

LoRaWAN US915 PULSE

Transceiver pulse interfaces

Guide utilisateur / User Guide

Version 1.0.0



DOCUMENTATION

USER GUIDE

- Dedicated to a product
- Cautions & electrical warnings
- Declaration of conformity
- Product functionalities and modes
- Casing dimensions
- Characteristics (casing and electrical)
- LED explanations
- Specific wiring on terminal blocks

TECHNICAL REFERENCE MANUAL

- Dedicated to a product
- Registers content
- Frame explanations (uplink and downlink)

INSTALLATION GUIDE

- For all adeunis® products
- Configuration of the products
- Installation and fixing
- Start-up of the products
- Opening and closing the case
- Replace battery

EN

Préambule / Preamble / Präambel / Preambolo / Preámbulo

- Ce guide décrit les fonctionnalités du produit adeunis®. Il explique les modes de fonctionnement du produit et la manière de le configurer.
- This guide describes the functionalities of the product adeunis®. It explains its functionnements and how to configure it.
- Dieser Leitfaden beschreibt die Funktionalität des Produktes adeunis®. Er erklärt die Betriebsfunktionen des Produktes und die Art und Weise, um es zu konfigurieren.
- Questa guida descrive la funzionalità del prodotto adeunis®. Questo spiega come funziona il prodotto e come configurarlo.
- Esta guía describe las funcionalidades del producto adeunis®. En él se explica los modos de funcionamiento del producto y cómo configurarlo.
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INFORMATIONS

Document Information

Title	LoRaWAN PULSE - User guide
Sub-title	Version 1.0.0
Document type	User Guide

This document applies to the following products :

Name	Reference	Firmware version
LoRaWAN PULSE	ARF8230B	Version RTU : V01.07.01 Version APP : V02.00.00



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TECHNICAL SUPPORT

Website

Our website contains a lot of useful information: information on modules and wireless modems, user guides, and configuration software and technical documents which can be accessed 24 hours a day.

E-mail

If you have technical problems or cannot find the required information in the provided documents, contact our Technical Support on our website, section « Technical Support ». This ensures that your request will be processed as soon as possible.

Helpful Information when Contacting Technical Support

When contacting Technical Support, please have the following information ready:

- Product type
- Firmware version (for example V1.0)
- A clear description of your question or the problem
- A short description of the application

COMPLIANCE TO FCC US/CAN

- This device complies with part 15 of the FCC rules and Industry Canada licence-exempt RSS standard(s).

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 of the device.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radiocommunication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.
- CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY ADEUNIS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lower) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be chosen so that the equivalent isotropically radiated power (e.i.r.p.) is not superior than necessary for successful communication.

Identification :

- Contains FCC ID : U3Z-ARF8133
- Contains IC : 7016A-ARF8133

Product reference: USA/CANADA: ARF8230B

Authorized representative in Canada

X Telia

440 rue Ste-Hélène,
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CANADA

INTRODUCTION

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ENVIRONMENTAL RECOMMENDATIONS

All superfluous packaging materials have been eliminated. We have done everything possible to make it easy to separate the packaging into three types of materials: cardboard (box), expanded polystyrene (filler material) and polyethylene (packets, foam protective sheets). Your device is composed of materials that can be recycled and reused if it is dismantled by a specialist company. Please observe local regulations concerning the manner in which waste packaging material, used batteries and your obsolete equipment are disposed of.

WARNINGS

Valid for products indicated in the declaration of conformity



Read the instructions in the manual.



The safety of this product is only guaranteed when it is used in accordance with its purpose. Maintenance should only be carried out by qualified persons.



Risk of explosion if the battery is removed with an incorrect type. Contact Adeunis for more information if needed.



Risk of explosion if the battery is replaced by an incorrect type

Please note: Do not install the equipment close to a heat source or in damp conditions.

Please note: When the equipment is open, do not carry out any operations other than the ones set out in this document.



Please note: Do not open the product as there is a risk of electrical shock.



Please note: For your own safety, you must ensure that the equipment is switched off before carrying out any work on it.



Please note: For your own safety, the power supply circuit must be SELV (Safety Extra Low Voltage) and must be from limited power sources.

Please note: When the aerial is installed outside, it is essential to connect the cable screen to the building's earth. We recommend using lightning protection. The protection kit chosen must permit the coaxial cable to be earthed (eg: coaxial lightning arrester with earthing of the cable at different places on the aerial at the base of pylons and at the entrance, or just before entering the premises).

The product must be equipped with a switching mechanism so that the power can be cut. This must be close to the equipment. Any electrical connection of the product must be equipped with a protection device against voltage spikes and short-circuits.

RECOMMENDATIONS REGARDING USE

- Before using the system, check that the power supply voltage shown in the user manual corresponds to your supply. If it doesn't, please consult your supplier.
- Place the device against a flat, firm and stable surface.
- The device must be installed in a location that is sufficiently ventilated so that there is no risk of internal heating and it must not be covered with objects such as newspapers, cloths, curtains, etc.
- The device's aerial must be free and at least 10 cm away from any conducting material.
- The device must never be exposed to heat sources such as heating equipment.
- Do not place the device close to objects with naked flames such as lit candles, blowtorches, etc.
- The device must not be exposed to harsh chemical agents or solvents likely to damage the plastic or corrode the metal parts.

DISPOSAL OF WASTE BY USERS IN PRIVATE HOUSEHOLDS WITHIN THE EUROPEAN UNION



This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste by taking it to a collection point designated for the recycling of electrical and electronic appliances. Separate collection and recycling of your waste at the time of disposal will contribute to conserving natural resources and guarantee recycling that respects the environment and human health. For further information concerning your nearest recycling centre, please contact your nearest local authority/town hall offices, your household waste collection company or the shop where you bought the product



This symbol on the device or its packaging means the use of a DC voltage.



Warning: If the charger is used with any other batteries or products whatsoever, there is a risk of an explosion. After use, the batteries must be disposed of at an appropriate recycling centre. They must not be thrown away to degrade in the environment. When batteries are replaced, the device must be correctly implemented.



Warning for Switzerland : the annex 4.10 of SR 814.013 Standard must be applied for batteries.

1. PRODUCT PRESENTATION

IMPORTANT NOTE: the LoRaWAN US915 PULSE can only be started or restarted using a magnet.

Description

- LoRaWAN US915 PULSE is a ready to use radio transmitter that can be used to transform any type of meter into a wireless meter (smart meter).
- This product meets the needs of users who require to remotely monitor the consumption of different fluids (water, gas, electricity, heat ...) or any other phenomenon with an impulse interface (rain gauge, odometer ...).
- The use of the LoRaWAN protocol allows the user to integrate the LoRaWAN US915 PULSE into any network that is already deployed.
- Two 3 wires-meters or one 5 wires-meters may be controlled by a single LoRaWAN US915 PULSE transmitter thus permitting a significant reduction in implementation and deployment costs.
- The product emits the data from the meters periodically with or without history. It allows also the detection of tamper, and leakage, and the flow calculation with transmission possibilities on exceeding high or low thresholds.
- The configuration of the transmitter is accessible by the user via a micro-USB port or remotely via the LoRaWAN network, allowing in particular a choice of modes of transmission, periodicity or triggering thresholds.
- The LoRaWAN US915 PULSE is powered by a non-replaceable internal battery.

IMPORTANT NOTE: The LoRaWAN US915 PULSE is delivered by default with OTAA configuration, allowing the user to declare his/her product to a LoRaWAN operator For an ABP procedure, please contact our Sales Department with the necessary information.

