sigfox RC4 PULSE V3

Transceiver pulse interfaces

User Guide

Version 1.0.0

NEW DOCUMENTATION

ENGLISH

EN

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

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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 functionnments 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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Table of content

PRODUCTS AND REGULATORY INFORMATION

Document Information	
Title	sigfox RC4 PULSE V3 - User Guide
Document type	User Guide
Version	1.0.0

This document applies to the following products :

Name	Reference	Version firmware
sigfox RC4 PULSE V3	ARF8230KA	Version RTU : V01.01.01 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

Declaration of conformity - Australia

Manufacturer's name :   **adeunis**.

Manufacturer's address :   **Parc Technologique PRE ROUX**

                                283 rue Louis NEEL

                                38920 CROLLES

Country: **FRANCE**

Authorized representative   **M2M Connectivity Pty Ltd**

                                E3763

Address :   **1 Barrett Street**

                                3031 Kensington (Victoria)

Country: **AUSTRALIA**

Certify and declare under our sole responsibility that the following apparatus:

Description: PULSE **Wireless transceiver in 915-928MHz band**.

Manufacturer: **adeunis**

Identification: **ARF8230K**

Conforms with the essential requirements for Australia market:

Harmonized Standards :

• IEC 60950-1 ed.2 and IEC 62368-1(safety)

• AS/NZS 4268:2012

Name and position of person binding the manufacturer **Emmanuel MONNET**

or his authorised representative: **Certification Manager- adeunis**

Declaration of conformity - New Zealand

Manufacturer's name :	**adeunis**.
Manufacturer's address :	**Parc Technologique PRE ROUX**
	283 rue Louis NEEL
	38920 CROLLES
Country:	**FRANCE**

Authorized representative	**Direct Control Limited**
	E3441
Address :	**Wellesley Street,**
	1141 Auckland
Country:	**NEW ZEALAND**

Authorized representative	**Go Wireless NZ Ltd**
	E678
Address :	**1 Kingsford Smith Drive**
	Unit 5, 7440 Rangiora (North Canterbury)
Country:	**NEW ZEALAND**

Certify and declare under our sole responsibility that the following apparatus:

Description PULSE **Wireless transceiver in 915-928MHz band**.

Manufacturer: **adeunis**

Identification: **ARF8230K**

Conforms with the essential requirements for New Zealand market:

Harmonized Standards :

• IEC 60950-1 ed.2 and IEC 62368-1(safety)

• AS/NZS 4268:2012

Name and position of person binding the manufacturer **Emmanuel MONNET**

or his authorized representative: **Certification Manager- adeunis**

INTRODUCTION

Adeunis
283, rue Louis Néel
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France

Web   www.adeunis.com

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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.

RECOMMANDATIONS 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.

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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

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 corectly implemented.

1. PRODUCT PRESENTATION

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

Description
- sigfox RC4 PULSE V3 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 sigfox protocol allows the user to integrate the sigfox RC4 PULSE V3 into any network that is already deployed.
- Two meters 3 wires or one meters 5 wires may be controlled by a single SIGFOX 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 sigfox RC4 network, allowing in particular a choice of modes of transmission, periodicity or triggering thresholds.
- The sigfox RC4 PULSE V3 is powered by a non-replaceable internal battery.

IMPORTANT NOTE: The sigfox RC4 PULSE V3 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

