User Guide | DRY CONTACTS ARF8420ABA | LwM2M | NB-IoT / LTE-M

Document version	V1.0
Product/Service	DRY CONTACTS
Area	
Zone	

PRODUCT INFORMATION AND REGULATORY INFORMATION

This User Guide applies to the following product:

DRY CONTACT

Reference:

ARF8420ABA

APP Version: V1.4.x

DOCUMENT INFORMATION	
Title	DRY CONTACTS LwM2M - User Guide
Type	User Guide
Version	1.0

DECLARATIONS OF CONFORMITY

EU declaration of conformity (DC NB-iot & LTE-M ARF8420AB).pdf

UK declaration of conformity (DC NB-iot & LTE-M ARF8420AB).pdf

Compliance to FCC/ISED

TABLE OF CONTENTS

1. INTRODUCTION

1.1. DRY CONTACTS Overview

DRY CONTACTS is a ready-to-use sensor for **reporting status and alarms** over a cellular network.

This wireless product is designed to **remotely supervise** simple **binary data such as open/close status:** door contact, motion detector, smoke detector, gas detector, power detector, alarms, etc.

Thanks to its **2 configurable inputs**, DRY CONTACTS can operate simultaneously with up to 2 pieces of equipment.

Collected data are transmitted via a cellular IoT network (**NB-IoT** or **LTE-Cat-M1**) on a server. No additional equipment (gateway, router, etc.) is required for data transmission.

The product is equipped with an **NFC interface**, enabling **quick and easy configuration** with a smartphone.

DRY CONTACTS also integrates the **LwM2M** standard (Lightweight Machine to Machine), enabling users to **configure it remotely**, **optimize data consumption** with each transmission, achieve **integration and maintenance cost savings**, and **optimize the product's battery life**.

The product is powered by a dual **battery pack** and can **operate for over 15 years** without maintenance (configuration: 24 transmissions per day, 2 digital inputs activated with default open state).

Thanks to its **IP68** protection rating, DRY CONTACTS can operate in any environment.

1.2. DRY CONTACTS Main Features

- **2** configurable **digital inputs**, reading 0/1 state (Dry Contact) and allowing connection to 2 independent sensors
- **Worldwide cellular compatibility**: Can connect to any NB-IoT network (bands B1, B2, B3, B4, B5, B12, B13, B17, B19, B20, B25, B26, B28, B66) or LTE-Cat-M1 network (bands B1, B2, B3, B4, B5, B12, B13, B14, B18, B19, B20, B25, B26, B28, B66)
- **Multi-platform Integration:** Support for the standardized LwM2M communication protocol allows product integration with any IoT platform without the need for specific development
- **Customizable data transmission modes:**
  - Periodic transmission of dry contact status, open/close counts, open/close time, with configurable transmission interval