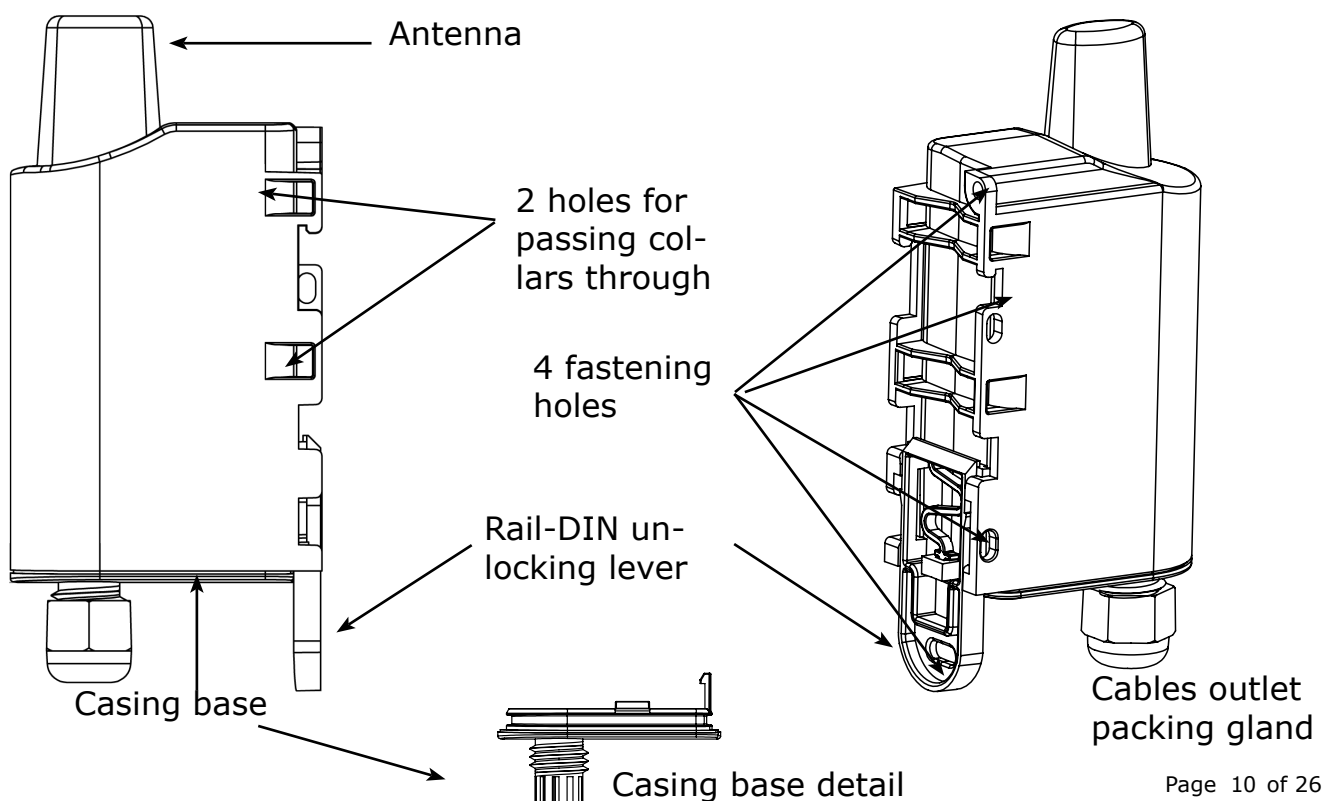
IMPORTANT NOTE: The LoRaWAN US915 PULSE can transmit measurements from the meters but does not power them.

Package composition

The product is supplied in a cardboard package containing the following elements:

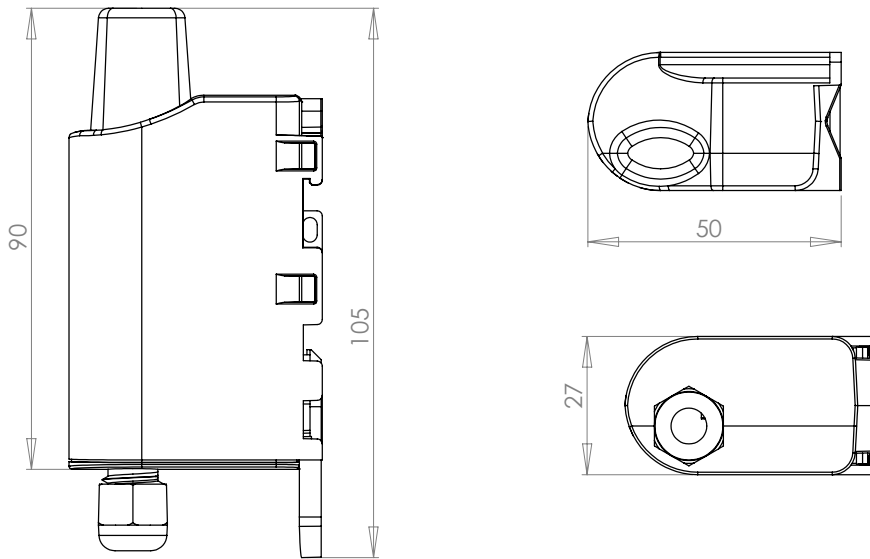
- Upper case, electronic board, case plate.
- Compression gland with nut, 3 compression seals, 2 CBLZ 2.2 x 19mm screws, 2 Fischer SX4 plugs.

