

ICL v2 Quick Start Guide (CONFIDENTIAL)

REVISION HISTORY

Version	Publish Date	Author(s)	Comment
1.0	2020/12/23	Amelie Sarragozi	Initial version for EVT phase.
2.0	07/30/2020	Amelie Sarragozi	Edited activation. Edited results. Added configuration part.
2.1	09/22/2020	Amelie Sarragozi	Added mounting
2.2	2024/05/21	Yunny Hsueh	Added Safety Precautions, Service & Support, Copyright Information and Limitation of Liability. Revised the content and updated the layout and style.
2.3	2024/12/20	Emily Chiao	Add FCC Statement

New changes in the latest version appear in **Red**.

CE MARKING



FCC STATEMENT

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and a human body.

This device has been tested with the supplied antenna listed below. Use of other antennas may result in non-compliance with FCC regulations. Any antenna used with this device must be of the same type and have a gain not exceeding that tested for compliance.

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Aristotle	RFA-S89-T355-2.5M-R2	PIFA	2.15dBi

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

SAFETY PRECAUTIONS

The following safety precautions will increase the life of the device and keep the operators safe. Except as specifically explained in this manual, refer all servicing to qualified personnel.

 DO NOT operate the device next to flammable gas.	 DO NOT place the device near a heat source.
 DO NOT spill food or liquid on the device.	 DO NOT let children play with the device and its parts.
 DO NOT attempt to disassemble, repair, or modify the device without following the instructions.	 Incorrect installation of battery may cause explosion and damage the device.

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1. INTRODUCTION

1.1. Purpose of the Document

This document aims to guide you through the initialization process of the IceConnect device, referred to as ICL.

1.2. Project Description

The ICL allows the tracking and monitoring of fridges through Sigfox technology. Coming with several accessories such as a CT clamp, a probe PT100 and a Sigfox/Wifi antenna, it is designed to be screwed into the fridge shelf and installed accordingly to measure the necessary data.

It is programmed to send the geolocation of the fridge at regular intervals if it has moved since the last transmission. Its core feature is the precise temperature measurement inside the fridge coupled with the detection of anomalies thanks to the probe and the defined thresholds.

The ICL settings can be edited remotely thanks to the downlink (DL) messages. Powered by battery, it is designed to last 2 years following a specific scenario of the number of messages per day. Moreover, it has been designed to be outdoor resistant, as it has passed the IPX5 (Water pressure) certification.

