LogTag®

TICT - iS0°Tag®

Freeze Indicator with display

DOCUMENT REVISION 1.0, 4 March 2014

Contents

Document revision history

Ver	Date	Author	Details
0.1	8/8/13	MJ	Initial
0.2	21/10/13	MJ	Added Start Delay and Stop with Button.
0.3	23/10/13	SL	Minor changes to improve readability, added picture
0.4	18/11/2013	SL	Spec change for battery life, start delay, added TICT into product name
0.5	29/11/2013	SL	Amended specs for 2 day only log buffer
1.0	4/03/2014	SL	Release version

Description

The LogTag® TICT *iS0°Tag*® is a single-use, low cost electronic freeze indicator for monitoring temperature as well as recording statistics during the transportation and storage of chilled products, such as vaccines, food or specialty chemical products.

The product is made from durable polycarbonate plastic and features an LCD display and a START/MARK button.

The LogTag TICT *iS0°Tag*® can monitor and record statistics against one lower and one additional upper, factory pre-set temperature limit for up to 3 years, showing OK if environmental conditions remain within. If, however, temperatures exceed either the high temperature alarm limit or go below the low temperature alarm limit, the LCD shows a REJECT symbol, indicating the goods require further checking. In this case the indicator stops and cannot be reset, so an irreversible record is generated.

An inspection mark can be recorded once each day to show the indicator has been checked.

An interface cradle is available so trip statistics can be downloaded and saved for analysis in the freely available companion software LogTag Analyzer, including trip duration, minimum and maximum temperatures, inspection marks and exposure to levels outside the alarm limits.

Up to three days of real time logged temperature data before and after the alarm trigger are available for further analysis [1].

Alerts

Once the TICT *iS0°Tag*® is started, the indicator provides a visual status on the display, indicating OK (☑) or Reject (☒) throughout transport and storage.

The indicator stops once any of the two alarms are triggered. Detailed information regarding temperature and time exposure during transportation and storage is made available via download in LogTag Analyzer.
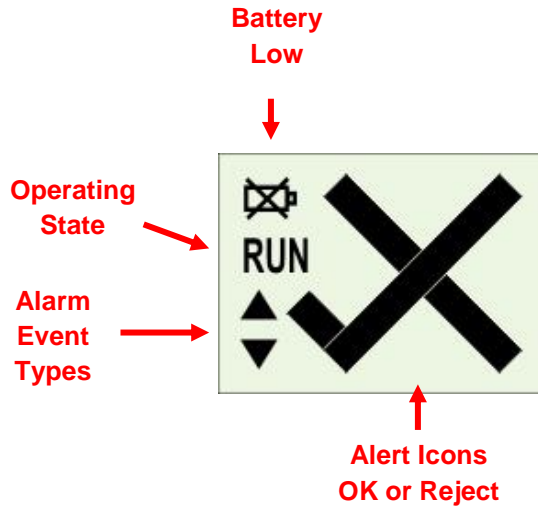
The two alarm limits are factory pre-set. Custom configurations can be ordered, allowing clients to select different alarm limit values (one upper and one lower) and alert event options such as instant or delayed reject alerts. Note the lower alarm cannot be disabled.

Stored Statistics

Statistics are collected and stored on a daily basis and can be downloaded using LogTag Analyzer.

- Run time for the trip (days, hours, minutes). Each day represents a period of 24 hours from 0:00:00 to 23:59:59. Day 1 begins when the Indicator starts monitoring. A new day starts when the internal clock advances from 23:59:59 to 0:00:00.
- Maximum temperature reached for each day the indicator was running.
- Minimum temperature reached for each day the indicator was running.
- The total accumulative time above/below for each of the two alarms on each day the indicator was running.
- Up to three days of logged readings (at the sample interval) are stored each before and after the Alarm has triggered.[1]