1.1. General description

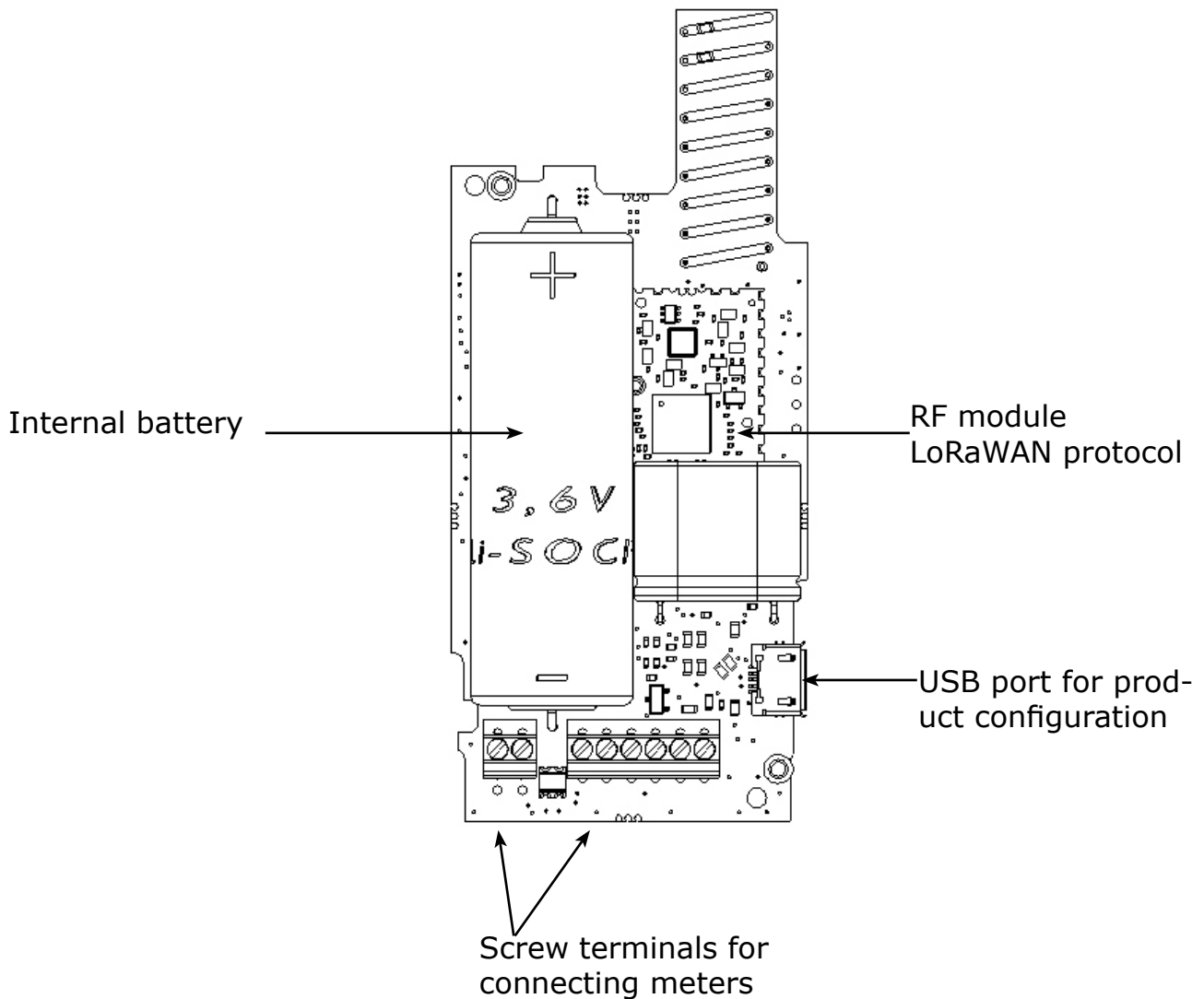


1.2. Dimensions

Values in millimeters



1.3. Electronic card



1.4. Technical Specifications

1.4.1 General characteristics

Parameters	Value
Supply voltage	Nominal 3.6V
Power supply	Battery Li-SOCl ₂
Maximum Power	90mA
Working temperature	-25°C / +70°C
Dimensions	105 x 50 x 27mm
Casing	IP 67
LoRaWAN region	EU 863-870
LoRaWAN specification	1.0.2
Power transmission	14 dBm
Applicative port (downlink)	1

1.4.2 Autonomy

Operating conditions	Sending periodicity	Number of sensors	Autonomy (SF7)	Autonomy (SF12)
Product shelf life before use: Maximum 1 year.	140 frame/day	1	9.8 year	1.1 year
	140 frame/day	2	9.6 years	1.1 year
	100frame/day	1	11.5 years	1.4 year
	100 frame/day	2	11.1years	2 years
Calculations performed at a temperature of 20°C	50 frame/day	1	14.4 years	2.7 years
	50 frame/day	2	13.8 years	2.7 years
	20 frame/day	1	17 years	5.6 years
Based on 500 pulses / day	20 frame/day	2	16.2 years	5.5 years
	2 frame/day	1	19 years	15.5 years
	2 frame/day	2	18 years	15 years

The above values are estimations based on certain conditions of use and environment. They do not represent a commitment on the part of adeunis®.

WARNING : the connection of the USB cable can highly impact the device autonomy.

1.4.3 Sensor compatibility

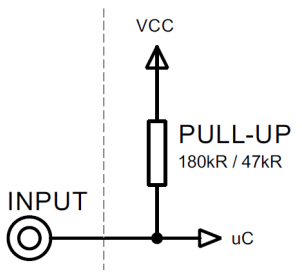
Examples of sensors tested by adeunis® (non-exhaustive list):

Type	Name	Type of sensor
Water	Itron Flodis	Cyble Sensor V2
	Wehrle TRK-HYX / ETK-EAX	Wehrle Modularis
	Sappel-Diehl Aquarius/Altair	IZAR Pulse 3 & 4 Fils
Gas	Elster BK	Elster IN-Z63
Electricity		Fludia FM250E et FM250M
	Socomec Countis E00	
Thermal	Itron CF Echo II	

1.4.4 Physical interface characteristics

1.4.4.01 INPUT Circuit

The schematic diagram is the following:



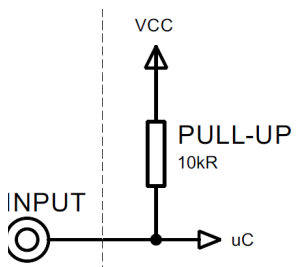
Absolute maximum ratings		Unit
Minimum input voltage	- 0.7	V
Maximum input voltage	3.6	V

Electrical characteristics (Typ.)		Unit
Minimum input voltage	0	V
Maximum input voltage	3.3	V
Equivalent Input pull-up	180 47	kΩ (Water) kΩ (Gas)
Input frequency	<100	HZ
Current consumption - Input HIGH	0	μA
Current consumption - Input LOW	20 80	μA (Water) μA (Gas)

Values beyond absolute maximum ratings will damage the device

1.4.4.02 TAMPER Circuit

The schematic diagram is the following:



Absolute maximum ratings		Unit
Minimum input voltage	- 0.7	V
Maximum input voltage	3.6	V

Electrical characteristics		Unit
Minimum input voltage	0	V
Maximum input voltage	3.3	V
Equivalent Input pull-up	10	kΩ
Current consumption - Input HIGH	Not applicable	μA
Current consumption - Input LOW	Not applicable	μA

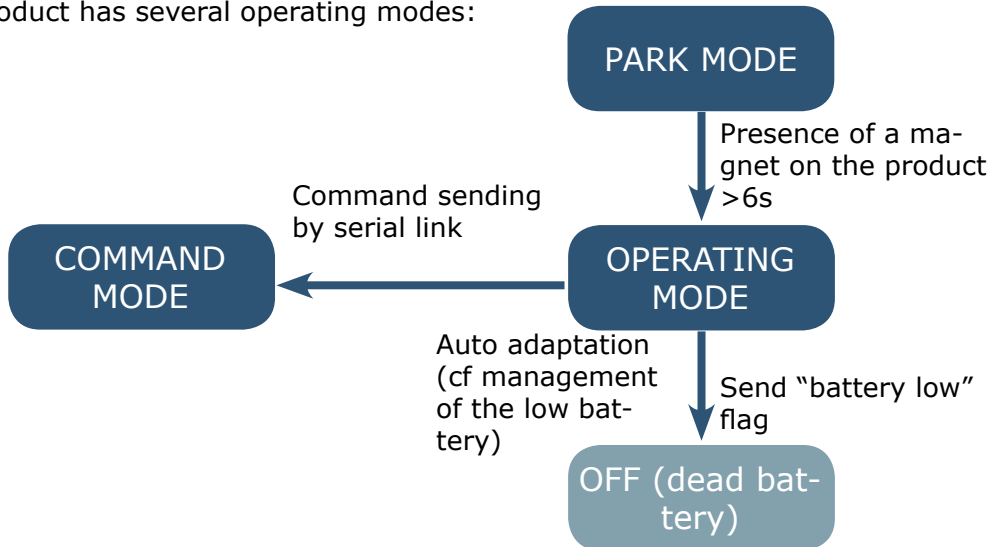
Values beyond absolute maximum ratings will damage the device.

2. PRODUCT OPERATION

2.1. Global Operation

Important: 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 6 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.