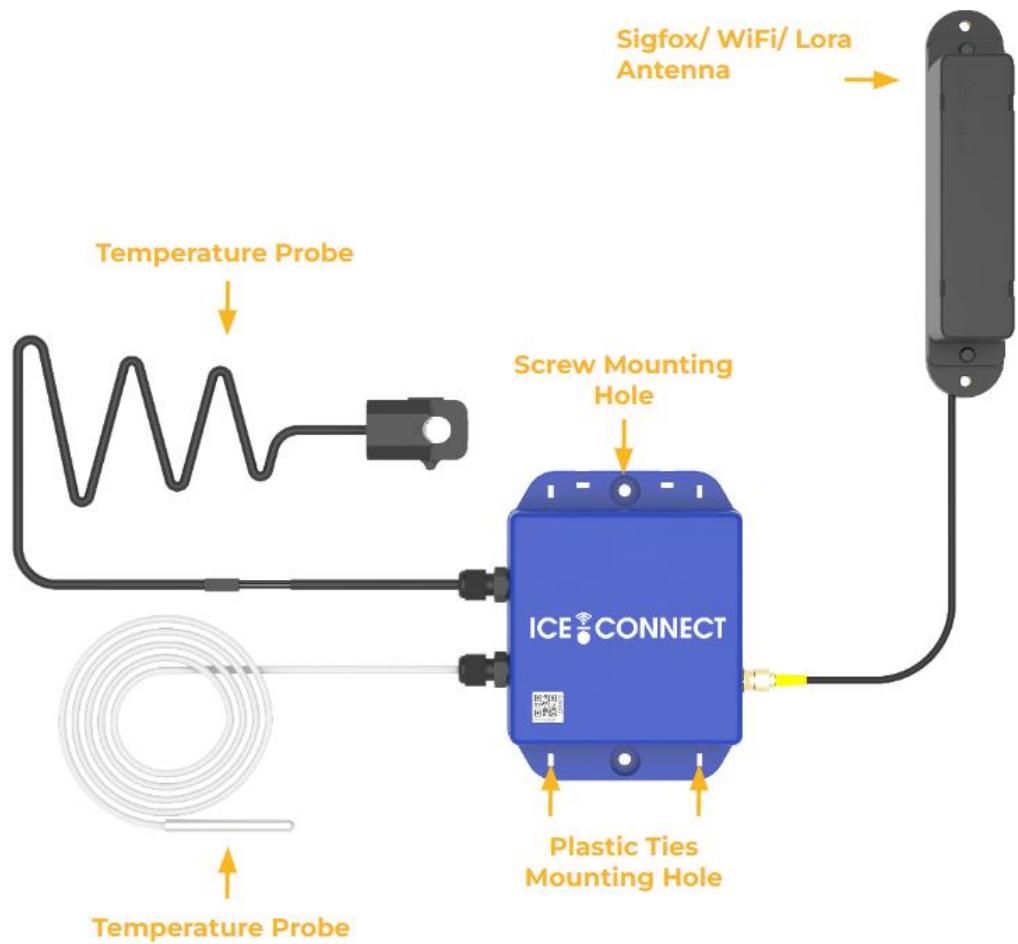
1.3. ICL v2 Overview



Packing Box:

- 1x ICL v2 device
- 1x External antenna
- 1x CT Clamp
- 4x screws bag (M3x6)

Overview:



2. INITIALIZATION

After being manufactured, the ICLv2 is shipped with:

- Batteries inside the device but not connected.
- CT clamp and screws in the box but not connected to the device.

It is mandatory to follow the safety precautions and the instructions to receive messages from your ICL v2.

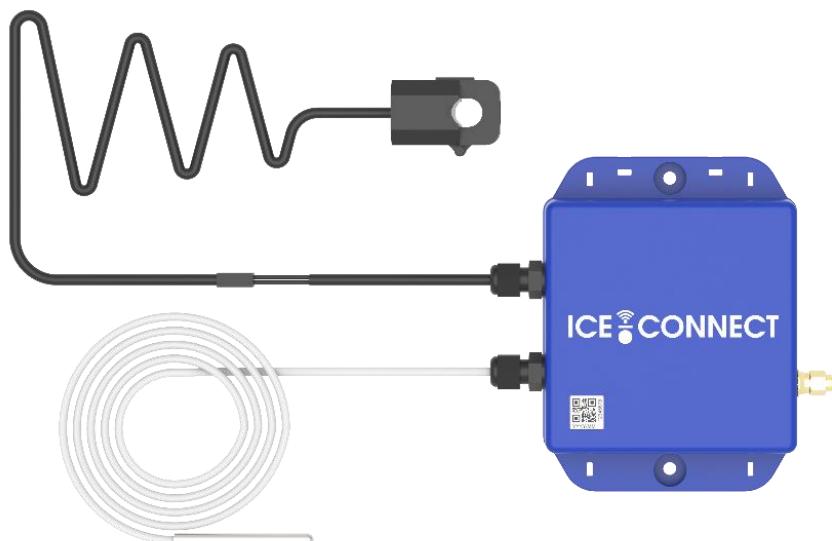
2.1. Activating Your Device

To activate your device, you would need to finish the assembly of the device:

- Assemble the accessories
- Connect the battery
- Assemble the covers

2.1.1. Assembling the Accessories

1. Probe is already connected to the device. Connect the **CT clamp** male cable to the female cable going out of the ICL.



