



# User Guide - TEMP - LoRaWAN EU863-870

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# PRODUCTS AND REGULATORY INFORMATION



This document applies to the following products :

**TEMP IP68 LoRaWAN 863-870 ambient probe and remote probe**

**TEMP IP68 LoRaWAN 863-870 two external probes**

**Part number:**

ARF8180BCA

ARF8180BCB

**Firmware version:**

RTU version: V02.00.01

APP version: V02.01.00

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DOCUMENTATION GUIDE

PREAMBLE

DISCLAIMER

TECHNICAL SUPPORT

RECOMMENDATIONS

INTRODUCTION

[https://s3-us-west-2.amazonaws.com/secure.notion-static.com/d0283b1e-df27-4863-87a5-1481351a9482/EU\\_declaration\\_of\\_conformity\(\\_TEMP\\_LoRaWAN\\_ARF8180xx\).pdf](https://s3-us-west-2.amazonaws.com/secure.notion-static.com/d0283b1e-df27-4863-87a5-1481351a9482/EU_declaration_of_conformity(_TEMP_LoRaWAN_ARF8180xx).pdf)

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# 1. . PRODUCT PRESENTATION

**IMPORTANT NOTE:** The TEMP V4 IP68 LoRaWAN 863-870 can be started with a magnet or switching the product in PRODUCTION mode using the IoT Configurator.

Description :

- The Adeunis LoRaWAN TEMP is a ready-to-use radio device enabling temperatures to be measured and transmitted by wireless communication network
- This product exists in 2 versions: one including an ambient probe and a remote probe and a second one with two remote probes.
- These two products answer the users need to monitor the temperature (ambient or contact) of a storage room, cold room or all rooms needing a product able to withstand more or less harsh environment.
- The use of the LoRaWAN protocol allows the user to integrate the TEMP V4 IP68 LoRaWAN 863-870 into any network that is already deployed.
- The product emits the data from the sensors either periodically or in an event-based way based on top and/or bottom thresholds.
- The configuration of the transmitter is accessible by the user via a micro-USB port or via the network, allowing in particular a choice of modes of transmission, periodicity or triggering thresholds.
- The TEMP V4 IP68 LoRaWAN 863-870 is powered by a replaceable internal battery and/or an external supply.
- The product is compatible with the Class C of the LoRaWAN Network and can be used as a Class C product but only if it is powered by an external supply.

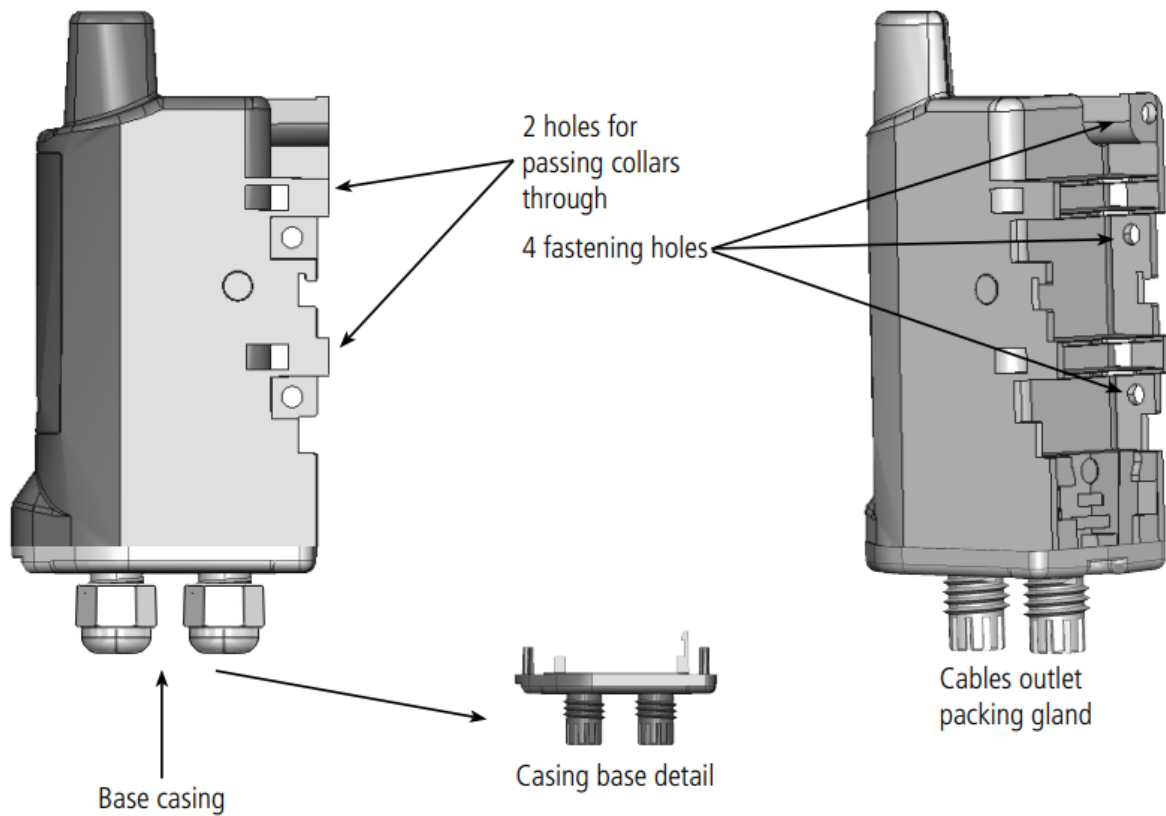
**IMPORTANT NOTE :** The LoRaWAN TEMP is delivered by default with OTAA configuration, allowing the user to declare the product to a LoRaWAN operator.

Composition of the package

The product is supplied in a cardboard box containing the following items:

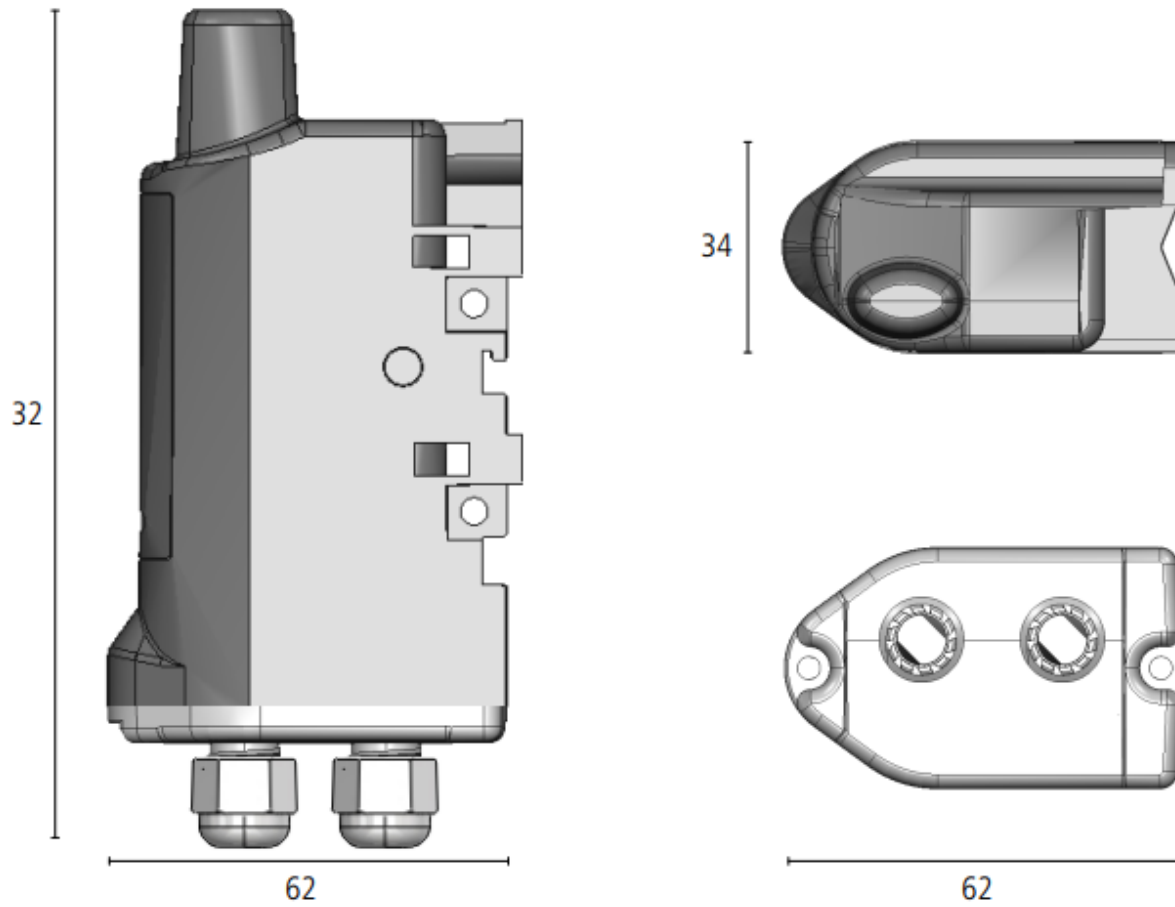
top casing, electronic card, casing base plate, 2 screws for the plate, cable gland, 3 gland seals, 2 CBLZ 2.2 x 19mm screws, 2 Fischer SX4 plugs, Removable LiSOC12 FANSO (battery-pack ER18505H+W36+51021)