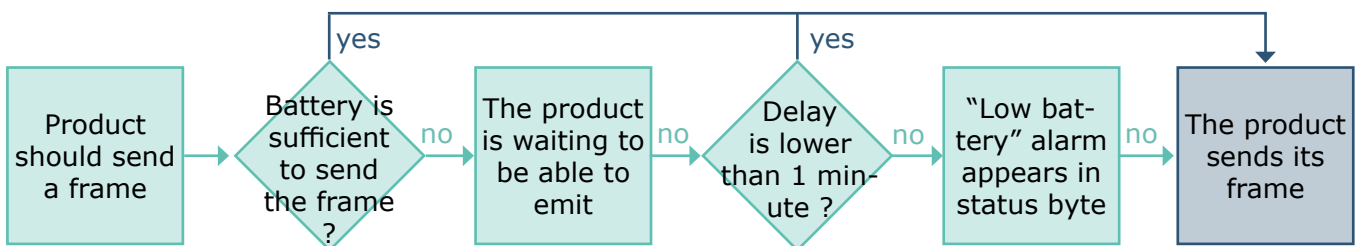
To enter this mode, connect a cable to the micro-USB port of the product and enter the command mode by an AT command (see paragraph 3).

2.1.3 OPERATING mode

This mode allows the user to operate the product in its final use. It should allow a maximum of autonomy to the product.

2.1.4 Management of the low battery

When the product detects that the battery is not anymore in capacity to deliver the energy needed to send a frame (extreme temperatures or end-of-life of the battery) it waits to be in capacity to transmit. If it detects that the delay generated is longer than 1 minute it informs the user via the "battery low" flag in the status byte of each frame.

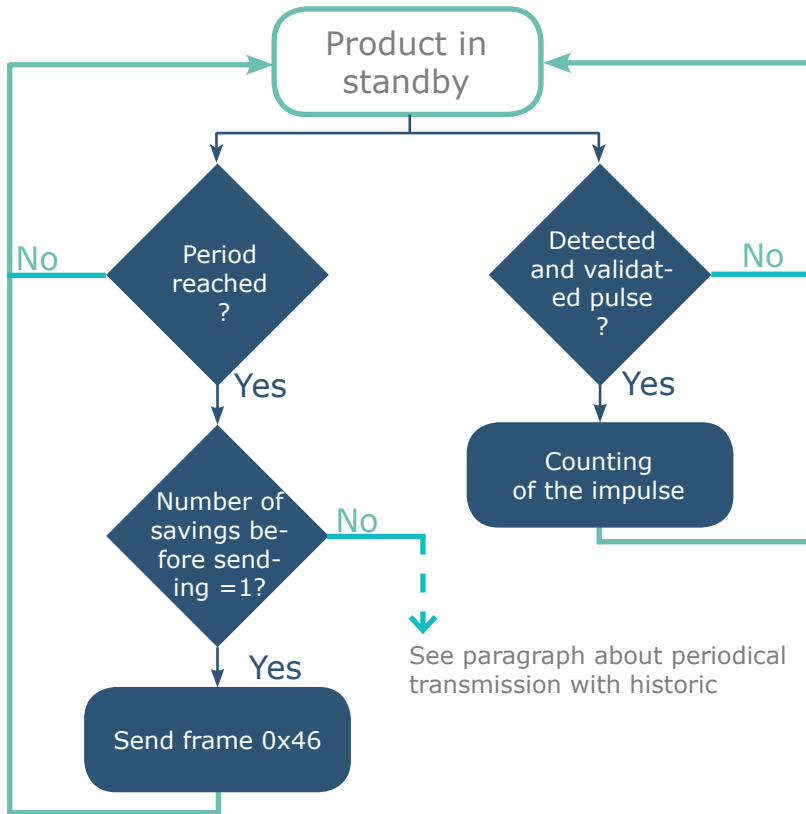


The battery low alarm is switching off if the battery is replaced or when the temperature conditions are favorable for the proper functioning of the battery.

2.2. Application operation

2.2.1 Periodic transmission

The product allows the measurement and the periodic transmission of the values of the sensors according to the following diagram:



The settings associated with this mode of operation are:

- Transmission frequency (register S301)
- Historisation period of the data (register S321)
- Enabling and Configuring inputs (register S320)
- Anti-bounce timer period (registers S322)



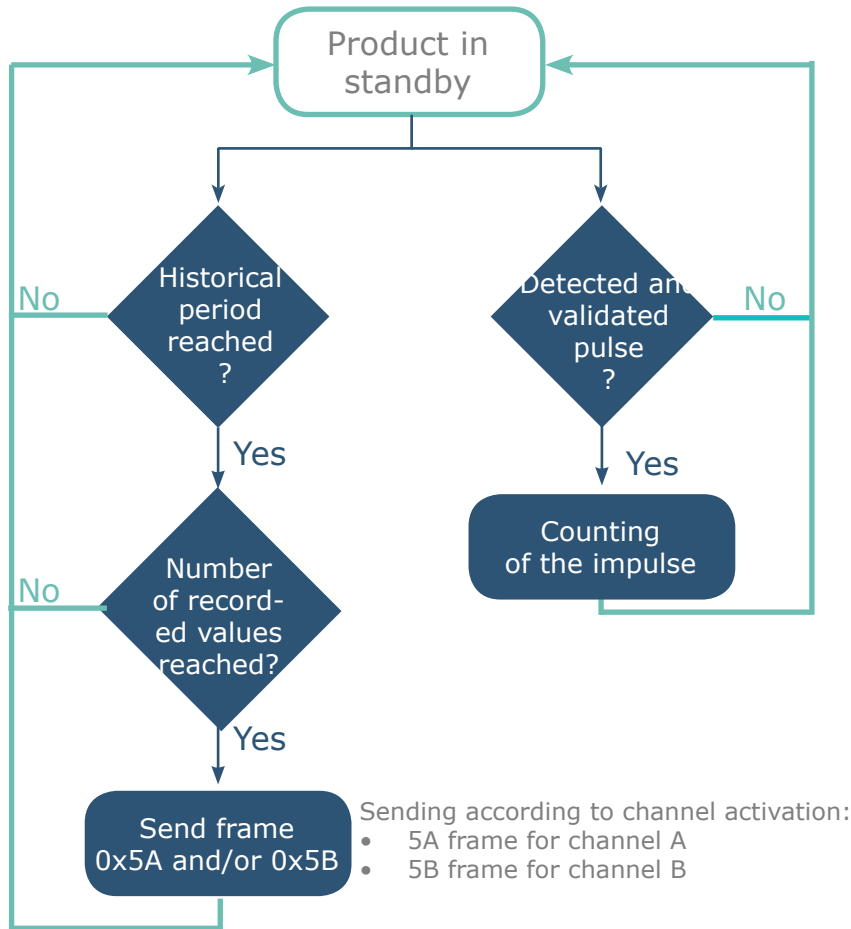
Eg:

Register	Value encoding	Value	Result
S301	Decimal	1	Number of historisation (savings) to be done before sending
S321	Decimal	43200	Period of historisation/saving of the data (43200x 2 seconds = 24h).
S320	Hexadecimal	0x39	Channel A : • Activated • Meter other than gas • Tamper input activated Channel B : • Activated • Gas meter • Tamper input disabled
S322	Hexadecimal	0x57	Anti-rebound : • Channel A = 500ms • Channel B = 100ms

N.B: for a periodical transmission without historisation of the data, S301 must be equal to 1.