2. Screw the **external antenna** to the SMA connector.



2.1.2. Connecting the Battery

1. Insert the battery connector in the DC connector.



2. Put the cable aside from the battery.



3. Make sure the LED on the PCBA blinks green. It means the initialization of all components has succeeded. If it blinks red, try to connect the battery again.



2.1.3. Assembling the Covers

1. Place the top cover and the bottom cover aligned.
The certification logo on the bottom cover should be in the bottom right corner.



2. Fix the bottom cover to the top cover using 4 screws and the screwdriver with a torque equal to 7kgf*cm.



2.2. Mounting Your Device

It is preconized to mount the ICL horizontally for battery impact, it can be mounted vertically as well; in both cases, the battery life can reach 2 years minimum. The ICL can be placed above 2m in height.

2.2.1. Flat Surface



You may use **screws** to mount the ICL onto any flat surface. There are two holes for screws on the two wings of the ICL.

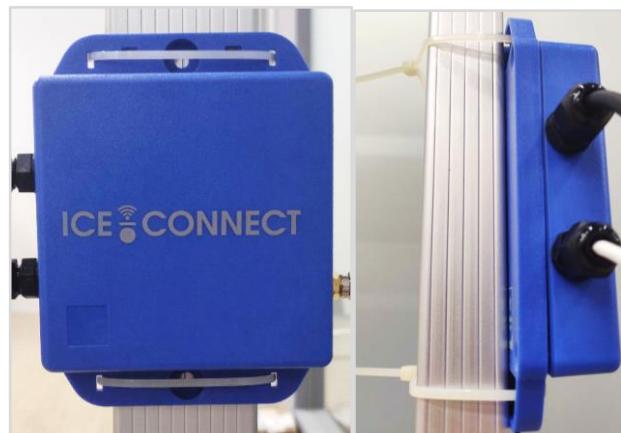
💡 Advised size of screws: M3x10



2.2.2. Cylindrical Surface



You may use the **plastic ties** to mount the ICL onto cylindrical surface. There are two rectangular holes for the plastic ties on the wings of the ICL.



2.2.3. Accessories

After mounting the device, the accessories must be placed at the right place.

Temperature Probe

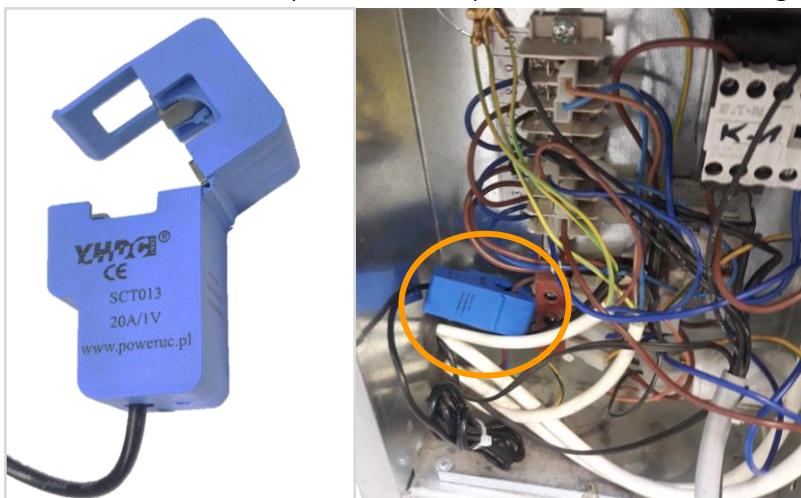
The temperature probe must be placed inside the fridge to measure the correct data.



CT Clamp

The CT clamp must be closed around the power cable of the fridge to measure the current of the fridge.

1. Unclip the CT clamp.
2. Close the CT clamp around the power cable of the fridge.



Antenna

The antenna location is critical as it will influence its performance. To reach the best antenna performance, it is advised to place the antenna under the following environment:

- On top of the fridge
- Placed horizontally
- No metal above or around the antenna (only below is accepted)



After installing the accessories, you may use the plastic ties to gather and attach the remaining cables around the two small holes on the wings of the ICL.