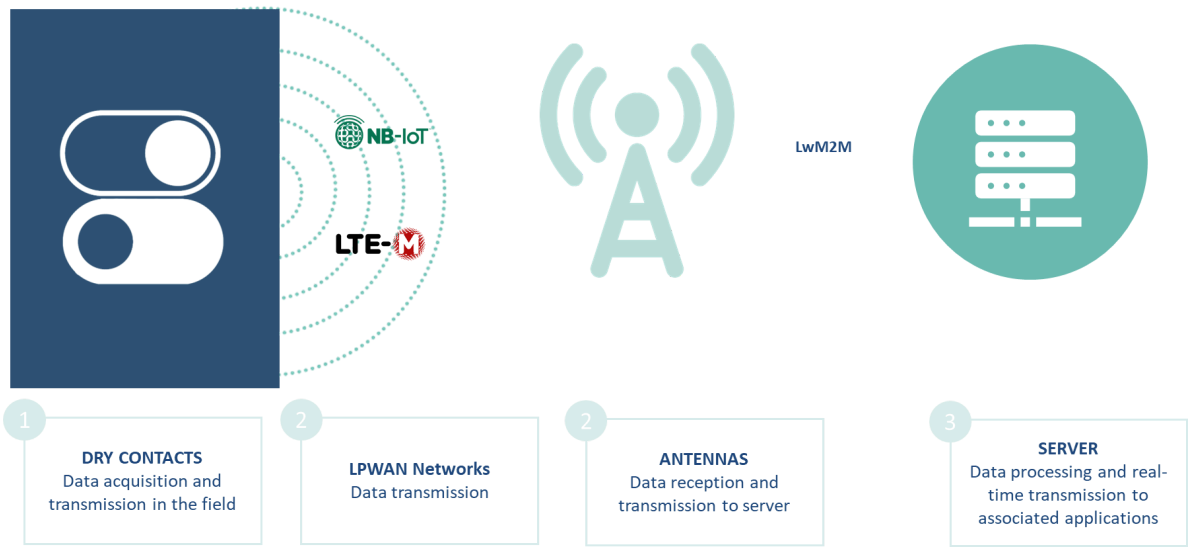
    - Event-driven (event counts, with configurable threshold for each input) for rapid detection of any anomaly such as a machine fault, door opening, or presence of water
    - Event-driven (event duration, with configurable threshold for each input) for detection of any anomaly such as a fridge or a door left open
- **Data logging :** The product can locally store 48 values per digital input, reducing the number of transmissions and increasing battery life
- **Fast local configuration:** The **NB-IoT/LTE-M IoT Configurator app** available on iOS and Android lets you configure the product in less than 10 minutes
- **Facilitated Remote Configuration:** All product configuration settings can be remotely configured from any LwM2M server, making it easy to reconfigure a deployed sensor fleet regardless of their location
- **Remote Operational Maintenance:** Application and modem firmware updates in a few minutes from any LwM2M server
- **Bootstrap Support:** Allows the factory-released product to download its secret codes and configuration upon first power-up (or after a factory reset)
- **Over 15 years lifetime:** powered by a dual battery pack and designed to operate for many years without replacement (see autonomy table)
- **Low battery alert:** When the product detects a low battery level, the user is alerted locally via a light signal or the NFC application, and remotely via a transmission to the LwM2M server.
- **Integrated mounting system**: DIN-rail, tube, wall, collar
- **IP68 protection rating**: DRY CONTACTS can operate in any environment
- **Made in France:** product designed and manufactured in France

📌 **NOTE**

To address different use cases, the DRY CONTACTS product also supports the MQTTS communication protocol.

To use the product with the MQTTS protocol, refer to the dedicated User Guide.

1.3. DRY CONTACTS Operating Principle



2. SPECIFICATIONS

2.1. Technical Specifications

2.1.1 General Characteristics

Mechanical Characteristics	
Dimensions	200 × 63.5 × 34 mm
Weight	163 g (including battery)
Casing	IP68, EMERGE™ PC 8731HH gray resin (casing) EMERGE™ PC 8430-15 transparent resin (soleplate) Indoor/outdoor use
Mounting System	DIN rail, tube, wall, collar

Electrical Characteristics	
Supply Voltage	3.6V nominal
Power Supply	Double FANSO Li-SOCl2 exchangeable Battery Pack - ER18505H-2 (max current 50 mA)
Battery Capacity	8000 mAh

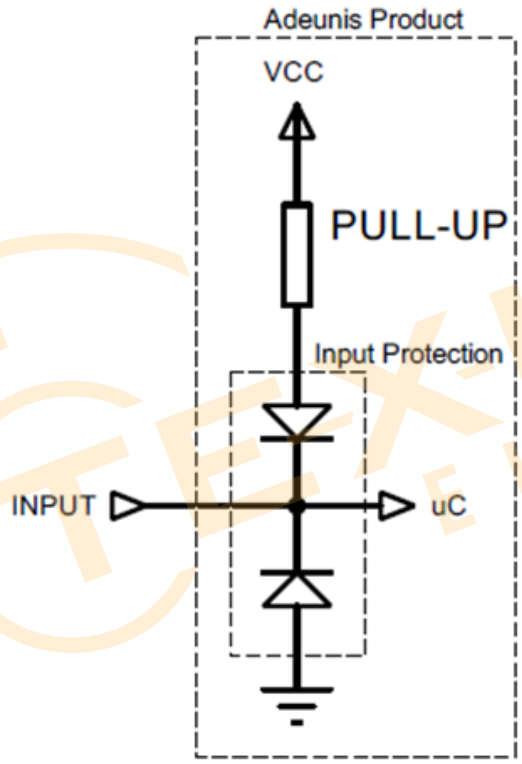
Operating Conditions	
Operating Range	-25°C / +70°C

Operating Conditions	
Relative Humidity	0 to 85% RH (non-condensing)
Operating Altitude	2000 m or less

2.1.2 Physical Interfaces

The DRY CONTACTS product has 2 configurable inputs, enabling 1 or 2 dry-contact output devices to communicate.