2.2.2 Periodic transmission with history

The product allows the accumulation of several successive meter values before the periodic transmission of the set of values according to the following scheme:



The parameters associated with this mode of operation are:

- Enabling and Configuring inputs (register 320)
- Historisation period (register S321)
- Sending frequency (S301)
- Anti-bounce timer period (registers S322)

Eg:

Register	Value encoding	Value	Result
S320	Hexadecimal	0x39	Channel A : <ul style="list-style-type: none"> • Activated • Meter other than gas • Tamper input activated Channel B : <ul style="list-style-type: none"> • Activated • Gas meter • Tamper input disabled
S301	Decimal	4	Sending every 4 historisations (saving)
S321	Decimal	300	Historisation of the data every 10 minutes (300x2 seconds=600 seconds).
S322	Hexadecimal	0x57	Anti-rebound : <ul style="list-style-type: none"> • Channel A = 500ms • Channel B = 100ms

2.2.3 Periodic transmission with redundancy

The product enables to add redundancy in the frame with historisation (cf scheme here under). Thanks to redundancy the product will memorize a certain number of data and send them again in the next frame.

The parameters associated with this mode of operation are:

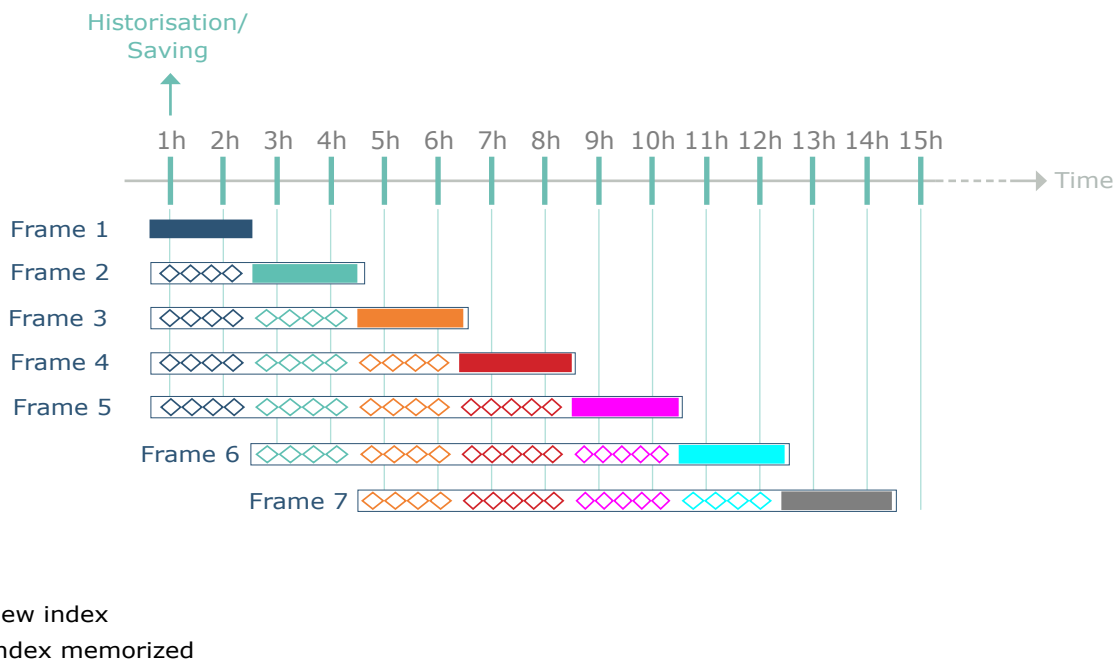
- Historisation period (register 321) and sending frequency (register 301)
- Enabling and Configuring inputs (register 320)
- Number of data to be repeated (register 340).

Example with redundancy:

Register	Encoding	Value	Result
S320	Hexadecimal	0x39	Channel A : <ul style="list-style-type: none"> • Activated • Meter different than gas • Tamper input activated Channel B : <ul style="list-style-type: none"> • Activated • Gas meter • Tamper input deactivated
S301	Decimal	2	Sending every 4 historisations (saving)
S321	Decimal	1800	Historisation of the channel A and channel B index every hours (1800x2seconds = 60 minutes)
S322	Hexadecimal	0x57	Anti-rebound : <ul style="list-style-type: none"> • Channel A = 500ms • Channel B = 100ms
S340	Decimal	4	4 redundant data per frame

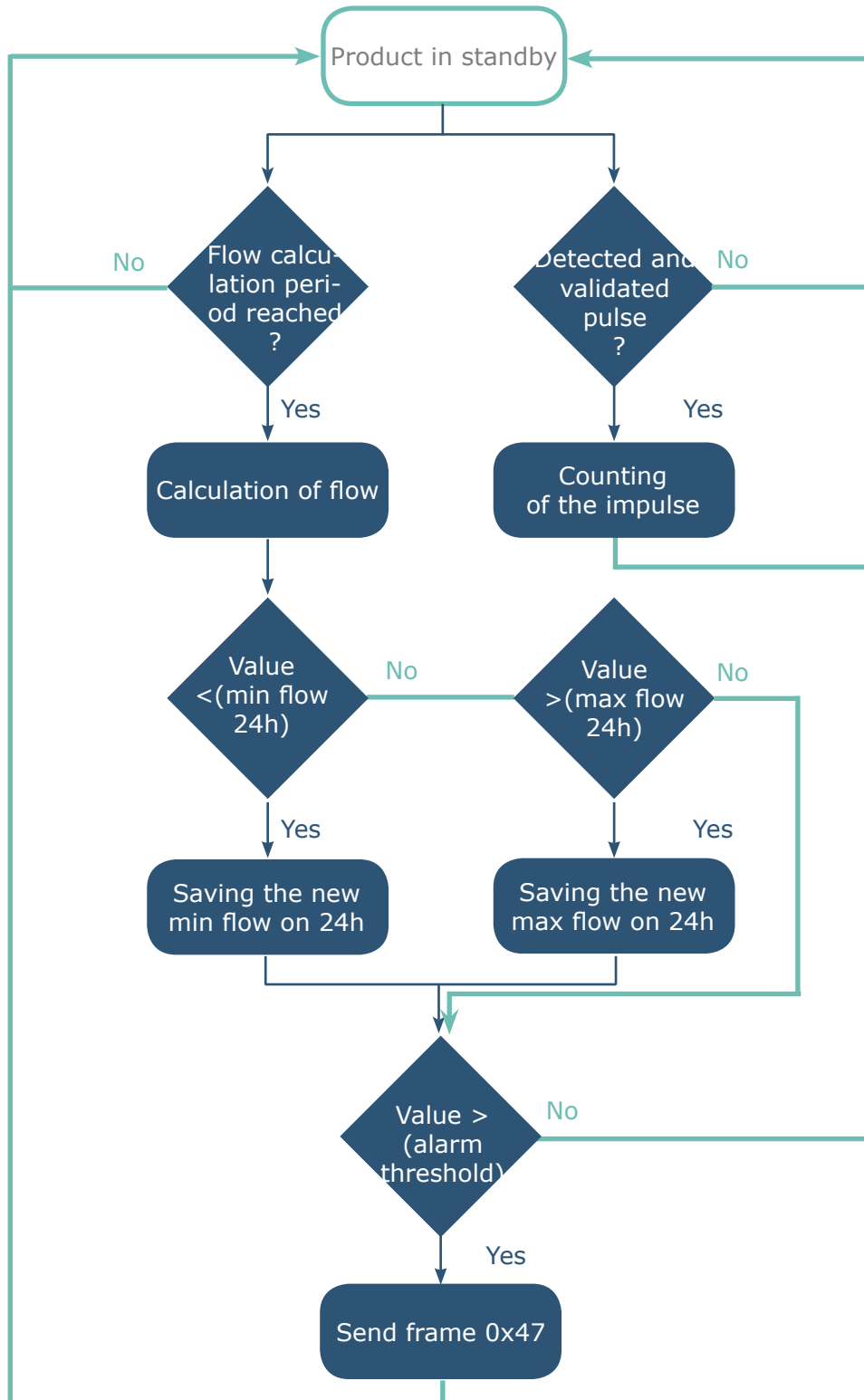
In this example:

- 1 historisation of the index each hours (1800x2seconds = 60 minutes)
- 1 sending every 2 savings so every 2 hours
- The 2 channel of the product are activated so the 2 periodic frame are sent (0x5A et 0x5B)
- When it is possible, the product will send for each channel the 2 recent index and the last 4 index memorized



2.2.4 Flow threshold alarm transmission

The product allows the detection of the exceeding of a flow threshold for each counting entry according to the following scheme:



The flow rate corresponds to the number of pulses of the flow calculation period divided by the same period. It is expressed in pulses / hour.

The alarm message (frame 0x47) is transmitted once, there is no new transmission if the flow rate returns above the threshold as long as the alarm remains active. The alarm is automatically deactivated after the daily frame is sent.

The settings associated with this mode of operation are:

- Enabling and Configuring inputs (register 320)
- Anti-bounce timer period (register S322)
- Flow calculation period (register S325)
- Alarm thresholds (registers S326 and S327)

Example :

Register	Value encoding	Value	Result
S320	Hexadecimal	0x39	Channel A : <ul style="list-style-type: none"> • Activated • Meter other than gas • Tamper input activated Channel B : <ul style="list-style-type: none"> • Activated • Gas meter • Tamper input disabled
S322	Hexadecimal	0x57	Anti-bounce : <ul style="list-style-type: none"> • Channel A = 500ms • Channel B = 100ms
S325	Decimal	60	Flow calculation period (channels A and B) = 60min
S326	Decimal	10 000	Flow alarm threshold (channel A) = 10,000 pulses per hour
S327	Decimal	30 000	Flow alarm threshold (channel B) = 30,000 pulses per hour

2.2.5 Tamper detection

The product allows detection of state change on the tamper input of each channel (rising edge detected on the input normally held to ground).

The product wakes up regularly (according to the periods defined in registers S332 and S334) and checks the status of the tamper input of each of the channels having active fraud detection.

The tamper alarm is stored if there are several successive detections (configurable in registers S333 and S335) and transmitted within the next daily frame.

The alarm is automatically deactivated after the daily frame is sent.

The settings associated with this mode of operation are:

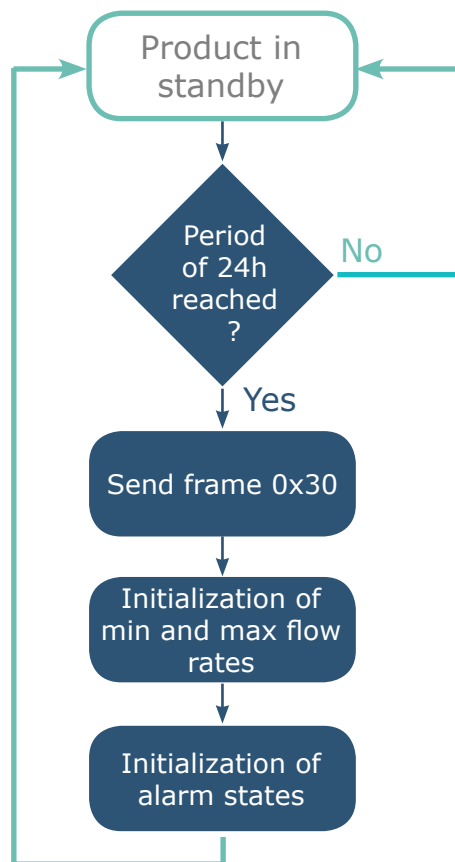
- Enabling and Configuring inputs (register 320)
- Fraud detection period 1 (register 332)
- Threshold for fraud detection 1 (register S333)
- Fraud detection period 2 (register 334)
- Threshold for fraud detection 2 (register S335)

Eg:

Register	Value encoding	Value	Result
S320	Hexadecimal	0x39	Channel A : <ul style="list-style-type: none"> • Activated • Meter other than gas • Tamper input activated Channel B : <ul style="list-style-type: none"> • Activated • Gas meter • Tamper input disabled
S332	Decimal	2	Scan period for A-channel tamper input is 2x10s = 20s
S333	Decimal	3	Tamper detection threshold for A-channel = 3 (positive scans of B-channel tamper before triggering the tamper alarm)
S334	Decimal	2	Scan period for B-channel tamper input is 2x10s = 20s
S335	Decimal	3	Tamper detection threshold for B-channel = 3 (positive scans of B-channel tamper before triggering the tamper alarm)

2.2.6 Transmitting a Daily Frame

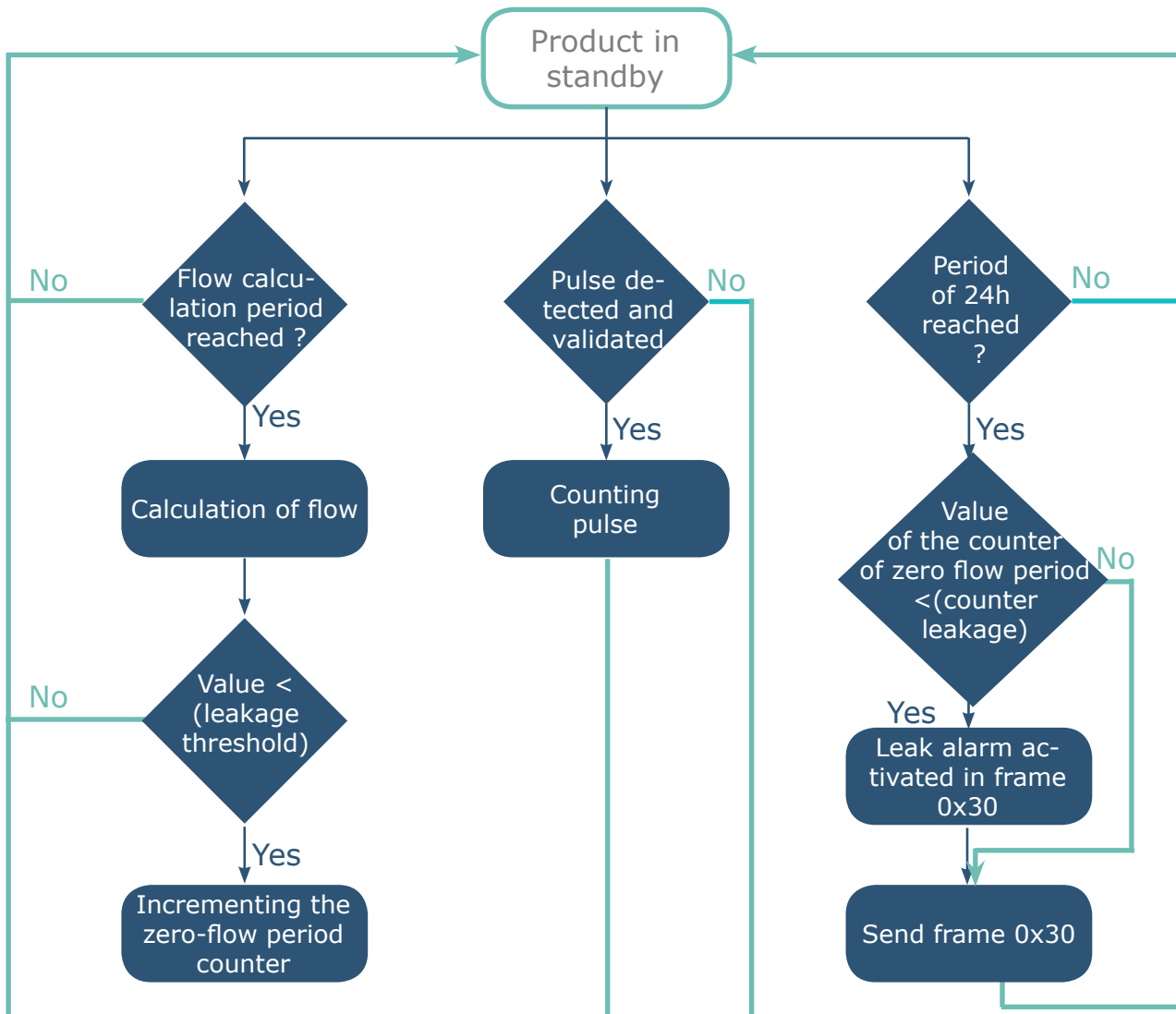
The product transmits every 24 hours a daily frame (0x30) according to the following diagram:



The transmission period of the daily frame is fixed (24 hours) and not configurable.

2.2.7 Leaks detection

The product allows leak detection on each count input as shown in the following diagram:



The flow rate corresponds to the number of pulses of the flow calculation period divided by the same period. It is expressed in pulses / hour.

The leak detection is performed by analyzing a number of occurrences (configurable by register: S330 and S331) where the calculated flow rate is less than a leakage threshold (configurable by register: S328 and S329).

The associated leak alarm is stored and transmitted with the next daily frame. The alarm is automatically deactivated after the daily frame is sent.

The settings associated with this mode of operation are:

- Enabling and Configuring inputs (register 320)
- Anti-bounce timer period (register S322)
- Flow calculation period (register S325)
- Leak thresholds (registers S328 and S329)
- Null flow period counters (S330 and S331)

Example :

Register	Value encoding	Value	Result
S320	Hexadecimal	0x39	Channel A : <ul style="list-style-type: none"> • Activated • Meter other than gas • Tamper input activated Channel B : <ul style="list-style-type: none"> • Activated • Gas meter • Tamper input disabled
S322	Hexadecimal	0x57	Anti-bounce : <ul style="list-style-type: none"> • Channel A = 500ms • Channel B = 100ms
S325	Decimal	60	Flow calculation period (channels A and B) = 60min
S328	Decimal	10	Leak threshold (channel A) = 10 pulses par hour
S329	Decimal	0	Leak threshold (channel B) = 0 pulse par hour
S330	Decimal	3	Daily periods number under the leak threshold (channel A) = 3
S331	Decimal	5	Daily periods number under the leak threshold (channel B) = 5

In this example, all the periods during which the flow rate on the channel A is less than 10 pulses / hour are considered as periods of zero flow. If the total daily number of zero flow periods is less than 3 then it is considered that there is a leak on the channel A.

2.3. Operation of the LEDs

Mode	LED red state	LED green state
Product in Park mode	OFF	OFF
Magnet detection process (1 to 6 seconds)	OFF	ON from detection of the magnet up to a maximum of 1 second
Product start (after detection of the magnet)	OFF	Rapid flashing 6 cycles, 100 ms ON / 100 ms OFF
Joining process (Lora product)	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)
Switching to the Command mode	Continuously lit	Continuously lit
Product faulty (return to factory)	Fixed ON	

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 PULSE product, available on the adeunis website: <https://www.adeunis.com/en/produit/pulse-impulse-interface/>

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.adeunis.com/telechargements/>

To configure the product using AT Command or install the product, please refers to the INSTALLATION GUIDE adeunis® available on the website.



5. PREPARATION

5.1. Dismantling the case

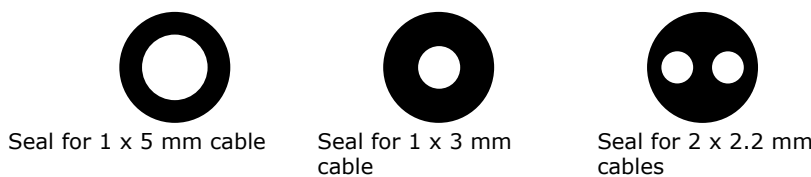
The product is supplied disassembled such that the lower electronic part can be accessed. This part is where the meter or meters are connected to the screw terminals and where the micro USB port for configuration of the device.

Once connection of the meters has been finalized and configuration carried out, the case may be closed.

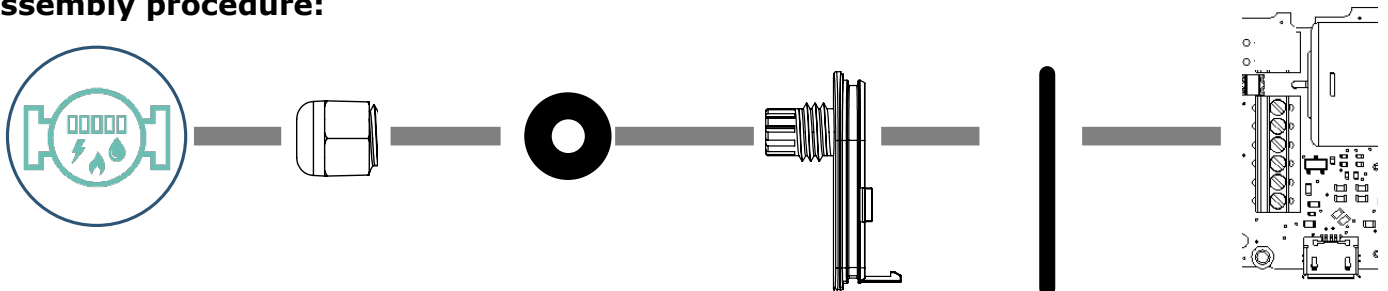
5.2. Installation of the compression seal

Before connecting your meter cables to the product's screw terminals, you must insert the compression gland nut and the appropriate seal for your configuration.

3 types of seals are supplied with the PULSE: for a 5 mm diameter cable, for a 3 mm diameter cable, for 2 x 2.2 mm cables.



Assembly procedure:



- 1 - Your meter and its pulse interface.
- 2 - Pass the cable through the compression gland nut.
- 3 - Pass the cable through the compression gland seal
- 4 - Pass the cable through the PULSE'S case plate.
- 5 - Verify that the O-ring seal is correctly positioned on the case plate and not twisted.
- 6 - Connect the ends of the meter cable to the screw terminals.