## 1.1. General description

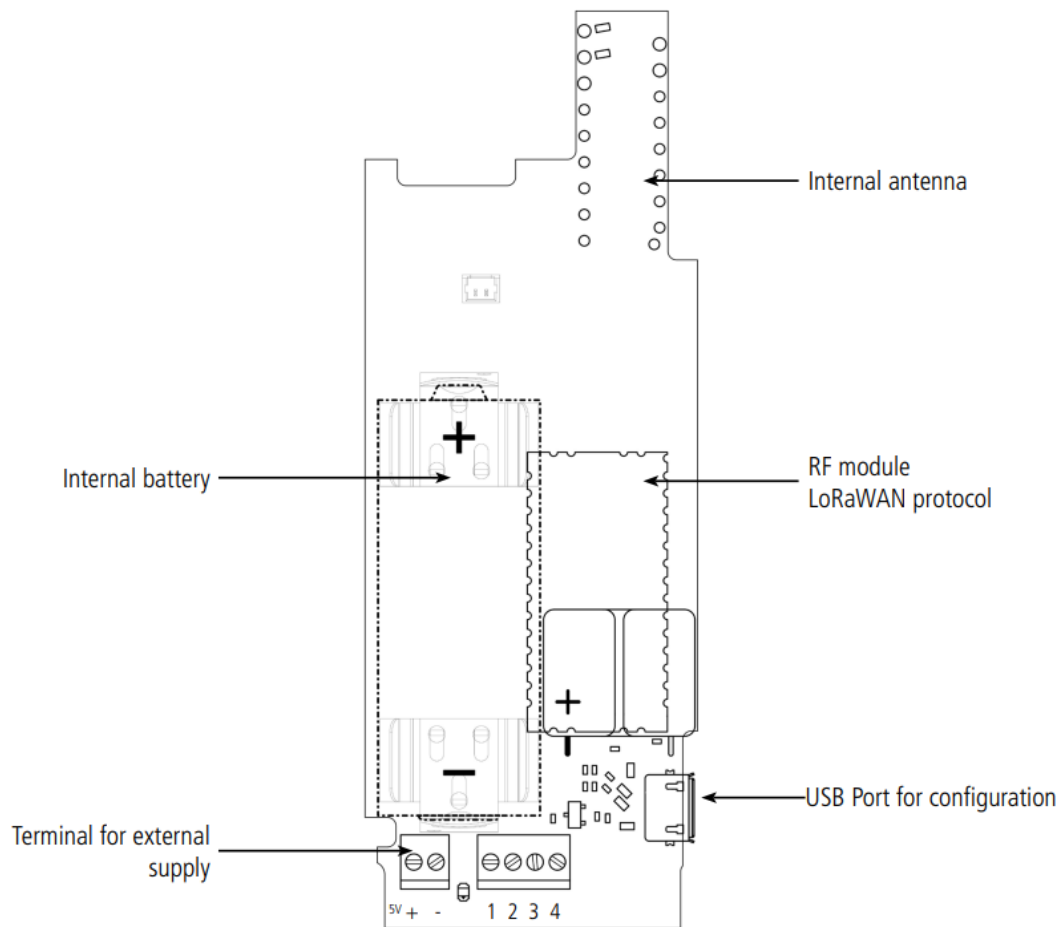


## 1.2. Dimensions

Values in millimeters

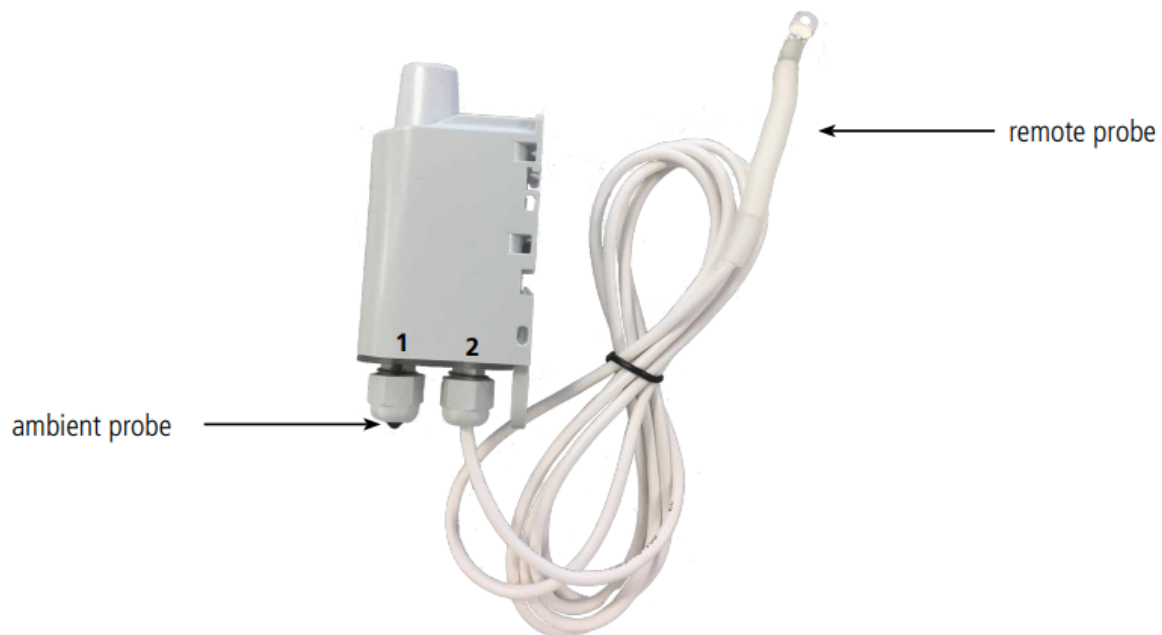


### 1.3. Electronic board



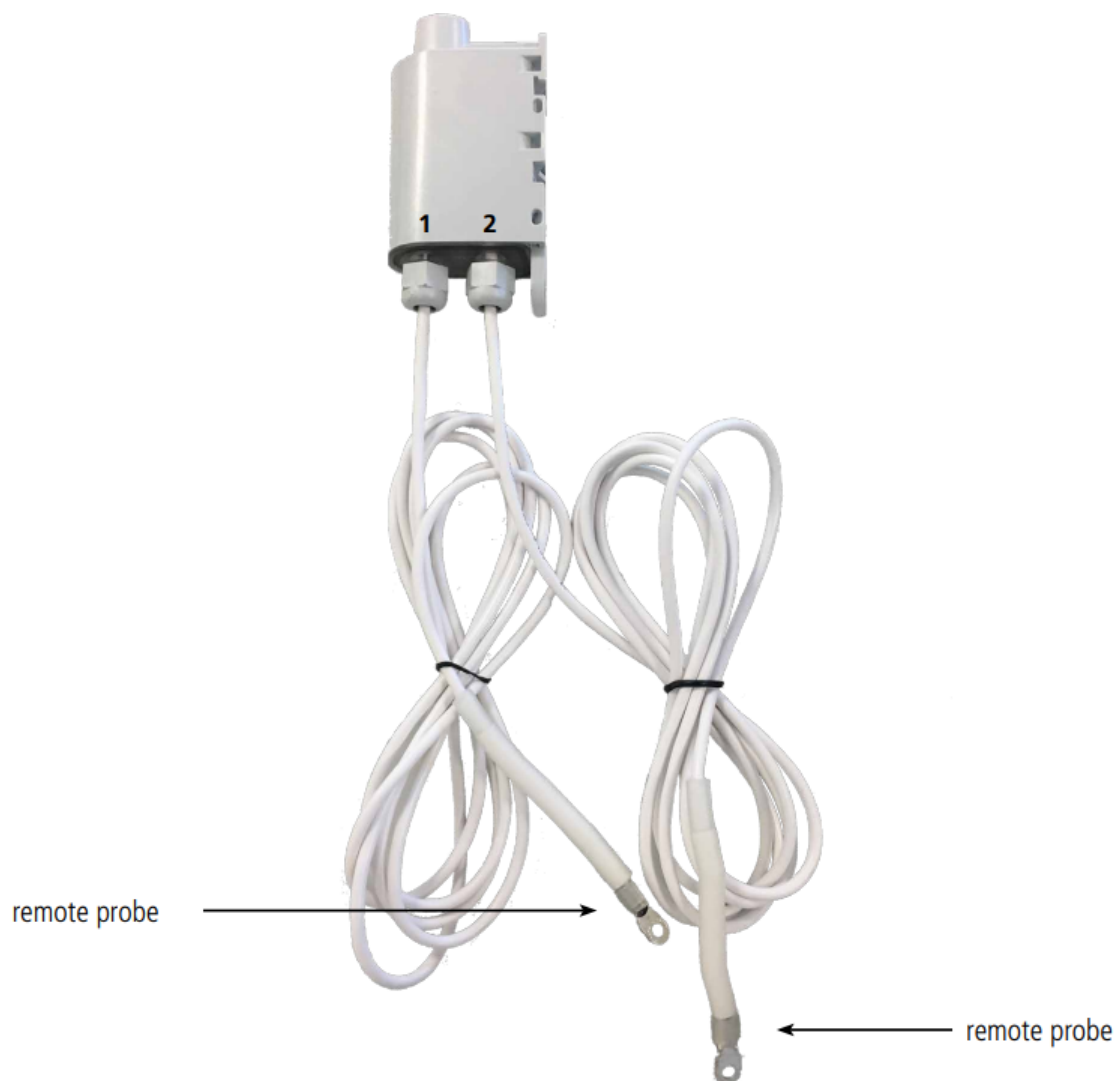
## 2.4. Two versions of the product

Product with ambient probe and remote probe:





Product with two external probes:



## 1.5. Technical specifications

### 1.5.1 General characteristics

Parameters	Value
Working temperature	-25°C / +70°C
Dimensions	132 x 62 x 34mm
Weight	148g 1 Remote probe, 185g 2 remote probes
Casing	IP 68
Radio standards	EN300220-1 et EN300220-2
LoRaWAN network	EU863-870
LoRaWAN class	Class A and Class C (if power by external supply)

Parameters	Value
Max power transmission	14 dBm
Applicative port number (downlink)	1
Daily clock drift at 25°C	5 to 7 seconds

## 1.5.2 Electric characteristics

Supply	Characteristics	Value	Unit
Battery FANSO ER18505H+W36mm+51021 connector :	Voltage	3.6	V
Battery FANSO ER18505H+W36mm+51021 connector :	Current max	150	mA
External :	Input range	4.5 to 6.5	V
External :	Current max	110	mA
USB	Tension	5	V
USB	Courent max	110	mA

The external power supply chosen must comply with the above electrical characteristics and must conform to the standards EN/IEC 62368-1 and EN 61000-3-2, EN 61000-4-2, EN 61000-4-4, EN 61000-4-5.