Display Overview

Battery Low

Operating State

Alarm Event Types

Alert Icons OK or Reject

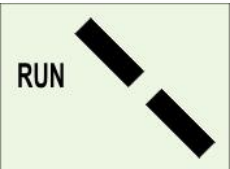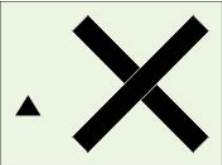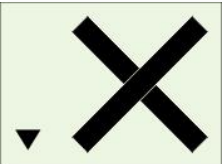| Display item		Description
Alert Indicators	✓	OK icon (☑). No alarms events have been generated; load has not been subjected to temperatures outside specified limits.
	✗	Reject alert icon (☒). Alarm event has been generated, as temperatures have been outside specified temperature limits; load needs to be checked.
Alarm Event Types	▲ (High Temperature) ▼ (Low Temperature)	Each of the alarm event types are factory pre-set. If an alarm event is enabled and the temperatures monitored generate an alarm, the alert will change from OK ☑ to Reject ☒ and the alarm type will be displayed. When an Alarm has trigged the Reject ☒ icon will be displayed and the indicator will continue to run collecting statistics for 1 more day.
Battery Condition	📵	Displayed when the battery test reports low, the unit will stop monitoring.
Operation	RUN	**Waiting to be started:-** Press and hold the START button will quickly flash the RUN icon (no other segments will be displayed). Releasing the button once the RUN icon stops flashing will start the indicator.
	RUN ✓ RUN ▼ ✗	**Running:-** The Indicator is running and temperature readings are taken. The display shows the alert indicators (OK ☑ or Reject ☒) and the statistical information is updated every sampling interval and stored every 24 hours. The RUN icon will briefly flash every 2 seconds (heart beat) while running.
	📵 ✓ ▼ ✗	**Stopped:-** The indicator has been stopped; stored statistics can now be downloaded. Indicator stopped due to low battery (📵 & ☑). Indicator stopped due to a Lower Alarm trigger (☒).

Operation

1. Starting the Indicator

✉	The TICT *iS0°Tag*® Indicator is shipped in a state of low energy consumption (hibernation) to maximise battery life. Pressing the START/MARK button ⊙ will wake up the Indicator. It will either briefly display the **RUN** symbol, if the battery is OK, or the **Battery Low** symbol for 30 seconds, if the battery is low. If the button is not pressed again during that time, the display will turn off and the Indicator will re-enter hibernation. An Indicator with a low battery cannot be started.
☀RUN☀	To start the Indicator, press and hold the START/MARK button for 4 seconds ⊙ 4 sec **RUN** will flash. When **RUN** is permanently lit, release the button within 2 seconds. ⊘ <2 sec The Indicator will start taking temperatures immediately, unless a Start Delay is configured. The display will briefly turn off and on.

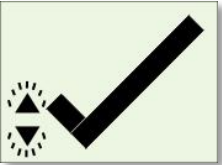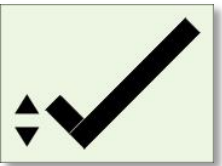## 2. Start Delay

RUN ╱
 	
RUN ╲
	The indicator can be configured so it does not start taking temperatures immediately, but only after a start delay time has passed. This delay allows the indicator to acclimatise to the temperature of the load, so it does not trigger an Alert too early. This is particularly important if a High Alarm has been configured The display will show alternating ╱ and ╲ symbols during this Start Delay period.
	
	The speed at which the symbols change is dependent on how much time is left until the indicator starts:
	
	    More than 5 minutes left to indicator start - slow change
	
	    Less than 5 minutes, but more than 1 minute to indicator start – fast change
	
	    Less than 1 minute left – very fast change
	
	If the selected factory pre-set profile does not have a start delay enabled, the Indicator will start taking temperatures immediately.

