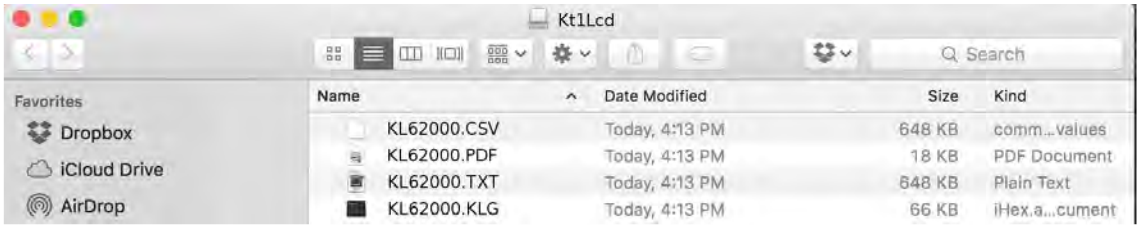
10.4. How to Read the Kt1Mu

Quick press any button to awake the logger if necessary.
LED indicate the current state . (see ¶10.2)

To download the report on the computer, just connect the logger and check the external the mass storage device which appear in the explorer (for Windows) or directly mounted and visible on the desktop (for MAC).

The following files are available:

- *.KLG: KeyTag format, needs KeyTagManager. (See: ¶7.1)
- *.CSV: Excel CSV File (See: ¶7.2)
- *.TXT: Text file (See: ¶7.3)
- *.PDF: PDF File (See: ¶7.4)



The alternative way is to use KeyTag Manager. (see ¶5, ¶6 & ¶7)

10.5. How to Stop the Kt1Mu

Step by step process to stop the Kt1LcdMu Data Logger.

2 flashes / 5 sec	Quick press any button to awake the logger if necessary.
LED scroll down from red to blue	Press and hold the Stop button for 8 seconds until the loggers switch to the “Stop Mode”. A visual progress will appear during this process.
1 flash / 8 sec	The logger is now in “Stop Mode”.