Example of reference tested by adeunis and functional with the product by cutting the wires: GS05E-USB - Wall Mount AC Adapters 5W 5V 1A W/Euro Plug WallMount USB Output from Mean well.

## 1.5.3 Probes characteristics

Characteristics	
Ambient probe - temperature range	[-25°C /+70°C]
Remote probe - sensor temperature range	55°C..+155°C
Remote probe - wire temperature range	30°C+105°C
Remote probe - wire length	2m
Precision [0°C/+60°C]	+/- 0,2°C
Precision [-35°C/0°C]	+/- 0,5°C

Characteristics	
Precision [-55°C/-35°C]	-0,6 /+0,8°C
Precision [+60°C/105°C]	+/- 2°C

CAUTION: Allow a few minutes for the probe to come back to room temperature before any manual operations to avoid mechanical damages. In addition, please respect the minimum and maximum temperatures for the sensor and the wire (cf. Table here-above).

## 1.5.4 Autonomy

### Usage conditions :

Product in stock : maximum 1 year.

Calculations done for a temperature of 20°C.

Nb of frame per day	Event per day	Autonomy (years) SF7	Autonomy (years) SF12
2	0	> 10	> 10
2	10	> 10	> 10
24	0	> 10	6.1
24	10	> 10	4.5
48	0	> 10	3.3
48	10	> 10	2.8
144	0	> 10	1.2
144	10	> 10	1.1

Values above are estimations done under certain conditions of use and environment. They do not represent in any case a commitment on the part of Adeunis.

## 1.5.5 Environmental conditions and ingress protection

The casing of the TEMP V4 IP68 LoRaWAN 863-870 has been tested to ensure a certain level of dust and water protection.

- For dust: level 6 guarantees complete sealing against
- For water: level 8 guarantees at least a complete waterproof casing for more than 1 hour in one meter deep.

The tests carried out by Adeunis for the immersion were under the following conditions: immersion for 10 hours at a depth of 1 meter in water at room temperature (around 20 ° C) followed by an immersion for one hour in water at 60 °C.

We can therefore guarantee the waterproofness of our IP68 case for immersions less than or equal to these times. Any use of our sensor outside the criteria mentioned above cannot be guaranteed by Adeunis.

**Important:** the degree of protection IP68 does not, in any way, guarantee protection against condensation linked to ambient humidity and temperature variations. Large variations in temperature and / or prolonged high relative humidity can lead to an early end of product life.

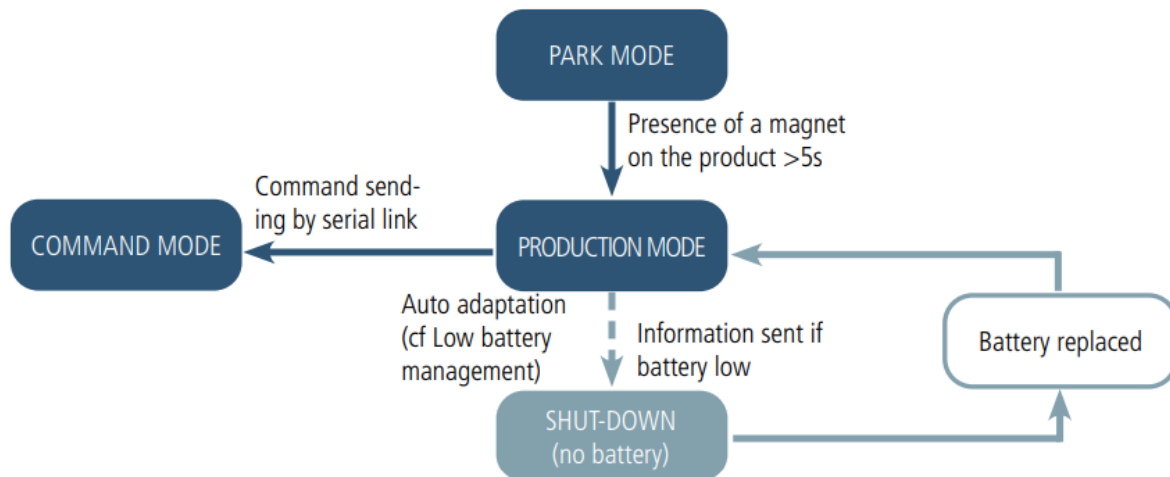
Depending on the mission profile of your product, we advise you to contact us.

## 2. PRODUCT OPERATION

### 2.1. Global operation

IMPORTANT NOTE : Adeunis use the most significant byte first format.

The product has several operating modes:



#### 2.1.1 PARK mode

The product is delivered in PARK mode, it is in standby mode and its consumption is minimal. To switch the product out of the Park\* Mode pass a magnet across it for a duration higher than 5 seconds. The green LED illuminates to indicate the detection

of the magnet and then flashes quickly during the product starting phase. The device then sends its configuration and data frames.

### 2.1.2 COMMAND mode

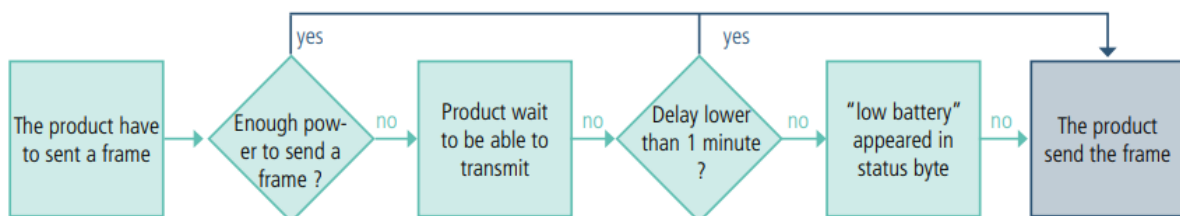
This mode allows the user to configure the registers of the product. To enter in this mode, plug the micro-USB cable and use the IoT configurator or AT command. Exit from command mode is done when USB is disconnected or with an ATO command. The product will return in its previous state, PARK or PRODUCTION.

### 2.1.3 PRODUCTION mode

This mode allows the user to operate the product in its finale use.

### 2.1.4 Low battery management

When the product detect that the battery is not able to deliver the level of power required for a emission (extreme temperature or end-of-life of the battery), it waits to be able to transmit. If it detect that the generated delay is longer than 1 minute, it informs the user activating the “lowbattery” flag in the status byte of each frame sent.



The “battery low” flag is automatically disappearing when the battery is replaced or when temperature conditions are favorable to the proper functioning of the battery.

## 2.2. JOIN process

### 2.2.1 Start-up of the product, JOIN process and configuration

The product start the JOIN process after entering PRODUCTION mode (after the detection of the magnet or after the exit of the command mode).

By default, the device make 10 successive trials, in case of failure the device waits for 12 hours and then restarts the process. This process will be repeated until the device receive an accept from the gateway called Join Accept.

It is possible to configure the JOIN process through the IoT Configurator. With the App you can decide :

- How many trials you want for each authentication attempt,
- The delay maximum between 2 attempts,
- The weighting factor, used to reduce the delay for the first

Registers concerned by the configuration:

- S312: Maximum delay between 2 authentication attempts
- S313: Weighting factor for initial authentication attempts
- S314: Number of tries for each authentication attempt

Example:

Register	Encoding	Value	Result
S312	0x2A30	10800	The maximum delay between each attempts is 4 hours.
S313	0x04	4	The weighting factor indicated that the first attempt will be spaced by 1 hour, then it will increase after each attempt until it reaches the maximum delay specified in S312.
S314	0x0F	15	Each attempt is composed by 15 successive trials

### 2.2.2 Launch a JOIN process remotely

The product receives a 0x48 downlink frame and restart after a defined delay (indicated in the frame).

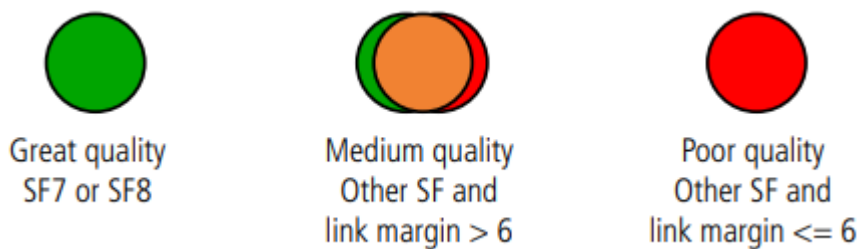
This function of restart enables the device to start a JOIN process remotely. It can be useful for a change of operator or when you have to restart a gateway.