THE SCHEMATIC DIAGRAM IS AS FOLLOWS



Maximum Absolute Values	Unit
Minimum Input Voltage	-0.7 V
Maximum Input Voltage	+42 V

Electrical Characteristics	
Minimum Input Voltage	0 V
Maximum Input Voltage	+24 V
Equivalent Input Resistance	50 kΩ

Electrical Characteristics	
Input Frequency	< 50 Hz
HIGH LEVEL/CLOSE Input Current Consumption	33 µA
LOW LEVEL/OPEN Input Current Consumption	0 µA

Values exceeding the maximum absolute values will damage the product.

2.1.3 Compatible Networks and Protocols

Connectivity	
SIM Card	Nano SIM 4FF Class C (1.8 V)
Antenna	Internal
Radio Module	Nordic nRF9160
Cellular Standard	3GPP LTE Release 13
Cellular IoT Networks	NB-IoT, LTE-Cat-M1
NB-IoT Frequency Bands	B1, B2, B3, B4, B5, B8, B12, B13, B17, B19, B20, B25, B26, B28, B66
LTE-Cat-M1 Frequency Bands	B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B28, B66
Data Transfer Protocol	MQTTS, LwM2M (To use the product with the MQTTS protocol, refer to the dedicated User Guide)
Power Saving Feature	PSM

2.1.4 RF Characteristics

RF Characteristics	NB-IoT	LTE-Cat-M1
Max Transmit Power	+23 dBm	+23 dBm
Tx Bandwidth	200 kHz	1.4 MHz
Theoretical Data Rate	65 Kbps (UL) 30 Kbps (DL)	375 Kbps (UL) 300 Kbps (DL)
Sensitivity	> -108 dBm -113 dBm typ.	> -103 dBm -107 dBm typ.

2.1.5 Data Consumption Estimate

This section shows the estimated data consumption of DRY CONTACTS, depending on the type of communication mode selected and the frequency of data transmission.

📌 **NOTE 1**

Product/server communications such as time update, server registration, and firmware update are not considered in the data consumption estimate below.

NOTE 2

Historization of measurements in "PUSH" mode significantly reduces data consumption.

NOTE 3

Data consumption is equivalent regardless of the technology (NB-IoT or LTE-Cat-M1) the product uses to connect to the cellular network.