Casing base detail
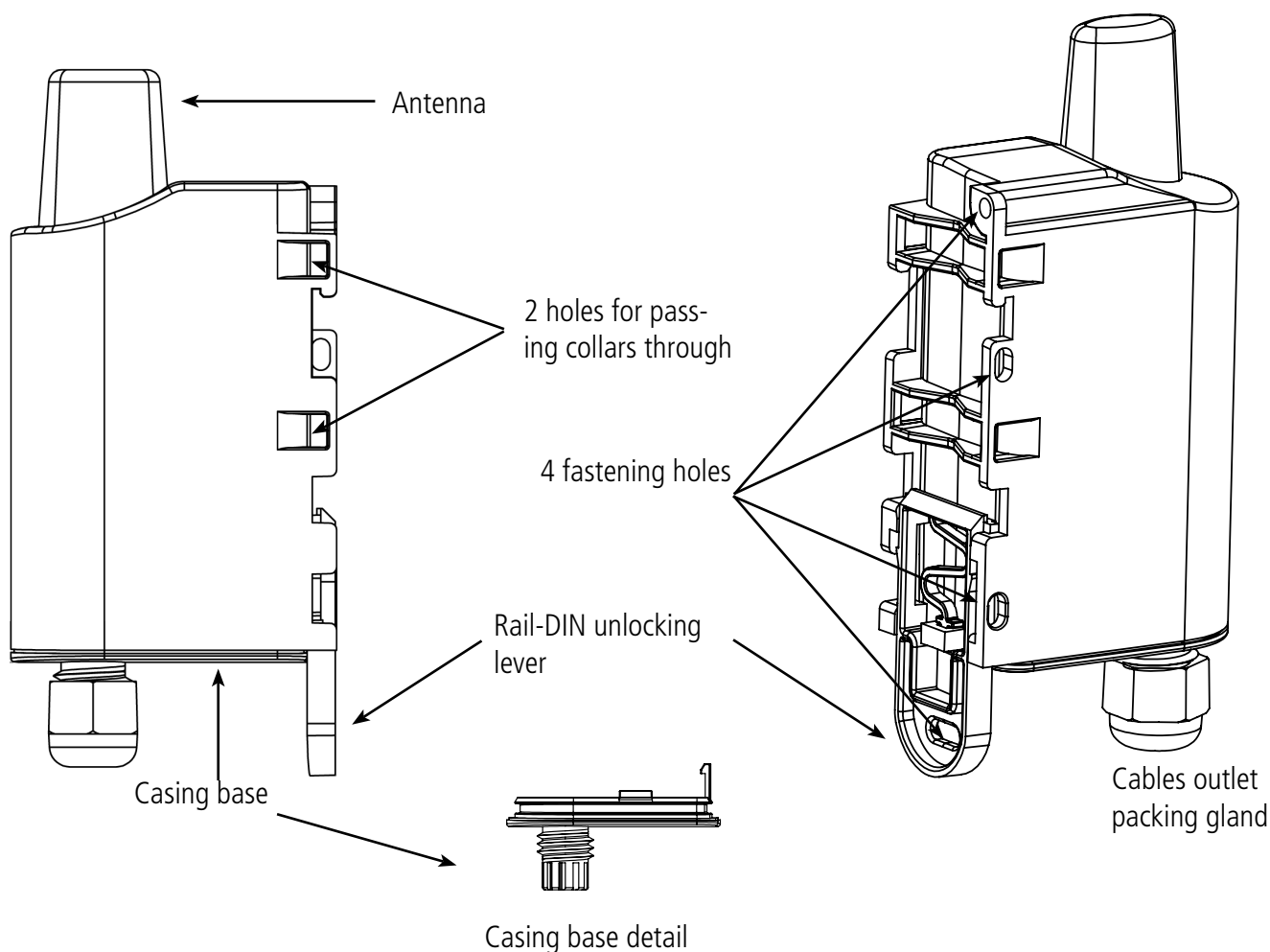
1.2. Dimensions

Values in millimeters

1.3. Electronic card

Internal antenna

Internal battery

RF module
sigfox protocol

USB port for product
configuration

Screw terminals for
connecting meters

1.4. Technical Specifications

1.4.1 General characteristics

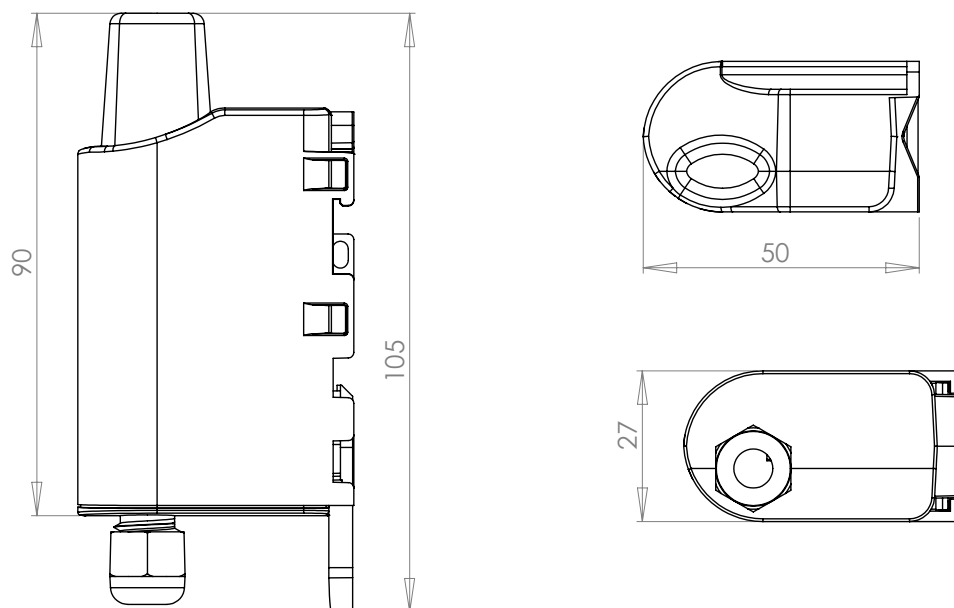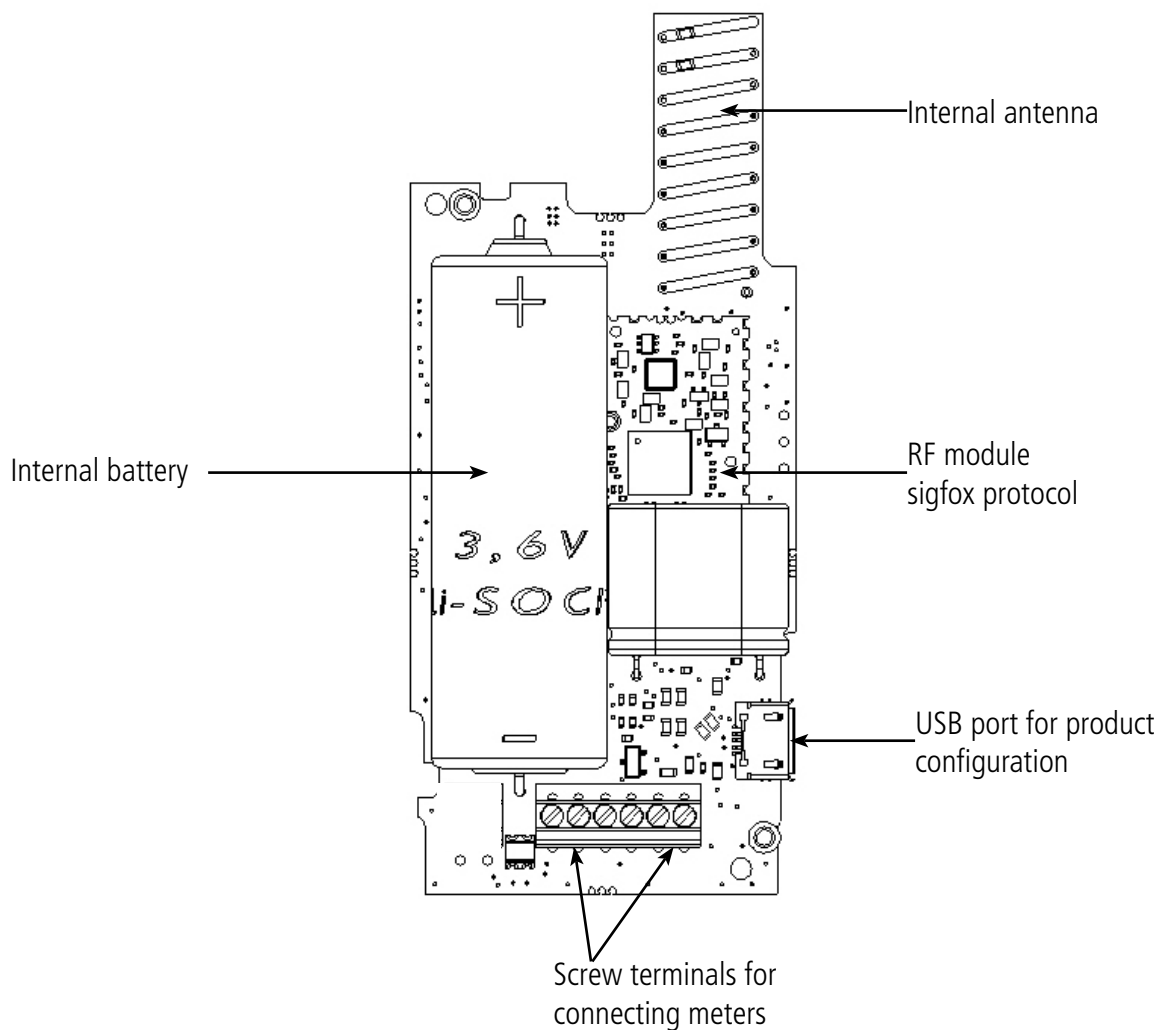| Settings	Value
Supply voltage	Nominal 3.6V
Power supply	Battery Li-SOCl2
Maximum Power	90mA
Working temperature	-25°C+70°C
Dimensions	105 x 50 x 27mm
Casing	IP 67
Sigfox zone	RC2