3. Indicator running

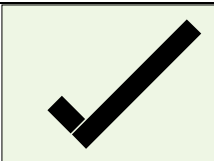|	
RUN ✔	As soon as the Indicator starts, temperature readings are taken according to the sample interval defined in the factory pre-set profile.
	As long as the temperature readings stay within the limits defined by the two pre-set alarm events, the OK Alert (☑) is displayed.
	The **RUN** symbol will flash approx. every 4 seconds.
▲ ✘ Upper alarm event was generated ▼ ✘ Lower alarm event was generated	If an alarm event is generated, the Reject Symbol (☒) is displayed.
	Depending on the factory pre-set profile, a lower only, or lower and upper alarm event types are enabled.
	Upper or lower alarm events are generated when recorded temperatures exceed the limit for a specified number of readings.
	Alarm events can be generated for example by a single temperature above (below) the limit, or by a number of sequential or accumulated readings above (below) the temperature limit. The alarm event types are independent of each other and are defined in the factory pre-set profile.

4. Placing a MARK in the Indicator statistics table

The TICT *iS0°Tag*® can store a **MARK** in the statistic table for each day; this can be used to indicate the start of another trip or that a visual check of the indicator has been conducted. It will be displayed in LogTag® Analyzer software once downloaded. Although only one mark per day is possible in the statistics table, each real time reading can be marked individually, once the indicator has registered an alarm.

▲▼ ✔	To place a **MARK** in the Indicator statistics table, press and hold the START/MARK button for 2 seconds ◎ 2 sec ⏱ ▲ and ▼ will flash together.
▲▼ ✔	When ▲ and ▼ are permanently on, release the button within 2 seconds. ⊘ <2 sec ⏱ A **MARK** will now be placed into the statistics table.

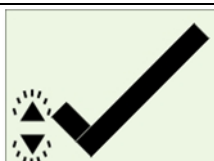|	
✓	2 sec ⊘ ⊘ The MARK will not be placed if you continue to hold the button after ▲ and ▼ are permanently on, until both arrows turn off. This is useful if you have started to press the button, but do not want to proceed with placing the MARK. In either case the display will revert to showing the RUN symbol. NOTE: The **RUN** may flash if **STOP** button is enabled, releasing the button while **RUN** is flashing will place a **MARK** into the statistic table.
⦂RUN⦂ ▲ ▼ ✓	

5. Stopping the Indicator

The Indicator will automatically stop:

- after one of the pre-defined alarm events has triggered an alarm or
- a period of three years has elapsed
  30 days before the end of the 3 year period the low battery symbol will light, signalling that the Indicator requires replacing.
- 30 days after a battery test has recorded "low"
  The battery voltage is measured every 2 hours. The low battery symbol will light once the battery test reads a low battery, and the indicator will stop recording after 30 days, signalling that the Indicator requires replacing
- when the summary statistics are downloaded with LogTag Analyzer.

After that, no additional readings will be taken or processed, and it is not possible to start the indicator again.

The Indicator can also be configured so it can be manually stopped via the Button:-

▲ ▼ ✓	If this feature is enabled, stop the Indicator by pressing and holding the START/MARK button for 4 seconds: 2 sec ⊘ ⊘ ▲ and ▼ will flash together for 2 seconds followed by
⦂RUN⦂ ▲ ▼ ✓	2 sec ⊘ ⊘ **RUN** will flash for another 2 seconds. Release the button once **RUN** stops flashing.
RUN ✓	The Indicator will now stop and no further readings will be taken.

TICT *iS0°Tag*® Factory Pre-sets

LogTag® TICT *iS0°Tag*® Indicators cannot be client configured, but instead are purchased with one of a number of different factory configuration profiles pre-installed. If a default configuration does not suit, customers can compile their own profile by specifying the parameters in the table below when ordering. Please note that minimum order quantities apply for TICT *iS0°Tag*® units with profiles not stocked by LogTag®.

The default configuration profile is called "Profile 0002"; each custom configuration is assigned a different profile number which can be used for ordering.