To know the content of the 0x48 frame refers to the Technical Reference Manual (TRM) of the product.

## 2.3. Network quality test

During the JOIN Process, a device configured in Class A OTAA will make a network quality test (patented algorithm). When the test is running the device shows the 2 LEDs green and red simultaneously (from 10 to 20 seconds).

The result of the test is given by the devices after around 20 seconds following the Join Accept. It is visible through the sole thanks to the LED.



With this information the installer know the quality of the network and can move the product to a place with a better coverage.

In any case, the product will send the first frames directly in the SF determined by the result of the test.

## 2.4. Transmission modes

The product allows to measure temperature on 2 probes or 1 probes only, to save the information and to send it according to 3 modes of emission.

	Periodical transmission	Over threshold transmission	Periodical and over threshold transmission
Definition :	The periodical transmission allows the temperature to be collected according to a specified period of time, to be saved and sent on a regular basis for <b>analysis over time</b> .	The over threshold transmission enables to read the temperature according to a specified period of time but to <b>send the alarm frame only if a threshold is over passed</b> .	<b>Mix of the 2 modes</b> to measure temperature regularly in order to be alerted if a threshold is over passed and to save the information to make analysis over time.
Concrete case of usage :	I want to measure my temperature on the 2 probes every 30 minutes. I want to minimize the number of frame per day and to optimize the autonomy so I prefer to send the maximum of data in each frame without losing data.	I want that the product send me an alarm if the temperature is lower than 10°C on probe 1.	I want to know the temperature on the 2 probes along the day and be informed if the temperature go under 10°C on the probe 1. The product will send me a frame twice a day with the temperature measured each hour and an alarm if the temperature is under 10°C on the probe 1.



	Periodical transmission	Over threshold transmission	Periodical and over threshold transmission
Associated configuration :	<ul style="list-style-type: none"> <li>• <b>Sampling period (S321)</b> = 900 (900s x2 =1800 seconds so 30 minutes) •</li> <li>• <b>Number of samples before saving (S320)</b> = 1 (1 saving at each reading) •</li> <li>• <b>Number of saving before transmission (S301)</b> = 12 (12 savings per frame)</li> <li>• Probe 1 alarm (S330) = 0 (alarm disabled) •</li> <li>• Probe 2 alarm (S340) = 0 (alarm disabled)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Sampling period (S321)</b> = 300 (300s x2 =10 minutes) •</li> <li>• <b>Number of saving before transmission (S301)</b> = 0 (no periodical transmission) •</li> <li>• Alarm temperature on probe 1 (S330) = 1 (low threshold) •</li> <li>• Low threshold on probe 1 (S333) = 100 (in tenth of °C) •</li> <li>• Low threshold hysteresis on probe 1 (S334) = 50 (in tenth of °C) the alarm is raised only if my temperature exceeds 15 °C.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Sampling period (S321)</b> = 300 (300s x2 =10 min) •</li> <li>• <b>Number of samples before saving (S320)</b> = 6 (6 x 10 min = 1h) •</li> <li>• <b>Number of saving before transmission (S301)</b> = 12 (12 X 1h = 12h) •</li> <li>• Alarm temperature on probe 1 (S330) = 1 (low threshold) •</li> <li>• Low threshold on probe 1 (S333) = 100 (in tenth of °C) •</li> <li>• Low threshold hysteresis on probe 1 (S334) = 50 (in tenth of °C) the alarm is raised only if my temperature exceeds 15 °C.</li> </ul>
			See here under explanation

WARNING: the number of data per frame depends on the network used. Here the case is available on a LoRaWAN Network.



To program registers, here are the steps to follow depending on the chosen mode.

**In which mode I want my product?**



Example of possible configurations:

Case (no 100% alarm) with 2 probes activated	Associated configuration	Theoretical number of periodical frame sent per day
• Reading/sampling : 10 minutes	• 321 = 300	2 frames
• Historisation : every hour (so each 6 readings)	• 320 = 6	2 frames
• Transmission : twice a days (each 12 historisations)	• 301 = 12	2 frames
• Reading/sampling : 10 minutes	• 321 = 300	12 frames
• Historisation : at each reading	• 320 = 1	12 frames
• Transmission : maximum allowed per frame (here in LoRaWAN 863-870)	• 301 = 12	12 frames
• Reading/sampling : 5 minutes	• 321 = 150	24 frames
• Historisation : every 15 minutes (so each 3 readings)	• 320 = 3	24 frames
• Transmission : every hour (so each 4 historisations)	• 301 = 4	24 frames
• Reading/sampling : each hour	• 321 = 1800	24 frames
• Historisation : at each reading	• 320 = 1	24 frames
• Transmission : at each historisation	• 301 = 1	24 frames
• Reading/sampling : each hour	• 321 = 1800	6 frames
• Historisation : at each e reading	• 320 = 1	6 frames
• Transmission : every 4 hours (so each 4 historisations)	• 301 = 4	6 frames
• Reading/sampling : every 10 seconds	• 321 = 5	144 frames
• Historisation : every minutes (so each 6 readings)	• 320 = 6	144 frames
• Transmission : every 10 minutes (so each 10 historisations)	• 301 = 10	144 frames
• Reading/sampling : every minutes	• 321 = 30	144 frames
• Historisation : at each reading	• 320 = 1	144 frames

Case (no 100% alarm) with 2 probes activated	Associated configuration	Theoretical number of periodical frame sent per day
<ul style="list-style-type: none"> <li>Transmission : every 10 minutes (so each 10 historisations)</li> </ul>	<ul style="list-style-type: none"> <li>301 = 10</li> </ul>	144 frames

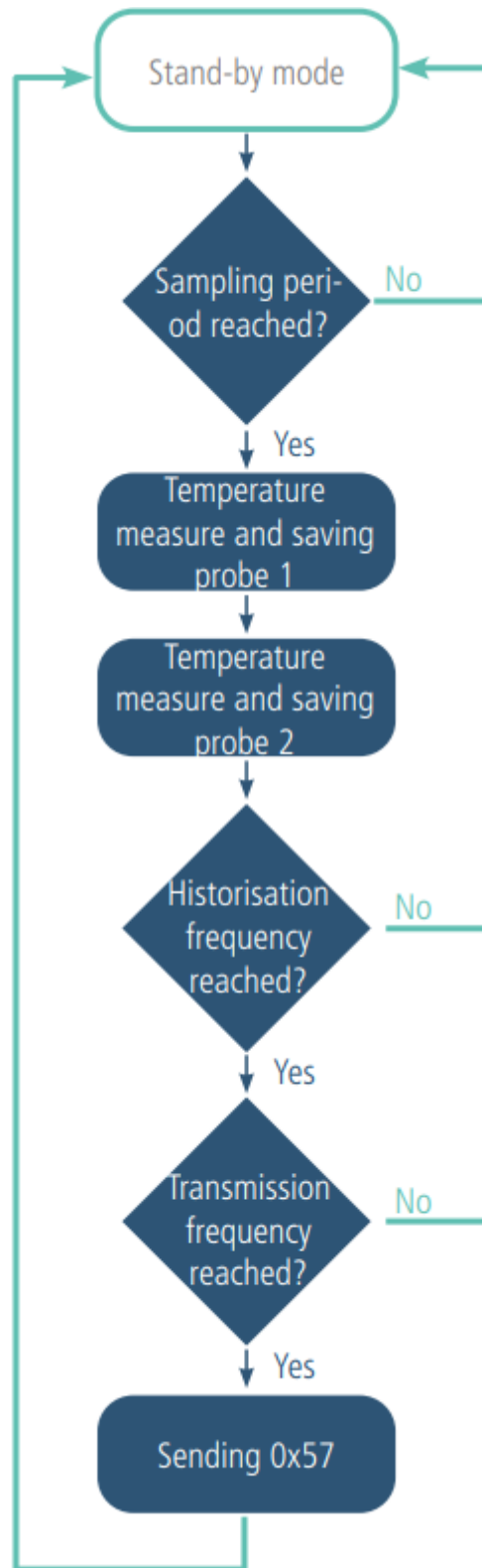
Reminder : In LoRaWAN, the technology enables to have 24 samples per frame (12 samples per probe). If only one probe is activated, it is possible to configure 24 in register S301 without losing data. If the 2 probes are activated, it is mandatory to configure at maximum 12 in the register S301 to not lose data. If there is too much data for the capacity of the frame, the flag “configuration incoherency” will appear in the concerned frame and the oldest samples will be lost.

### 2.4.1 Periodical transmission with or without historisation

The product enables to measure and send the data from the probe following the diagram bellow. This periodical transmission can be done with or without historisation of the data.

The product enables to activate or deactivate a probe. The 0x57 frame will be different depending if 1 or 2 probes are activated. Parameters associated to this mode are:

- Sampling period (register S321), historisation frequency (register S320) and transmission frequency (register S301)
- Activation of the probes (register S324).