1.4.2 Autonomy

Operating conditions	Sending periodicity	Number of sensors	Autonomy
Product shelf life before use: Maximum 1 year. Calculations performed at a temperature of 20°C Based on 500 pulses / day	140 frame/day	1	0.5 year
	140 frame/day	2	0.5 year
	100 frame/day	1	0.7 year
	100 frame/day	2	0.7 year
	50 frame/day	1	1.3 years
	50 frame/day	2	1.3 years
	20 frame/day	1	3 years
	20 frame/day	2	3 years
	10 frame/day	1	5.7 years
	10 frame/day	2	5.6 years
	4 frame/day	1	11.4 years
	4 frame/day	2	11 years
	2 frame/day	1	17 years
	2 frame/day	2	16 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):
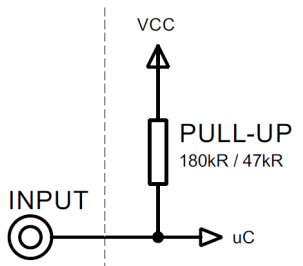
Type	Name	Type of sensor
Water	Itron Flodis	Cyble Sensor V2
	Wehrle TRK-HYX / ETK-EAX	Wehrle Modularis
	Sappel-Diehl Aquarius/Altair	IZAR Pulse 3 & 4 Fils
Gas	Elster BK	Elster IN-Z63
Electricity		Fludia FM250E et FM250M
	Socomec Countis E00	
Thermal	Itron CF Echo II	

1.4.4 Physical interface characteristics
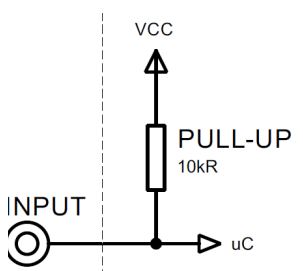#### 1.4.4.01   INPUT Circuit

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:
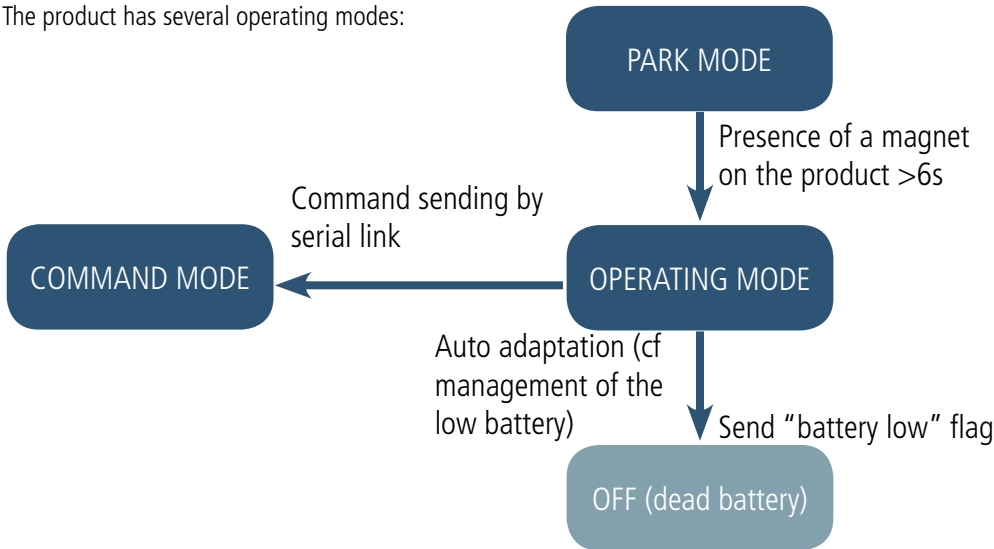
2.1.1 PARK mode