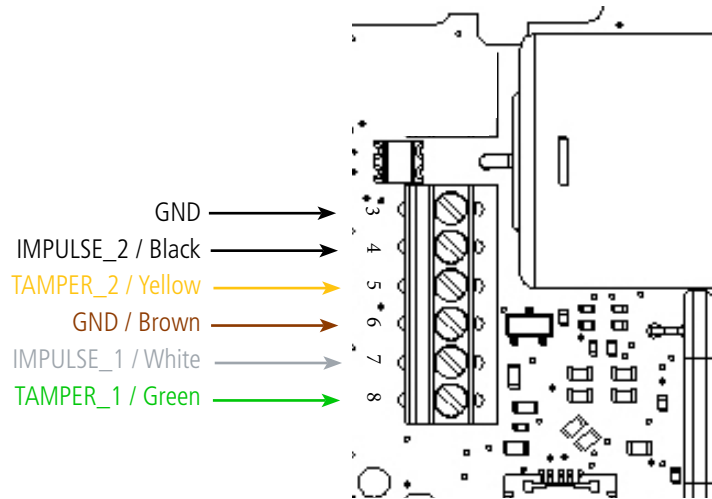
5.3. Mounting the counters on the screw terminals

Once the nut and packing seal are installed, the strands of the meter cable can be connected to the screw terminals of the product.

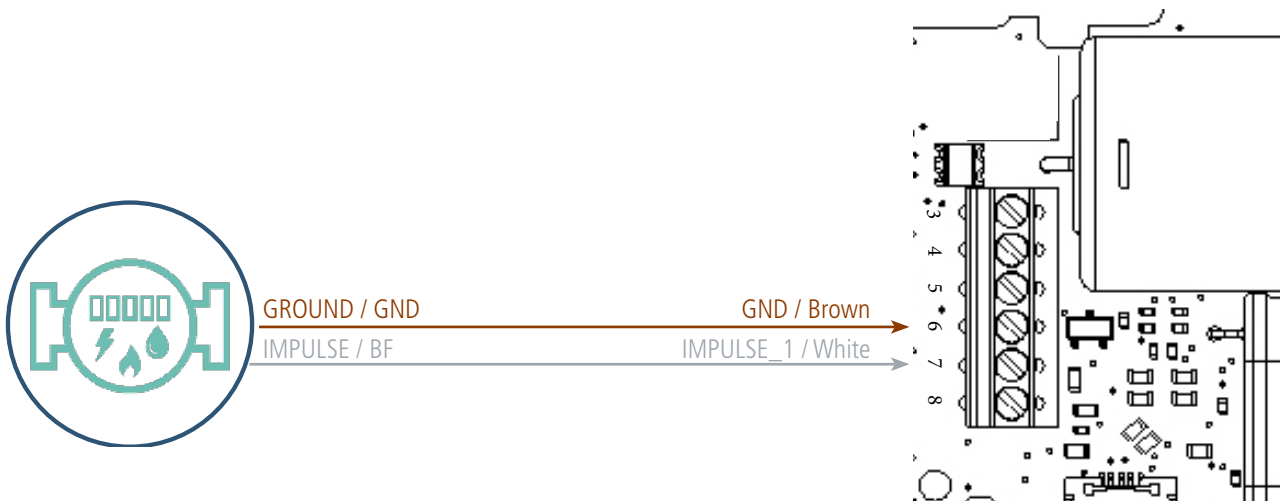
Below is the identification of each terminal block:

Note: Up to 2 meters of the same type can be used in parallel.

Below is a description of the terminal blocks:

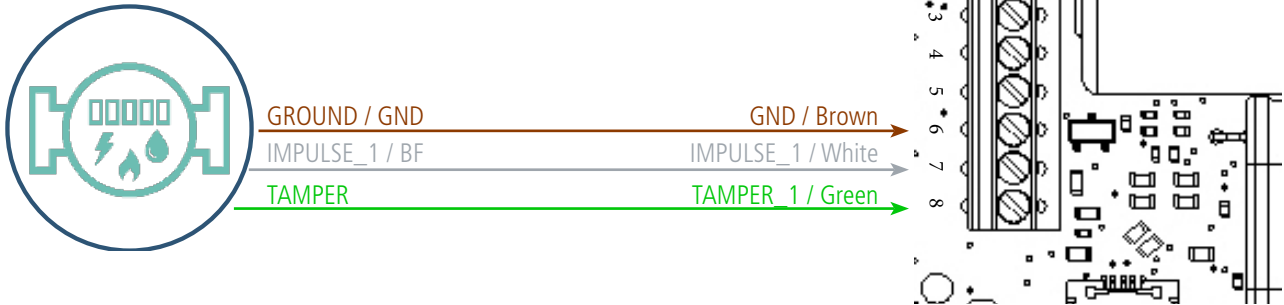


Meter with 2-wire output



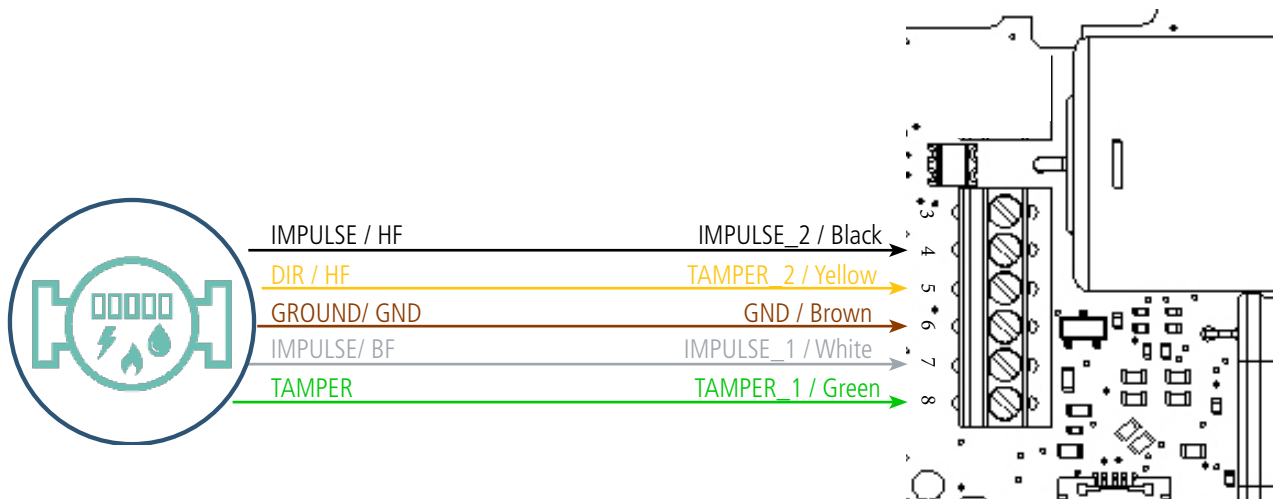
In this configuration, it is necessary to deactivate the input TAMPER of channel A (register 320 bit 3 = 0) and preferably deactivate channel B (register 320 bit 4=0) which is not no used.

Meter with 3-wire output



In this configuration, it is preferred to activate input TAMPER of channel A (register 320 bit 3 = 1) and deactivate channel B (register 320 bit 4=0) which is not used.

Meter with 5-wire output



In this configuration, the 2 inputs (A & B) must be activated (register 320 bits 0 and 4 = 1). The combination of the pulse counts on inputs A & B (IMPULSION_1 & IMPULSION_2) allows to know the quantities measured in the 2 directions. The activation of signals FRAUDE_1 & FRAUDE_2 (register 320 respectively bit 3 and 7 = 1) allows to generate alarms of fraud and wrong flow direction.



6. DOCUMENT HISTORY

User guide version	Contents
V1.0.0	Document created

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