Example without historisation :

Register	Encoding	Value	Result
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Register	Encoding	Value	Result
S321	Decimal	1800	1 sample every hour (1800 x 2 seconds = 60 minutes)
S320	Decimal	1	1 historisation for each sample
S301	Decimal	1	1 transmission for each historisation
S324	Decimal	3	The 2 probes are activated

In this example:

- 1 sample (reading) every hour (1800 x 2 seconds = 60 minutes)
- 1 historisation at each sample and the frame is sent immediately (so every hour)
- The 2 probes are activated so the product will read the temperature on the 2 probes every

Example with historisation:

Register	Encoding	Value	Result
S321	Decimal	1800	1 sample every hour (1800 x 2 seconds = 60 minutes)
S320	Decimal	1	1 historisation for each sample
S301	Decimal	12	1 transmission every 12 historisations
S324	Decimal	3	The 2 probes are activated

In this example:

- A sample (reading) every hour (1800x2secondes = 60 minutes)
- An historisation done at each sampling (so every hours)
- A transmission is done every 12 historisations (so every 12 hours, so 2 times a day)
- The 2 probes are activated so the product will read the temperature on the 2 probes every

## 2.4.2 Periodical transmission with redundancy

The product enables to add redundancy in the frame sent (cf diagram bellow).

Thanks to the redundancy the product will save samples locally in order to resend them in the next frame.

Parameters associated to this mode:

- Sampling period (register 321), historisation frequency (register 320) and transmission frequency (register 301)
- Activation of the probes (register 324).
- Number of samples to be repeated from a frame to another (register 323).

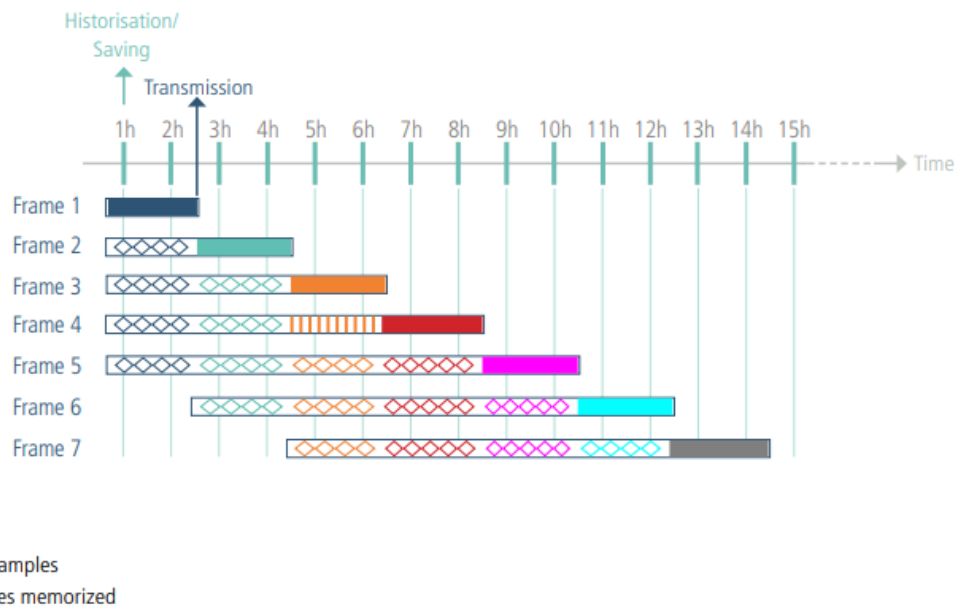
When redundancy is activated, the frame will contain the number of bytes corresponding to the total number of samples, so S301+S323. At the start-up of the product, bytes assigned to the redundant samples will be filled with zeros as long as there is no memorized samples.

Example with redundancy:

Register	Encoding	Value	Result
S321	Decimal	1800	A sample every hour (1800 x 2 seconds = 60 minutes)
S320	Decimal	1	1 historisation at each sampling
S301	Decimal	2	1 transmission every 2 historisations
S324	Decimal	3	The 2 probes are activated
S323	Decimal	4	4 samples are repeated in each frame

In this example:

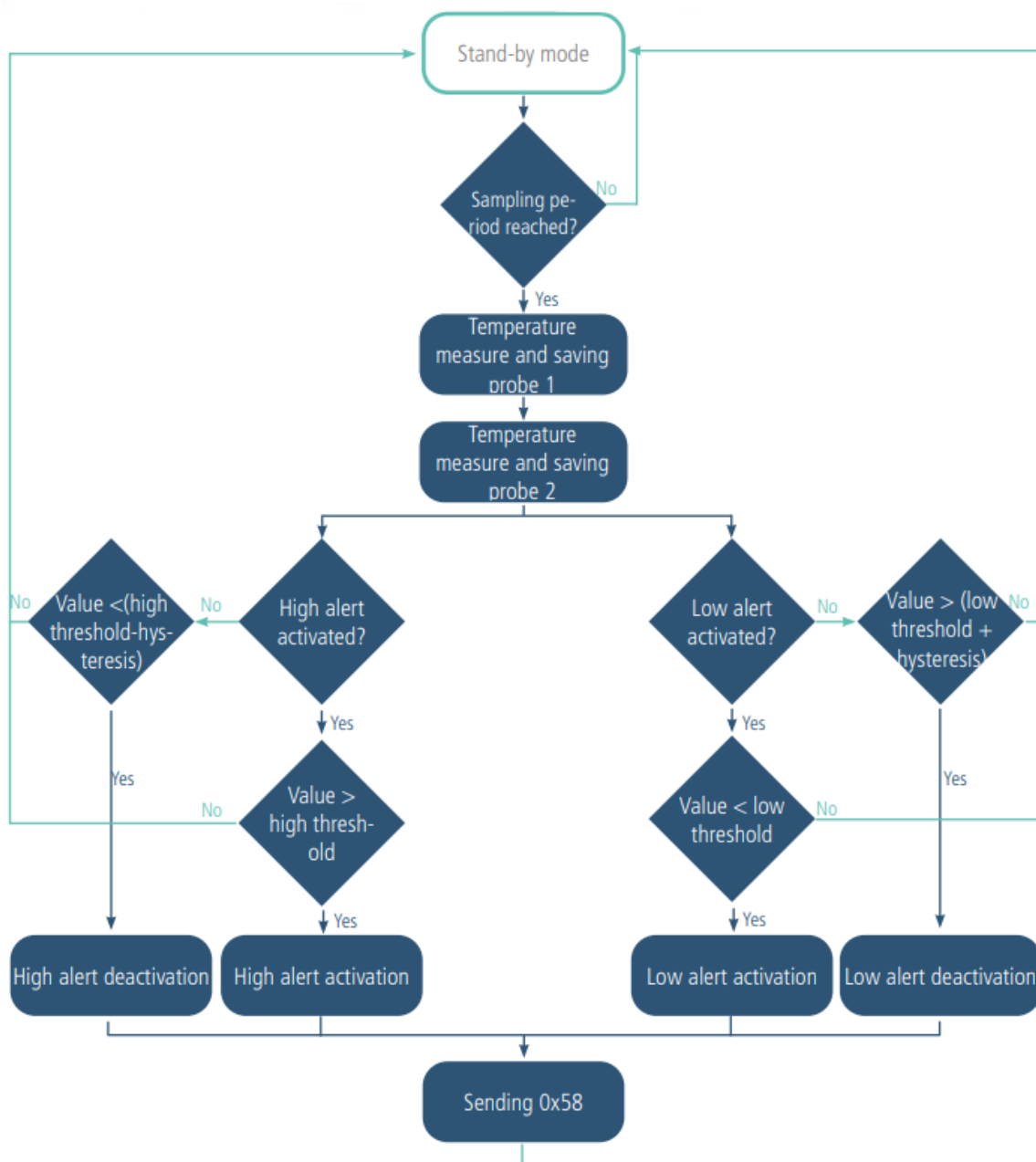
- A sample (reading) every hours (1800 x 2 seconds = 60 minutes)
- A historisation at each sampling
- A transmission done every 2 historisations (so every 2 hours)
- 2 probes are activated
- The product will send 2 new samples measured every hour and 4 memorized



### 2.4.3 Transmission on threshold overpassed

The product enables the detection of a threshold overpassed (high and low) for each probe, as described in the diagram below:

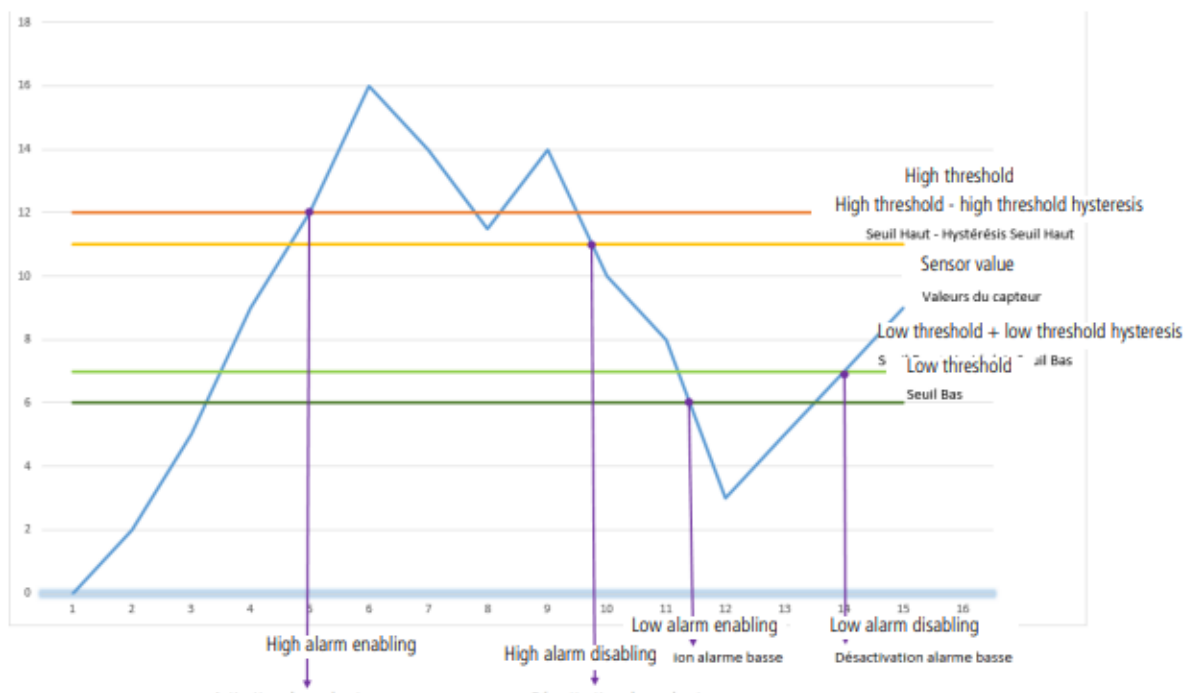




The sampling period (reading) enables to determine when the product will do the temperature measure and so the frequency at which the product will detect an overpassed threshold.