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.
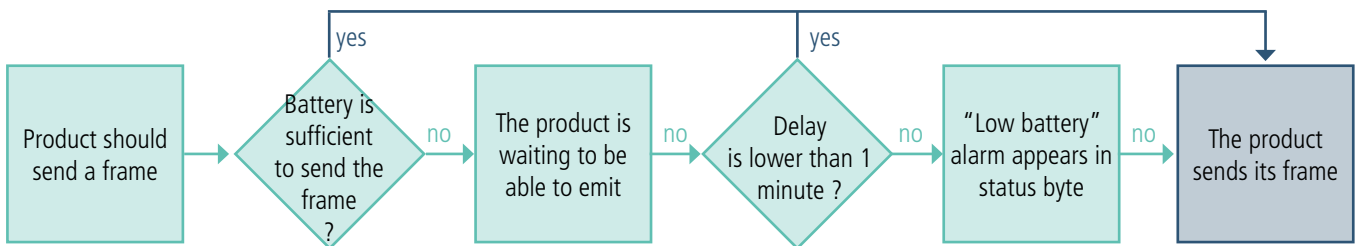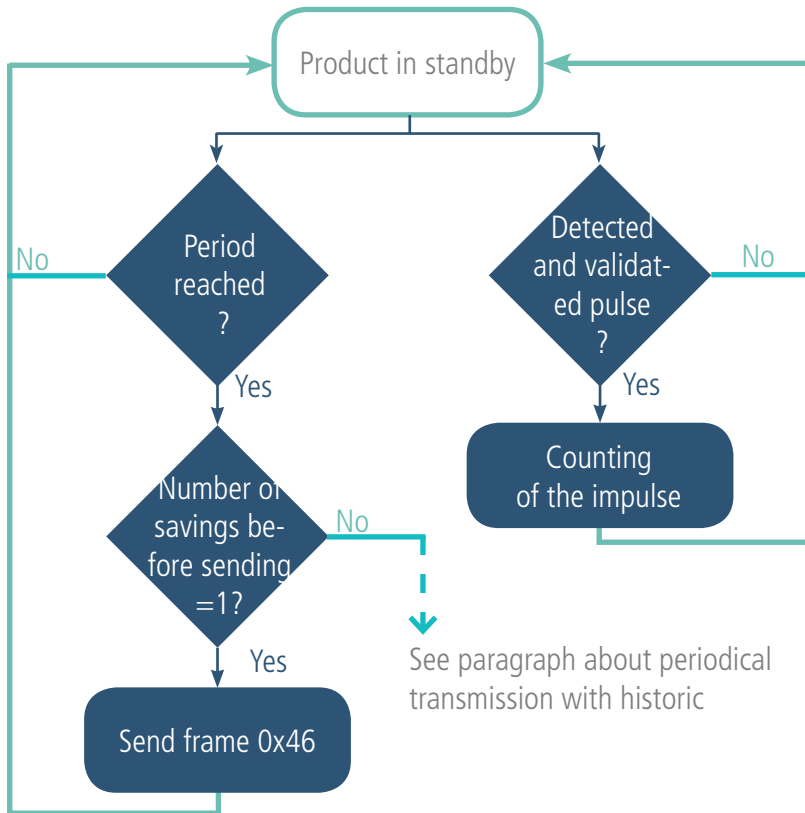

The battery low alarm is switching off if the battery is replaced or when the temperature conditions are favorable for the proper functioning of the battery.

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:

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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 egal 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:
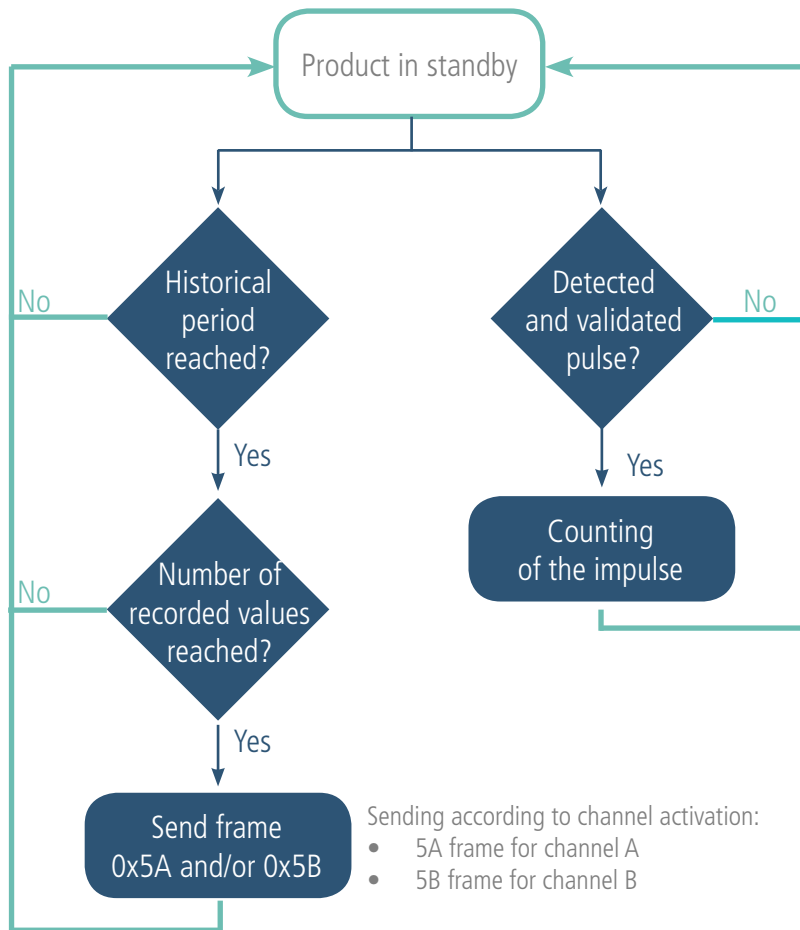
The parameters associated with this mode of operation are:
* Enabling and Configuring inputs (register 320)
* Historisation period (register S321)
* Sending frequency (S301)
* Anti-bounce timer period (registers S322)

Eg:

Register	Value encoding	Value	Result
S320	Hexadecimal	0x39	Channel A : • Activated • Meter other than gas • Tamper input activated Channel B : • 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 : • Channel A = 500ms • Channel B = 100ms

2.2.3 Periodic transmission with redundancy

The product enables to ad 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.