2.3. Receiving Your First Message

When the ICL is successfully activated and assembled, it will send several messages:

2.3.1. Location Message

The first action done by the ICL is to get its location and send it via an uplink message M2 or M3 to the cloud. (Refer to IceConnect v2 Technical Specification v1.3 for more information about the types of messages.)

The location sent as 1 or 2 MAC addresses is visible on Sigfox backend, or on any web application linked to Sigfox backend.

2.3.2. Downlink Message

After sending the location message, the ICL requests the cloud for the downlink message. The cloud must answer the downlink message, if the configuration is different than the default configuration, it is updated into the ICL. If no update, the ICL stays with the default configuration.

After the first downlink message, the next one is done after the Downlink interval defined in the configuration.

Example: Sigfox backend visualization

DEVICE	DEVICE TYPE	USER	GROUP									
Device 11CEC64 - Messages												
				2020-07-20 17:32:27	2.3	1294	631101c107fd0a0005813c	EBF0	-57.00	30.00	868.1197	3/3
				2020-07-20 17:32:24	2.6	1293	090000000000000041 Temp: 0.0 °C VDD idler: 0.000 V VDD tx: 0.000 V RSSI: -35.0	F076	-124.00	27.91	868.7826	1
				2020-07-20 17:31:49	1.9	1292	Downlink request 5311012300109260	EBF0	-67.00	30.00	868.1652	1
				2020-07-20 17:31:43	1.4	1291	Location payload 40b076c0f6d0d847327cb77e	F076	-121.00	30.00	868.7272	3/3
								EBF0	-57.00	30.00	868.1210	3/3
								F076	-57.00	30.00	868.1202	2/3
											Purge all messages	

3. CONFIGURATION

The ICL onboards several parameters that can be defined by the user through the web platform. Find below the table of all the parameters and associated default values.

Variable	Name	Default Value	Range	Unit
Temperature Report Interval	TRI	18min	11-18min	1min
	The interval between each temperature uplink message reporting the different measures taken.			
Temperature Measure Interval	TMI	2min	2-18min	1min
	The interval between each temperature measure.			
Temperature Alarm Report Delay	TARD	30min	0-120min	1min
	The delay to wait when a temperature measure is exceeding one threshold before sending an alarm. If after TARD, the temperature is still exceeding the threshold, the alarm is sent, if not, it is canceled.			
Location Report Interval	LRI	12h	6-24h	6h
	The interval between each location uplink message.			
Clamp Measure Interval	CMI	30min	10-30min	1min
	The interval between each clamp measure.			
Downlink Interval	DI	2/day	1-4DL/day	-
	The interval between each Downlink message.			

(Continued on next page)

Variable	Name	Default Value	Range	Unit
Sleeping Delay	SD	24h	0-24h	1h
	The delay to wait before switching the ICL from Active to Sleeping mode. The clamp value must be under Cmin after the SD is done in order to switch to Sleeping mode.			
Disable Temperature Alarm Delay	DTAD	60min	0-24h	10min
	The delay to wait before activating the temperature alarm when the ICL switches from Sleeping to Active mode.			
Minimum Fridge Power Threshold	Cmin	0W	0-3600W	10W
	The clamp minimum threshold value.			
Maximum Temperature Threshold	Tmax	10°C	-40 / 100 °C	1°C
	The temperature maximum threshold value.			
Minimum Temperature Threshold	Tmin	-3°C	-40°C/100 °C	1°C
	The temperature minimum threshold value.			
Fridge Type	FridgeT	0	0 or 1	-
	This variable determines the possible mode(s) of the ICL. <ul style="list-style-type: none"> • ridgeT=0 means the ICL uses the CT clamp and can switch between Active and Sleeping modes. • ridgeT=1 means the ICL does not use the CT Clamp, and only works in Active mode. 			

SERVICE & SUPPORT

For any assistance or further information:

- Contact us through support.tw@unabiz.com
- Submit a ticket via [Service Desk](#)

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