The product will send the frame when a threshold is overpassed but also when temperature comes back to normal (cf status alarm).

Explication of the thresholds and their hysteresis:



The settings associated with this mode of operation are:

- Sampling period (register 321).
- The activation of the probes (register 324).
- Alarm configuration of the probe 1 (register 330) and probe 2 (register 340).
- High threshold of the probe 1 (register 331) and probe 2 (register 341).
- Hysteresis for the high threshold of the probe 1 (register 332) and probe 2 (register 342).
- Low threshold of the probe 1 (register 333) and probe 2 (register 343).
- Hysteresis for the low threshold of the probe 1 (register 334) and probe 2 (register 344).

Example :

Register	Encoding	Value	Result
S301	Decimal	0	Alarm mode
S321	Decimal	1800	A sample of the temperature every hour
S324	Decimal	3	The 2 probes are activated
S330	Decimal	3	An alarm is activated on high and low threshold on the probe 1
S331	Decimal	700	High threshold is 70°C

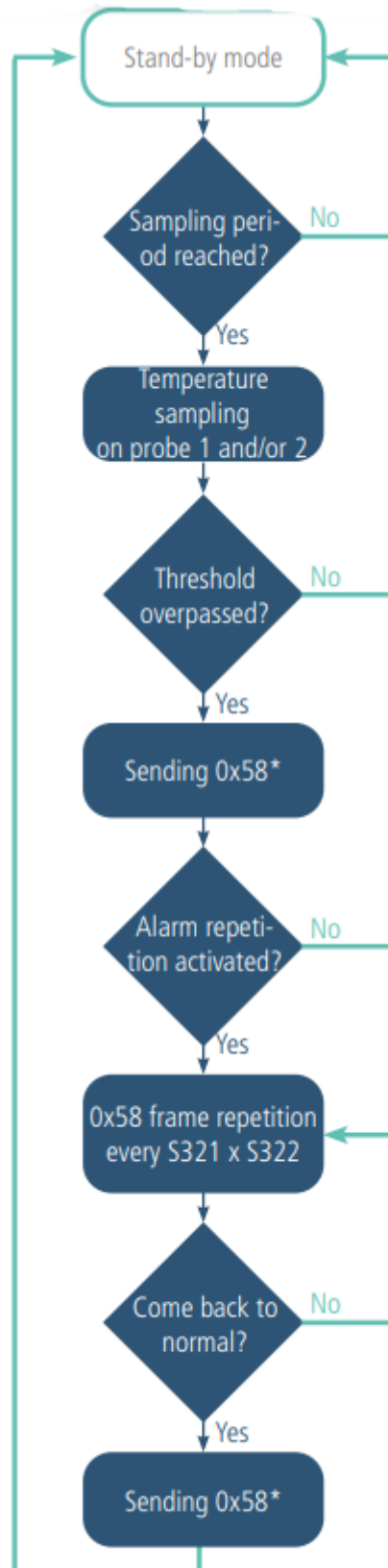
Register	Encoding	Value	Result
S332	Decimal	50	Hysteresis of the high threshold is 5°C, so the come back to normal is at 65°C
S333	Decimal	100	Low threshold is 10°C
S334	Decimal	20	Hysteresis of the low threshold is 2°C, so the come back to normal is at 12°C
S340	Decimal	2	An alarm is activated on high threshold only on probe 2
S341	Decimal	235	High threshold is 23.5°C
S342	Decimal	35	Hysteresis of the high threshold is 3.5°C, so the come back to normal is at 20°C
S343	Decimal	0	No low threshold determined
S344	Decimal	0	No low threshold determined

In this example:

- The product measure the temperature on the 2 probes every hour
- On probe 1, there is a high alert at 70°C with a come back to normal at 65°C and a low alert at 10°C with a come back to normal at 12°C
- On probe 2, there is only a high alert at 5°C with a come back to normal at 20°C.

#### 2.4.4 Transmission on threshold overpassed with alarm repetition

The product enables the detection of a threshold overpassed (high and low) for each probe and to repeat this alert depending on a determined period (register S321 x S322).



Settings associated to this operating mode are:

- Sampling period (register 321),

- Alarm repetition (register 322),
- Activation of the probes (register 324).
- Alarm configuration on probe 1 (register 330) and probe 2 (register 340).
- High threshold on the probe 1 (register 331) and probe 2 (register 341).
- Hysteresis for high threshold on probe 1 (register 332) and probe 2 (register 342).
- Low threshold on the probe 1 (register 333) and probe 2 (register 343).
- Hysteresis for low threshold on probe 1 (register 334) and probe 2 (register 344).

#### Example:

Registers	Encoding	Value	Result
S301	Decimal	0	Alarm mode
S324	Decimal	1	Only probe 1 is activated
S330	Decimal	3	High and low threshold activated on probe 1
S331	Decimal	700	High threshold is 70°C
S332	Decimal	50	Hysteresis for high threshold is 5°C, the come back to normal is at 65°C
S333	Decimal	100	Low threshold is 10°C
S334	Decimal	20	Hysteresis for low threshold is 2°C, the come back to normal is at 12°C
S321	Decimal	300	A sampling is done every 10 minutes (300 x 2 seconds = 10 minutes)
S322	Decimal	2	Alarm will be sent every 2 sampling if always activated

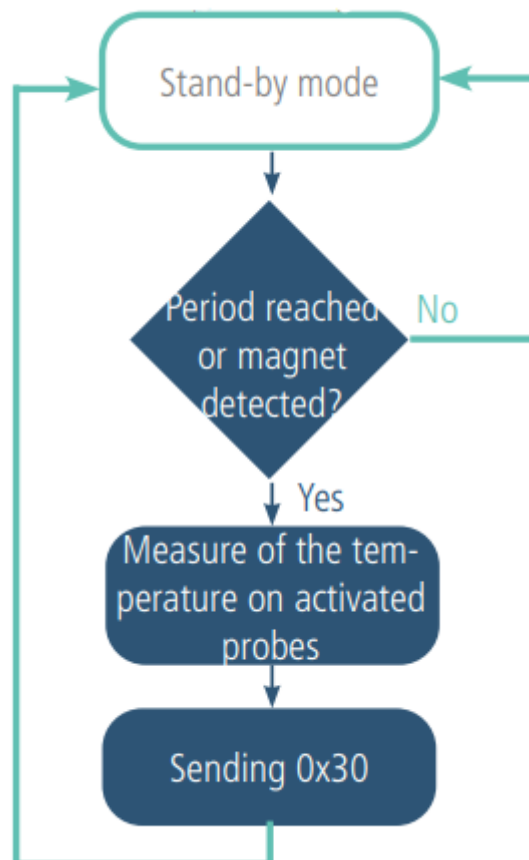
In this example:

- The product measure temperature only on probe 1
- On probe 1, there is a high threshold at 70°C with a come back to normal at 65°C and a low threshold at 10°C with a come back to normal at 12°C
- A sampling (reading) every 10 minutes (300 x 2 seconds = 10 minutes)
- As long as the alarm is active (threshold always overpassed), this alarm will be repeated every 2 samples (so every 20 minutes).

\*The “alarm status” byte gives the information if the alert is activated or not and so allows to dissociate a 0x58 frame sent to alert that the threshold is overpassed from a 0x58 frame sent to inform about come back to normal.

## 2.4.5 Transmission of the Keep Alive frame

In the event mode, it is possible that the product would never send data frames. So to be sure that it is working properly a Keep Alive frame is transmitted regularly (following diagram). Furthermore, in order to enable to measure the temperature on demand it is possible to cause the sending of this frame using a magnet on the product during 3 seconds (at the same place of the start-up) or sending a 0x05 frame.



Parameters associated to this operating mode :

- Activation of the probes (register 324).
- Transmission period of the keep alive frame, from 20 seconds to 7 days (register 300).