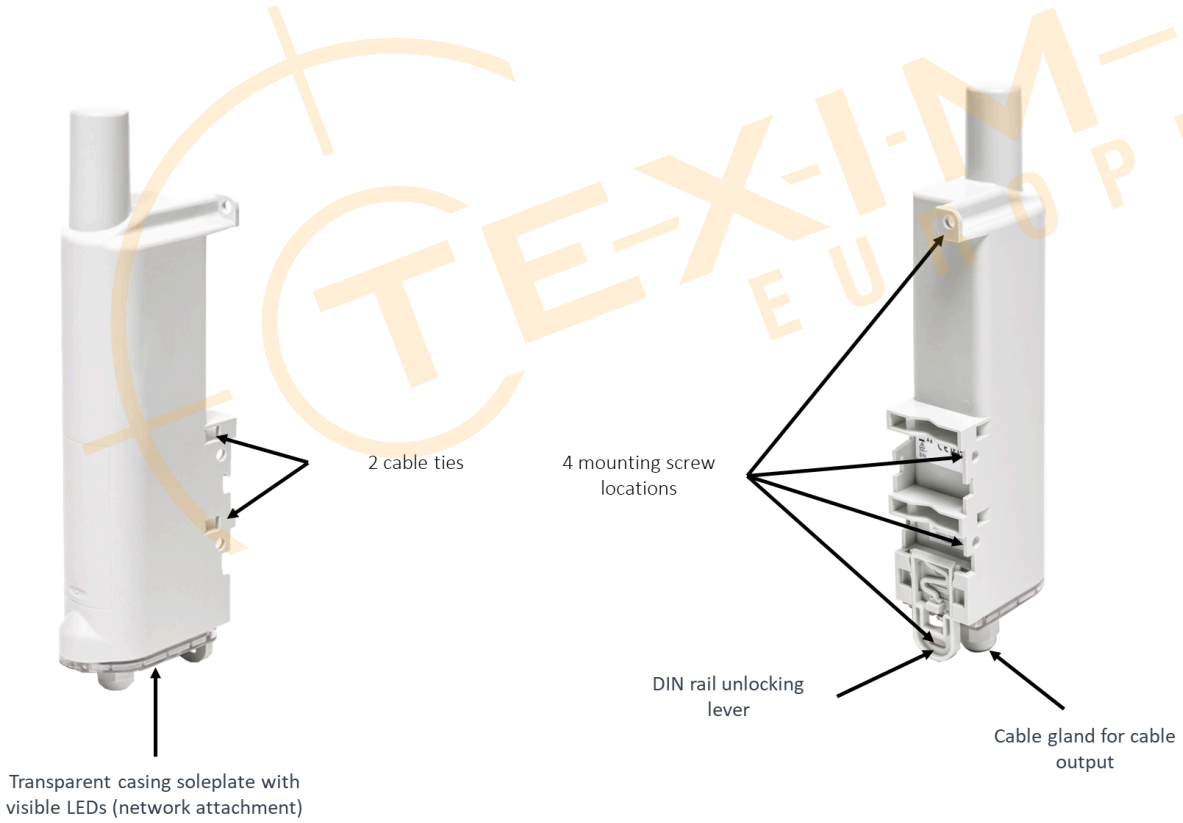
NOTE 4

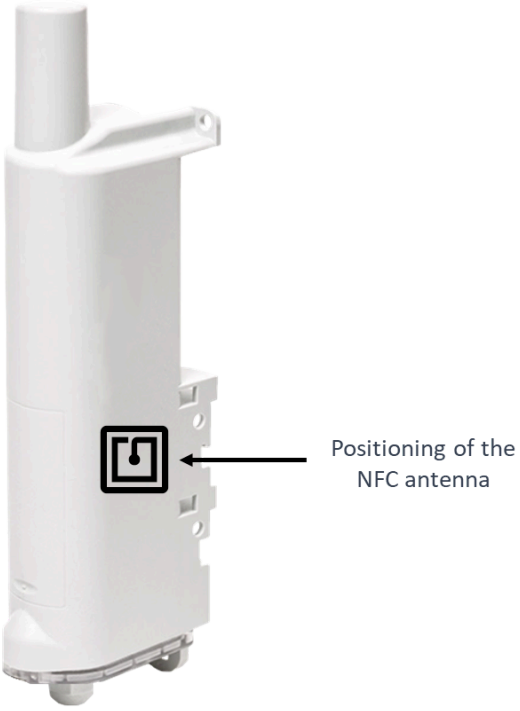
To reduce data consumption, it is recommended to configure a lifetime of 4 days once the initial data has been sent to the LwM2M server."

Product/server communication mode	Monthly Data Consumption for 144 Transmissions/Day	Monthly Data Consumption for One Transmissions/Day
"OBSERVE" mode Composite observation, 1 input enabled, default low state, time counter disabled, lifetime to 12 hours, "reliable notification" option disabled	673 Ko	135 Ko
"OBSERVE" mode Composite observation, 2 inputs enabled, default low state, time counters enabled on both inputs, lifetime to 12 hours, "reliable notification" option disabled	1107 Ko	204 Ko
"PUSH" mode without data logging Periodic transmission, 1 input enabled, default low state, time counter disabled, lifetime to 12 hours	982 Ko	183 Ko

Product/server communication mode	Monthly Data Consumption for 144 Transmissions/Day	Monthly Data Consumption for One Transmissions/Day
“PUSH” mode with data logging Periodic transmission, 1 input enabled, default low state, time counter disabled, lifetime to 12 hours	-	309 Ko If event counter for digital input is saved every 10 min
“PUSH” mode without data logging Periodic transmission, 2 inputs enabled, default low state, time counters enabled on both inputs, lifetime to 12 hours	1258 Ko	229 Ko