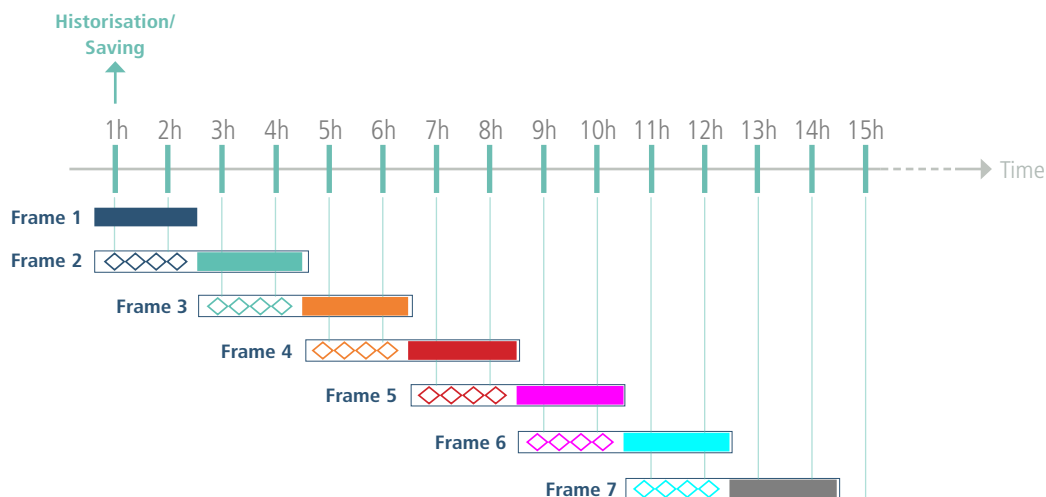The parameters associated with this mode of operation are:

- 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:

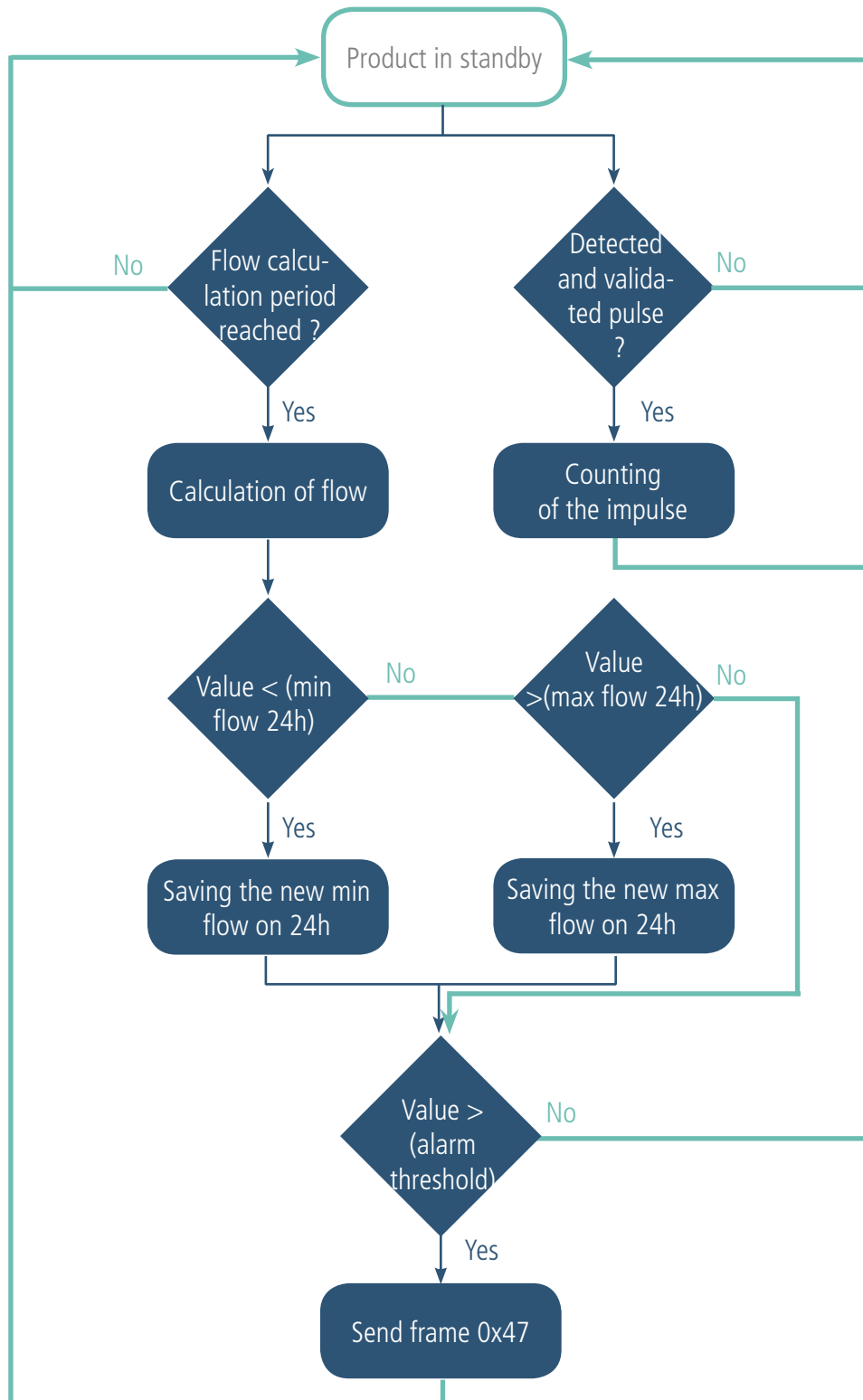| Register	Encoding	Value	Result
S320	Hexadecimal	0x39	Channel A : • Activated • Meter different than gas • Tamper input activated Channel B : • Activated • Gas meter • Tamper input deactivated
S301	Decimal	2	Sending every 4 historisations (saving)
S321	Decimal	1800	Historisation of the channel A and channel B index every hours (1800x2seconds = 60 minutes)
S322	Hexadecimal	0x57	Anti-rebound : • Channel A = 500ms • Channel B = 100ms
S340	Decimal	2	2 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 2 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:

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```
                          Product in standby
                      ┌──────────┴──────────┐
                      │                     │
              Flow calcu-              Detected
         No   lation period      No    and valida-
       ◄──────  reached ?      ◄──────   ted pulse
                      │                      │
                    Yes                    Yes
                      │                      │
              Calculation of flow      Counting
                                       of the impulse
                      │                      │
              Value < (min    No    Value
                flow 24h)    ─────► >(max flow 24h)   No
                      │                      │      ─────►
                    Yes                    Yes
                      │                      │
              Saving the new min     Saving the new max
                 flow on 24h            flow on 24h
                      │                      │
                      └──────────┬───────────┘
                                 │
                           Value >
                     No    (alarm
                   ◄──────  threshold)
                                 │
                               Yes
                                 │
                           Send frame 0x47
```

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)
- History configuration (register S321)
- 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 : • Activated • Meter other than gas • Tamper input activated Channel B : • Activated • Gas meter • Tamper input disabled
S322	Hexadecimal	0x57	Anti-bounce : • 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 : • Activated • Meter other than gas • Tamper input activated Channel B : • 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:
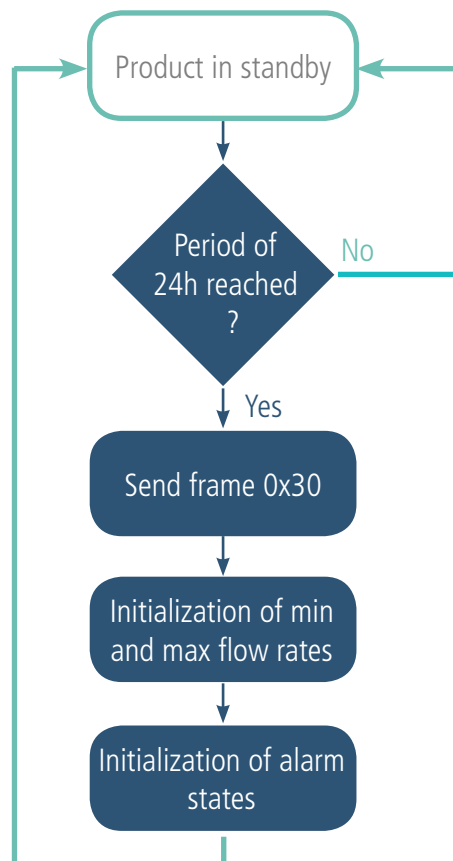
The transmission period of the daily frame is fixed (24 hours) and not configurable.

2.2.7 Leaks detection
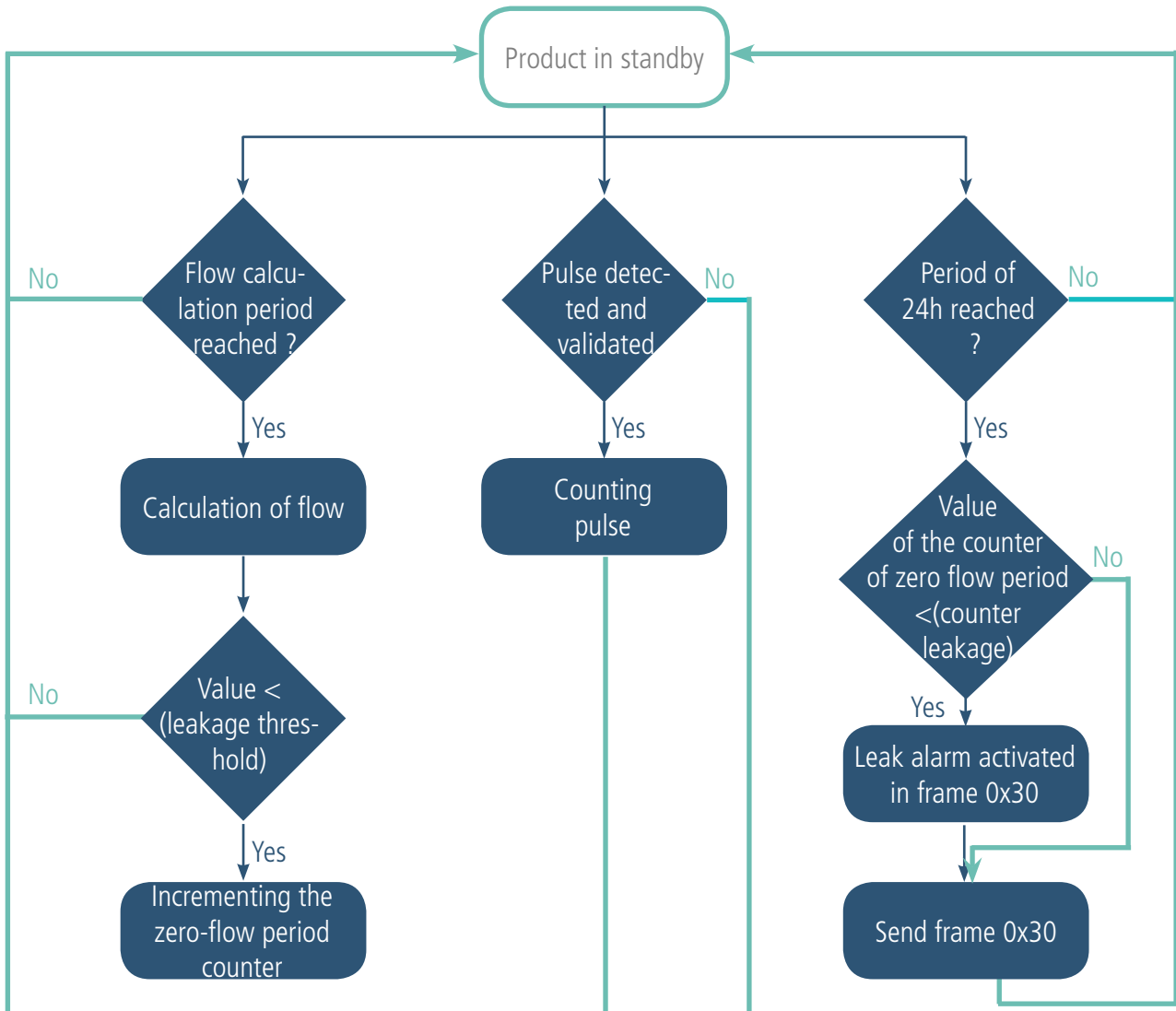
The product allows leak detection on each count input as shown in the following diagram:
The flow rate corresponds to the number of pulses of the flow calculation period divided by the same period. It is expressed in pulses / hour.

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 : • Activated • Meter other than gas • Tamper input activated Channel B : • Activated • Gas meter • Tamper input disabled
S322	Hexadecimal	0x57	Anti-bounce : • 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
Switching to the Command mode	Continuously lit	Continuously lit
Product faulty (return to factory)	Fixed ON	

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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/pulse-impulse-interface/

4. CONFIGURATION AND INSTALLATION

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
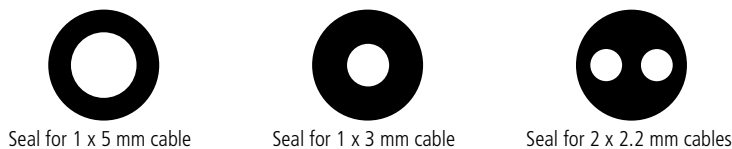
5.1. Dismantling the case

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 can be accessed.
Once connection of the meters has been finalized and configuration carried out, the case may be closed (be careful that the O-ring seal is not twisted).

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 SIGFOX PULSE to allow sealing: for a 5 mm diameter cable, for a 3 mm diameter cable, for 2 x 2.2 mm cables.
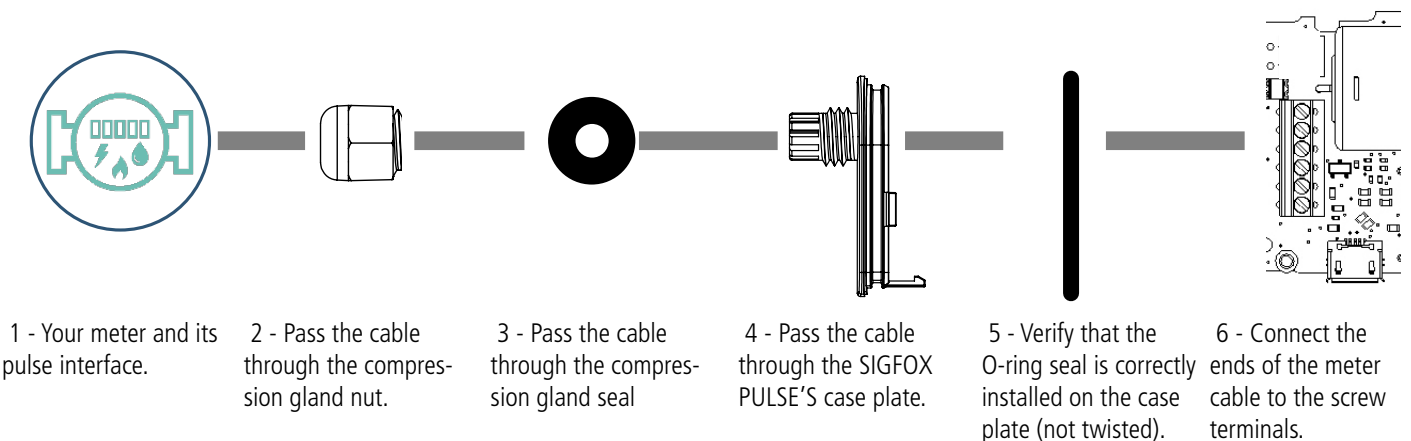