Example:

Register	Encoding	Value	Result
S300	Decimal	8640	The keep alive frame is sent every: 8640x10 seconds =1440min so 24h (so once per day)

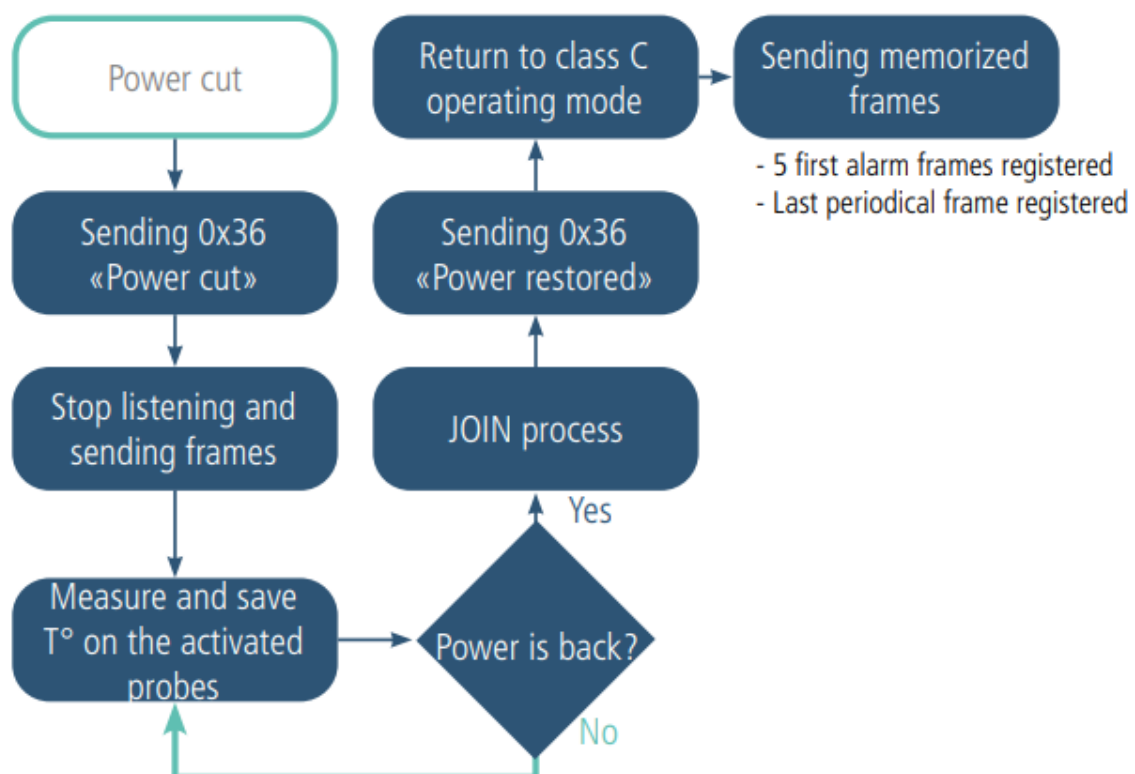
## 2.5. Class C LoRaWAN

The TEMP product is in class A by default but can be switched to Class C by configuration.

The class C enables the product to be in constant listening when it is not transmitting (no need for an uplink to receive a downlink). Thanks to this mode it is possible to measure at any moment remotely the temperature (manually with a downlink).

**WARNING: this mode can be activated only if the product is supplied by an external supply.**

When the product is running in Class C, if the supply is cut off, the product enter in safety mode and activate a degraded mode (explained in the here-under diagram) that still allows the product to ensure continuity of measurement :



WARNING: a battery must be present and connected in the product to enable this “back-up’ mode.

## 2.6. Timestamp of the data

The sensor can integrate the timestamp of the data in the frame if this option is activated. Timestamp is given in EPOCH 2013 (please, refer to the TRM of the product to know the content of each frame).

To configure the timestamp, you have to set the UTC time first, via Downlink or through the Advanced Menu of the IoT Configurator.

Then you can activate the timestamp in the Applicative parameters and choose if you want to set the timezone and if you want that the product take into account the Daylight Saving Time.

### Commands

Timestamp configuration —

Timestamp activated

Daylight Saving Time management

Time zone offset from UTC (hours)  
-12 ≤ value ≤ 14

Clock drift compensation (tenths of a second per day)  
-100 ≤ value ≤ 100

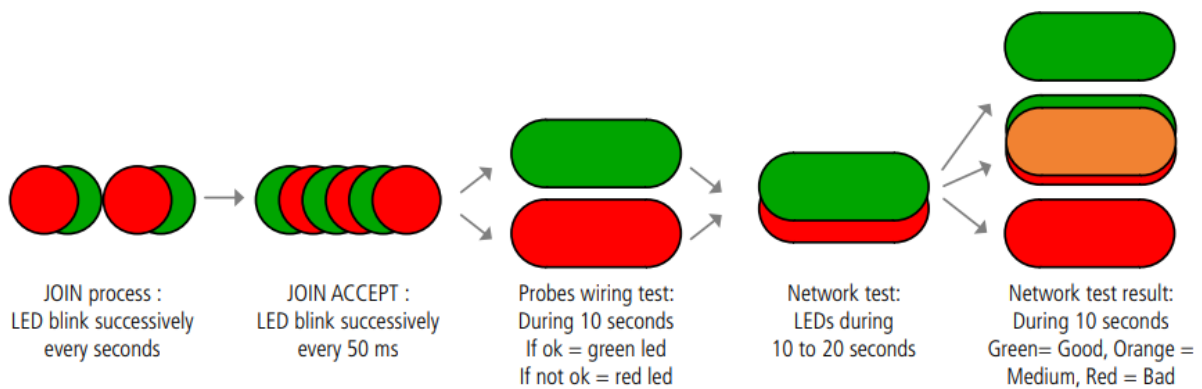
## 2.7. Operation of the LED

Mode	Red LED state	Green LED state
Product in Park mode	OFF	OFF
Magnet detection process in PARK mode	OFF	ON from detection of the magnet during 5 seconds
Product start (after detection of the magnet)	OFF	Rapid flashing 6 cycles, 100 ms ON / 100 ms OFF



Mode	Red LED state	Green LED state
Joining process (LoRaWAN products)	During the JOIN phase: flashing: 50ms on / 1 s off If the JOIN phase is complete (JOIN accept): flashing: 50ms on / 50ms Off (6x)	During the JOIN phase: flashing: 50ms on / 1 s off (just after the red LED) If JOIN phase is complete (JOIN accept): flashing: 50ms on / 50ms off (just before the red LED)
Detection of the correct wiring of the probes at startup	10 seconds ON if a default is detected	10 seconds ON if no default is detected
Network Quality test running	10 to 20 seconds ON	10 to 20 seconds ON
Network Quality test result	Bad coverage : 10 seconds ON Medium coverage : 10 seconds ON Good coverage : OFF	Bad coverage : OFF Medium coverage : 10 seconds ON Good coverage : 10 seconds ON
Switching to the Command mode	Continuously lit	Continuously lit
Battery level low	Flashing (0.5s ON every 60s)	
Product faulty (return to factory)	Fixed ON	
Magnet detection in PRODUCTION mode	OFF	Flashing 50ms ON / 50ms OFF after 3 seconds of magnet detection
In Class C, when the external supply is missing at the start up of the device	10 seconds ON	OFF

LEDs scenario for a sensor configured in Class A OTAA:



### 3. REGISTERS AND FRAME DESCRIPTION

To know the content of the registers and of each frames (uplink and downlink) of the product, refers to the TECHNICAL REFERENCE MANUAL of the TEMP product, available on the adeunis website: <https://www.adeunis.com/en/produit/temp/>

## 4. CONFIGURATION AND INSTALLATION

### 4.1. Configuration and installation of the transmitter

To configure the product, it is recommended to use the IoT Configurator (android and Windows application).

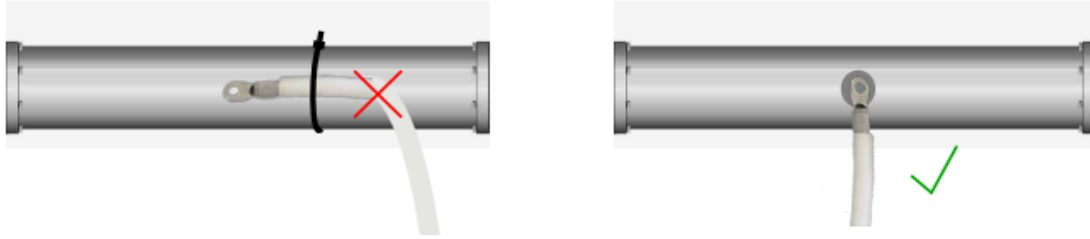
- Google Play : <https://play.google.com/store/apps/details?id=com.adeunis.IoTConfiguratorApp>
- Windows 10: <https://www.com/telechargements/>

To install the product, please refers to the INSTALLATION GUIDE Adeunis available on the website.