2.2. Casing presentation





Environmental Conditions and Protection Index

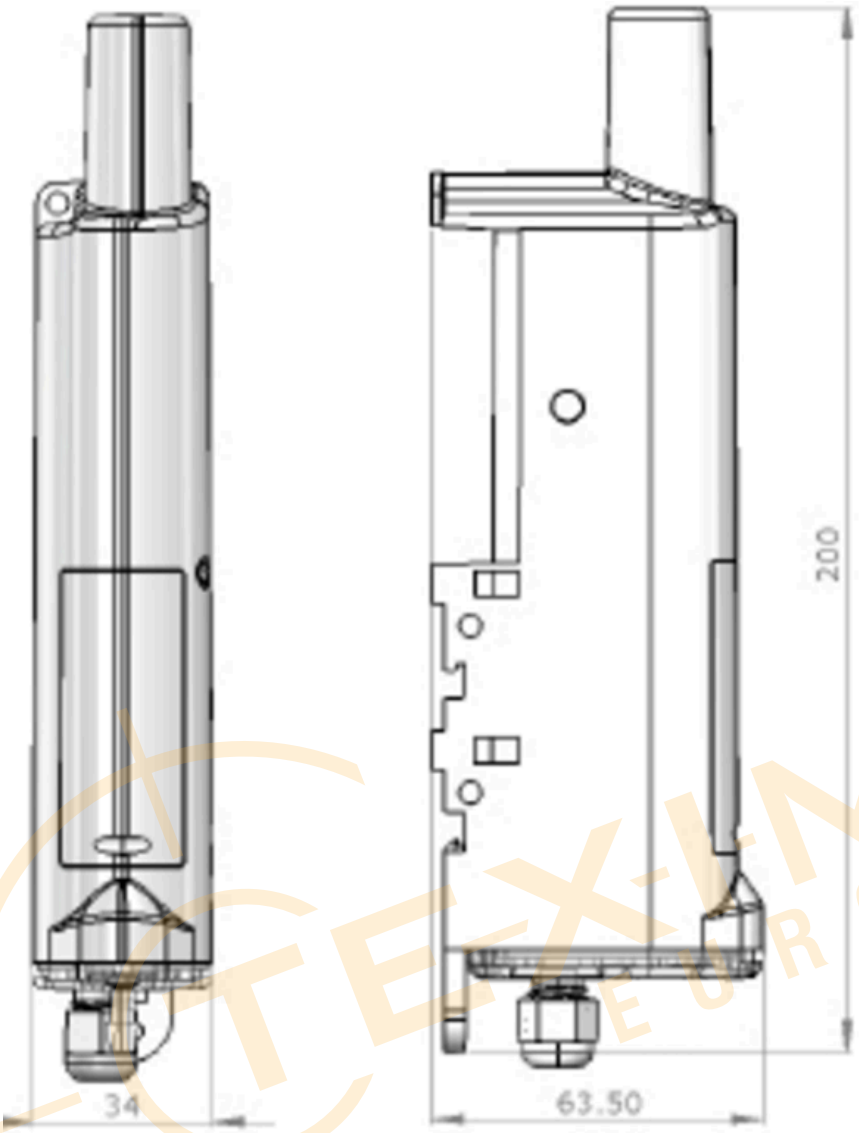
The product enclosure has been tested to ensure a certain level of dust and water resistance.

- For dust: Level 6 guarantees complete dust tightness.
- For water: Level 8 guarantees at least water resistance up to one meter for 1 hour.

Therefore, we can guarantee the water resistance of our IP68 enclosure for immersions less than or equal to this duration. Any use of our sensor outside the criteria mentioned above cannot be guaranteed by Adeunis.

> 📌 **NOTE**
>
> The IP68 protection rating does not guarantee protection against condensation due to ambient humidity and temperature variations. Prolonged exposure to high temperature variations and/or high relative humidity can lead to premature product failure.

2.3. Dimensions



Values in millimeters

3. DELIVERY PACKAGE

The product is delivered in a cardboard packaging containing the following elements:

- Upper casing, electronic board, casing soleplate, and 2 Torx 10 screws for the soleplate
- Cable gland nut and 2 cable gland seals

- Double ER18505H-2 battery pack

4. PRODUCT AUTONOMY

This chapter presents autonomy estimates for the DRY CONTACTS based on the number of active inputs, the selected network type, and the data transmission frequency, as well as network quality.