Seal for 1 x 5 mm cable   Seal for 1 x 3 mm cable   Seal for 2 x 2.2 mm cables

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 SIGFOX PULSE'S case plate.

5 - Verify that the O-ring seal is correctly installed on the case plate (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:
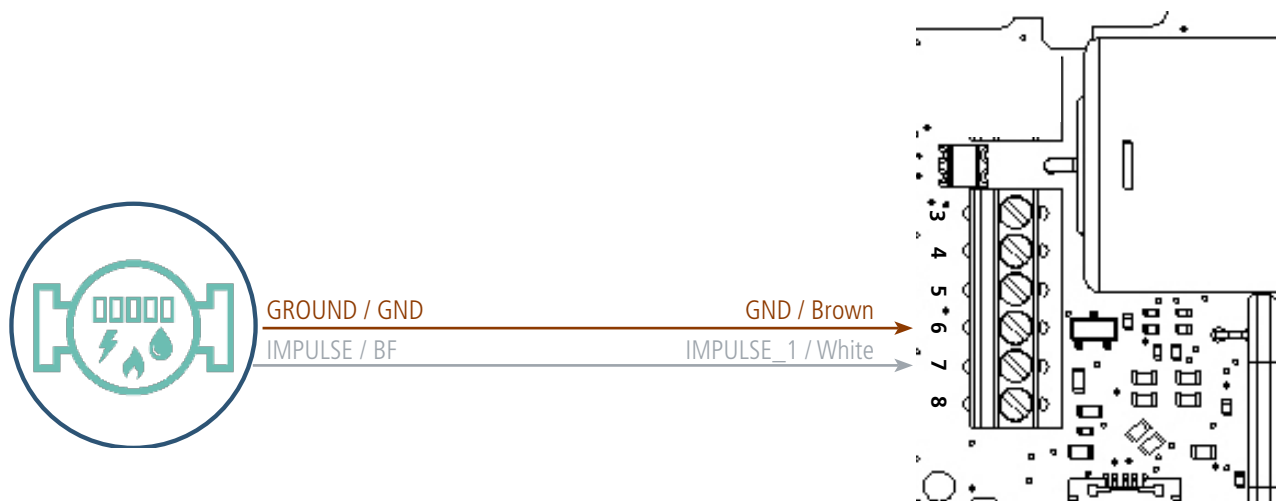
Note: Up to 2 meters of the same type can be used in parallel.

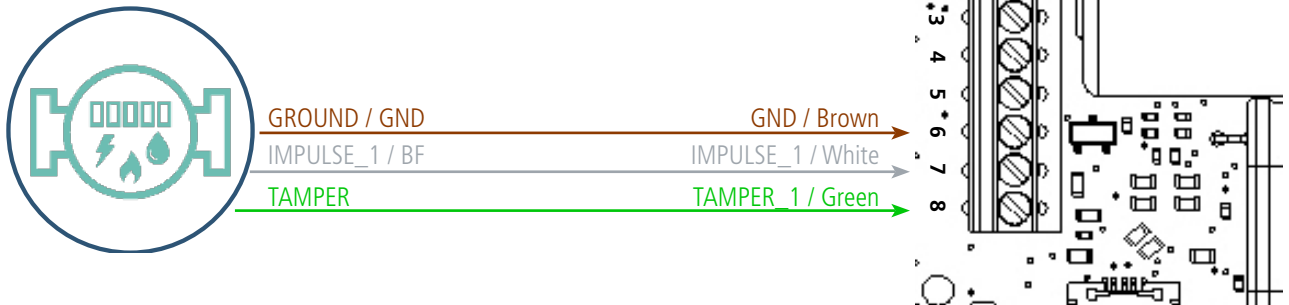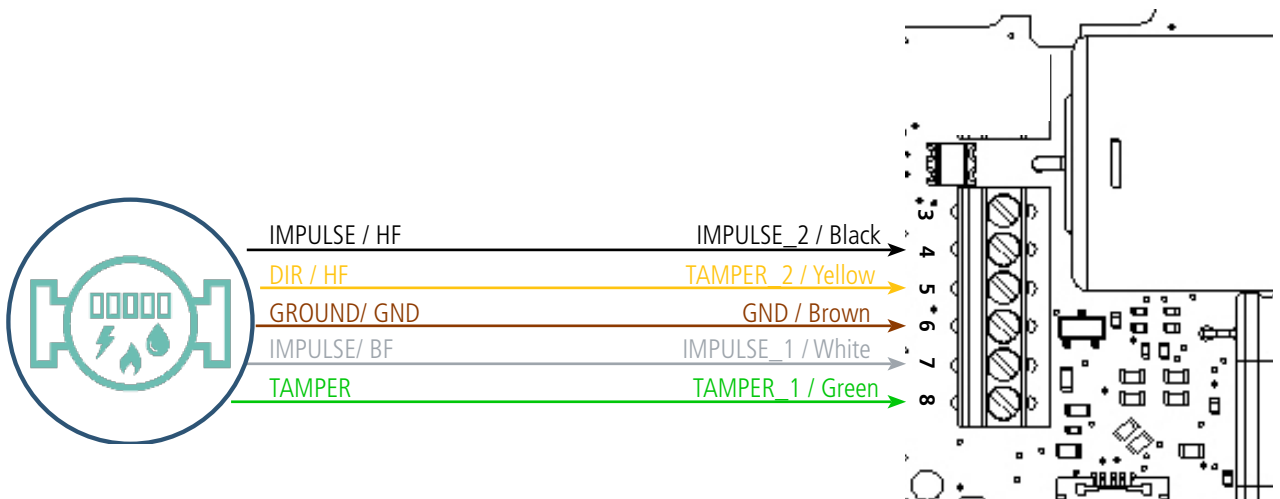Below is a description of the terminal blocks:
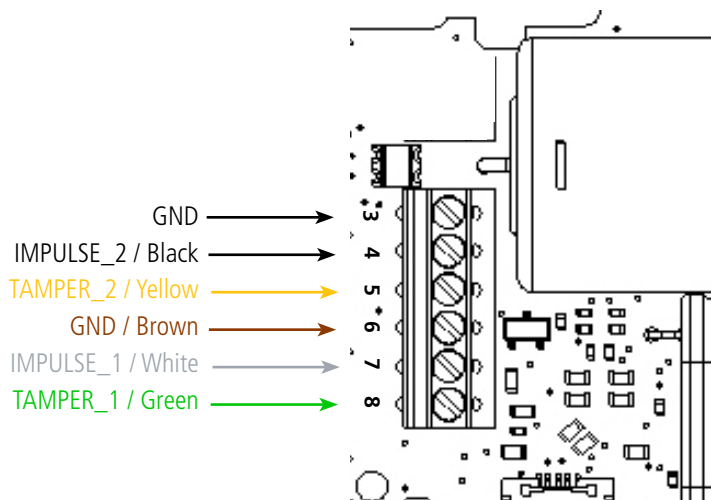
Meter with 2-wire output

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

Meter with 3-wire output

GROUND / GND — GND / Brown
IMPULSE_1 / BF — IMPULSE_1 / White
TAMPER — TAMPER_1 / Green

In this configuration, it is preferred to activate input TAMPER of A-channel (register 320 bit 3 = 1) and deactivate B-channel (register 320 bit 4=0) which is not no used.

Meter with 5-wire output

IMPULSE / HF — IMPULSE_2 / Black
DIR / HF — TAMPER_2 / Yellow
GROUND/ GND — GND / Brown
IMPULSE/ BF — IMPULSE_1 / White
TAMPER — TAMPER_1 / Green

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 channels A & B (IMPULSION_1 & IMPULSION_2) allows to know the quantities measured in the 2 directions.
The activation of signals TAMPER_1 & TAMPER_2 (register 320 respectively bit 3 and 7 = 1) allows to generate alarms of tamper and wrong flow direction.

5.4. 6 wires cable version

A version of the PULSE is proposed with a 6 wires cable of 70 cm already linked to the terminal blocks.
Here under the explanations of the colors:

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6. DOCUMENT HISTORY

User guide version	Contents	Author
V1.0	Document created	OPT