### 4.2. Installation of the remote probe

To ensure an optimal performance of the remote probe, please, follow the installation recommendations here-after:

- Install the contact probe on the surface to monitor
- Place the probe to be sure that it is the reinforced section that is in contact with hot surfaces and not the wire (cf illustration hereunder)
- Use the appropriate fixation for the monitored surface (thermal paste, heat resistant collars )

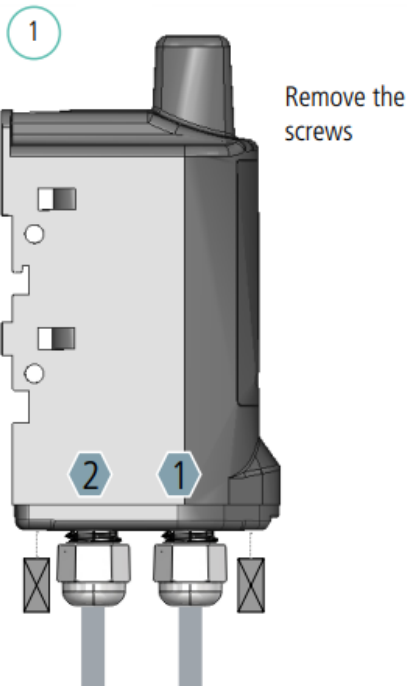


**WARNING** : the probe must be manipulated at room temperature, risk of damage if handled in negative temperatures or above 90°

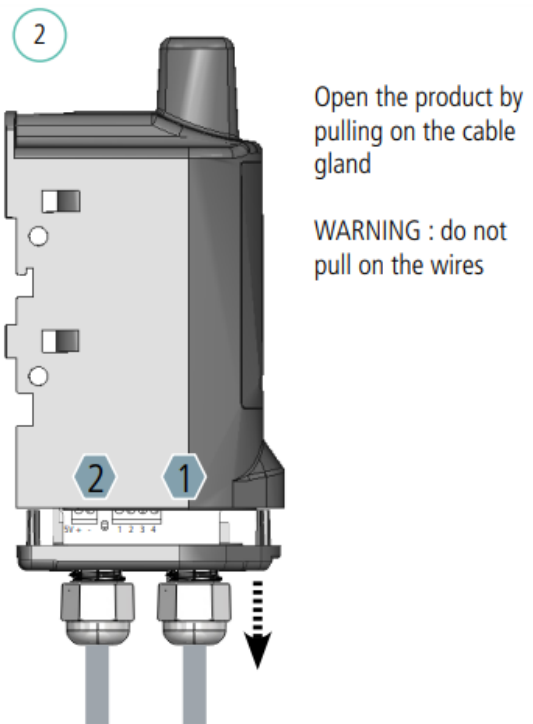
# 5. WIRING

## 5.1. Disconnect a probe

To disconnect a probe, please follow these instructions:

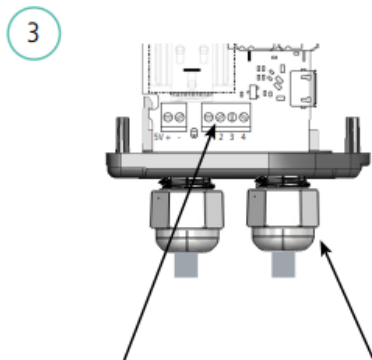


Remove the screws



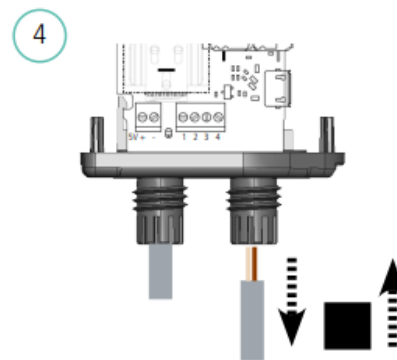
Open the product by pulling on the cable gland

WARNING : do not pull on the wires



Using a suitable screwdriver, unscrew the terminal block to detach the wires

Unscrew the cable gland to loosen the cable



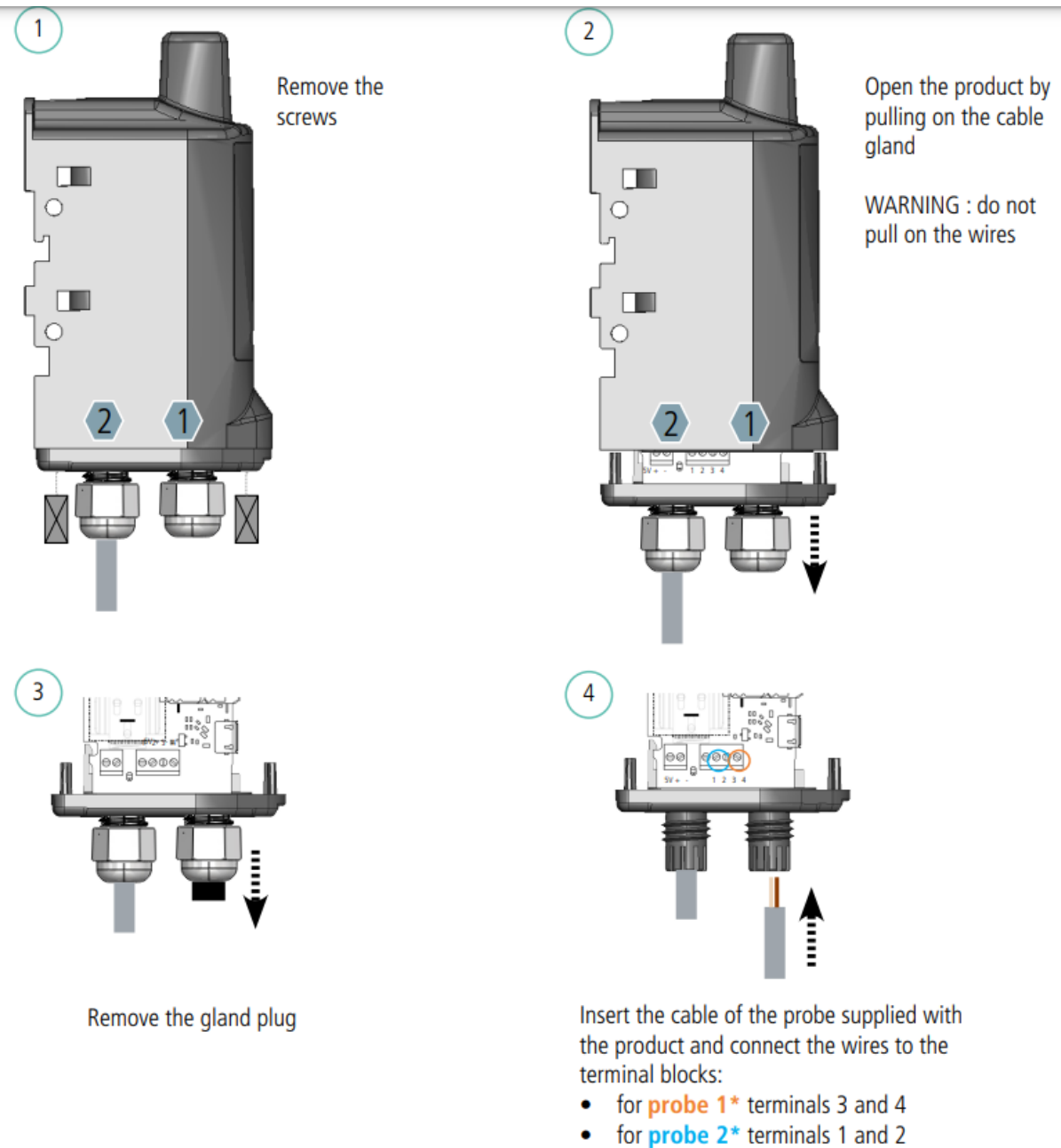
Once the cable has been removed, insert the gland plug provided in the package to maintain the watertightness of the product

**CAUTION: To maintain the IP 68 it is important to screw the cable glands fully and screw the screws with a PZ.1 head and a tightening torque of 0.9 N.m.**

As a reminder the probe 1 is on the rounded side of the housing, the probe 2 is on the flat side of the housing.

## 5.2. Wiring a probe

In order to wire a probe, please follow these instructions:



**CAUTION:** To maintain the IP 68 it is important to screw the cable glands fully and screw the screws with a PZ.1 head and a tightening torque of 0.9 N.m.

As a reminder the probe 1 is on the rounded side of the housing, the probe 2 is on the flat side of the housing.

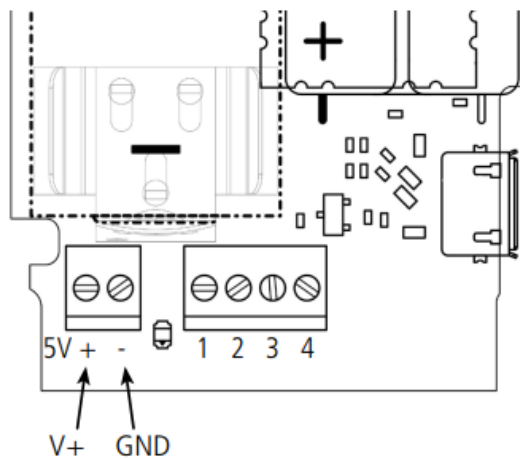
\*The wiring of the probes at the right place is important to match the associated registers and for the interpretation of the results (cf. Technical Reference Manual, Registers).

### 5.3. Wiring external supply

A terminal is present in the product to connect an external supply in order to:

- Use the Class C LoRaWAN (mandatory for this mode)
- Improve the autonomy of the product
- Send more frames more

Connect the power cable to the “+” terminal block (V +) with a power supply between 4.5 V and 6.5 V and connect the earth to the “-” (GND).



N.B. : To power the product via an external power supply it is necessary to disconnect a probe in order to pass the cable of the power supply in the cable gland.

N.B: It is not necessary to disconnect the battery when the external power supply is connected. For the Class C it is even advisable to keep it to benefit from the “back-up” mode in case of power failures.

## DOCUMENT HISTORY

Version	Contents
V1.0.0	Creation
V1.0.1	Update Declaration of Conformity
V1.2.0	Update Part 3
V2.0.0	Changes after update RTU & APP
V2.0.1	Two external probes product and changes after APP updates
V3.0.0	Add of applicative functionalities (historisation, redundancy, alarm repetition)
V3.0.1	Hardware changes: IP68 casing, external supply and new FANSO battery
V3.0.2	Change in electrical standard part

Version	Contents
V3.1.0	Add of applicative functionalities :Timestamp, Network Quality test, and JOIN process configuration
V3.1.1	More information about the battery