Description		Profile 0002 (default)	Range / Option	Requirement
Maximum Days (Maximum number of days to monitor)		1096 (3 years)	30-1096 days	
Start Delay		0 minutes	0 to 255 minutes	
Sampling interval		5 minutes	5 to 15 minutes*	
Allow stop via Stop button		Disabled	Enabled or disabled	
▲ (High Temperature)	Monitor this alarm	Disabled	Enabled or disabled	
	Temperature limit value	N/A	-5°C to 60°C (-13°F to 140°F)	
	Alarm activation	N/A	instant, accumulated or consecutive**	
	Activation delay time***	N/A	5 minutes to 45 days	
▼ (Low Temperature)	Monitor this alarm	enabled	enabled	enabled
	Temperature limit value	-0.5°C	-5°C to 60°C (31.1°F to 140°F)	
	Alarm activation	Consecutive	instant, accumulated or consecutive**	
	Activation delay time***	1 hour	5 minutes to 12 hours	

*   Preferred intervals are 5, 6, 10, 12 and 15 minutes

**   Instant = one temperature reading is above/below limit; consecutive = temperature readings are above/below limit for the time defined in the activation delay time without interruption (single event); accumulative = temperature readings above/below limit for a total of time defined in the Activation delay time, but may not necessarily be sequential.

*** Delay times for alarm activations must be in multiples of the sampling interval.

Product Specifications

LogTag® Part Code	TICT *iS0°Tag*®-xxxx (xxxx = factory pre-set profile number)
Operating Temperature Range	-25.0°C to +60.0°C (-13.0°F to +140.0°F)
Ambient humidity range during transport and use	0% to 95%RH
Resolution	0.1°C or better in range of -25°C to +60°C (temperature shown after download)
Accuracy	±0.5°C (±1.5°F) or better for -10°C to +25°C (+14°F to +77°F). ±1.0°C (±2.0°F) or better for range of -25°C to -10°C (-13°F to +14°F). ±1.0°C (±2.0°F) or better for range of +25°C to +60°C (+77°F to +140°F).
Capacity	Minimum & Maximum temperature for each day up to 3 years, the total accumulative time in excursion for each day plus one MARK button press per day. 540 real time temperature readings [1]. Please note the TICT *iS0°Tag*® does not store each individual temperature reading taken over the whole trip.
Memory type	Non volatile.
Sampling Interval	Factory pre-set between 5 and 15 minutes; 5 minute interval for profile 0002
Recordings	Up to 1096 day statistics, min/max temperature/time and accumulated excursion duration for each alarm for each day. One mark entry per day. Up to 540 real time readings are stored on an alarm activation[1].
Start delay	0 - 255 minutes (value of zero disables the start delay).
Sensor	Precision electronic thermistor
Sensor Reaction time	T90 less than 7 minutes by method detailed in EN12830:1999
Vibration	Withstands vibration specification as detailed in EN12830:1999
Shock	Withstands shock specification as detailed in EN12830:1999 Withstand 5 drops 1m to smooth concrete floor without loss of function or calibration.
Environmental	IEC 60529: IP64
Resistance to Electrical Storms	Designed to resist the effects of intense electrical storms.
Power source	Internal 3V Lithium Li-Mg – non replaceable
Battery life	3 years (includes storage, operating time and minimum accessibility period after 'stop').
Size	71.5mm(W) x 33.0mm(H) x 8.6mm(T)
Weight	19g.
Case Material	Polycarbonate
Warranty	One year replaceable warranty against defects in materials and workmanship from the date of purchase. Excludes misuse or abuse of the product or as a result of unauthorized alteration or repairs.
Calibration	Certificate of Traceability and Calibration to ISO/IEC17025 available on request.
EMC compliance	EC EMC directives (EN 61000-6-1:2005 & EN 61000-6-3:2006) Including electrostatic discharge as prescribed in EN 61000-4-2. Complies with FCC Part 15 Subparts A and B.
Alarm events	Two factory pre-set alarm events, one over temperature (optional) and one under temperature (always enabled). Each alarm event can be instant reject or accumulative/consecutive reject.
Alert indication	OK ☑ = Temperature has remained within the alarm limits. Reject ☒ = Alarm event has been generated

---

[1] up to 270 readings before and up to 270 readings after an alarm event are stored at the sample interval. For 270 readings to be stored before the alarm was triggered, the iS0°Tag® has to be running at least for the time covered by [270 x sample interval] before the alarm was triggered. For 270 readings to be stored after alarm activation, the iS0°Tag® must not be stopped by downloading or using the START/MARK button.