To ensure the proper functioning of the product and its autonomy, Adeunis strongly recommends:

- Selecting an operator supporting PSM mode on its network. Note that in the case of roaming, Adeunis recommends verifying that PSM mode is also guaranteed on other operator networks. For more information on PSM mode, please refer to the dedicated section.
- Choosing the technology (NB-IoT or LTE-Cat-M1) that the product will use to connect to the cellular network.
- Limiting the number of frequency bands used by the product to connect to the cellular network (for example, in France, only band 20 is used by operators).
- Preferring LwM2M servers with a connection ID.
- Limiting the number of OBSERVATIONS when using the "OBSERVE" mode.
- To configure, in the case of using the 'OBSERVE' mode, a lifetime of 4 days once the user-configured OBSERVATIONS and the initial data have been sent to the LwM2M server.”

📌 **NOTE 1**
The number of events detected has an impact on battery autonomy.

NOTE 2

If the associated sensors are in a “constantly closed” state then battery autonomy can be strongly impacted.

NOTE 3

In the case of a product configured to transmit data on change of state or event duration, Adeunis recommends setting a guard period to limit the number of transmissions.

NOTE 4

In the event of SIM suspension or network inaccessibility, the product will attempt to re-attach to the network automatically and regularly, which may have an impact on its autonomy.

4.1. Estimates of autonomy

4.1.1 NB-IoT Network

The autonomy table below was estimated based on a product connected to an NB-IoT network with PSM mode support.

Note that the product's autonomy may vary depending on the selected operator.

Battery life with a lifetime configuration set to 12 hours

Data Transmission Frequency	Number of Active Inputs	Good Network Autonomy (years)	Poor Network Autonomy (years)
144 messages/day	2	13	< 1
96 messages/day	2	> 15	< 1
48 messages/day	2	> 15	1.7
24 messages/day	2	> 15	3.2
12 messages/day	2	> 15	5.7
6 messages/day	2	> 15	9.3

Data Transmission Frequency	Number of Active Inputs	Good Network Autonomy (years)	Poor Network Autonomy (years)
4 messages/day	2	> 15	11.9
2 messages/day	2	> 15	> 15
1 message/day	2	> 15	> 15

Battery life with a lifetime configuration set to 4 days

Data Transmission Frequency	Number of Active Inputs	Good Network Autonomy (years)	Poor Network Autonomy (years)
144 messages/day	2	13	< 1
96 messages/day	2	> 15	< 1
48 messages/day	2	> 15	1.7
24 messages/day	2	> 15	3.3
12 messages/day	2	> 15	6.1
6 messages/day	2	> 15	10.5
4 messages/day	2	> 15	13.8
2 messages/day	2	> 15	> 15
1 message/day	2	> 15	> 15

4.1.2 LTE-Cat-M1 Network

The autonomy table below was estimated based on a product connected to an LTE-Cat-M1 network with PSM mode support.

Note that the product's autonomy may vary depending on the selected operator.

Battery life with a lifetime configuration set to 12 hours

Data Transmission Frequency	Number of Active Inputs	Good Network Autonomy (years)	Poor Network Autonomy (years)
144 messages/day	2	7.8	1.1
96 messages/day	2	11	1.6
48 messages/day	2	>15	3.0
24 messages/day	2	>15	5.5
12 messages/day	2	>15	9.6
6 messages/day	2	>15	>15
4 messages/day	2	>15	>15
2 messages/day	2	>15	>15
1 message/day	2	>15	>15

Battery life with a lifetime configuration set to 4 days

Data Transmission Frequency	Number of Active Inputs	Good Network Autonomy (years)	Poor Network Autonomy (years)
144 messages/day	2	7.8	1.1
96 messages/day	2	11.1	1.6
48 messages/day	2	>15	3.1
24 messages/day	2	>15	5.7
12 messages/day	2	>15	10.2
6 messages/day	2	>15	>15
4 messages/day	2	>15	>15
2 messages/day	2	>15	>15
1 message/day	2	>15	>15

📌 **NOTE**

The autonomy values above are estimates made under certain conditions of use and environment
- 1 year maximum of product storage before use,
- Calculations made at a temperature of 20°C indoors
- Based on 1 emission per change of state , lasting 100 ms
- LOW/OPEN state by default

They do not represent a commitment on the part of Adeunis.

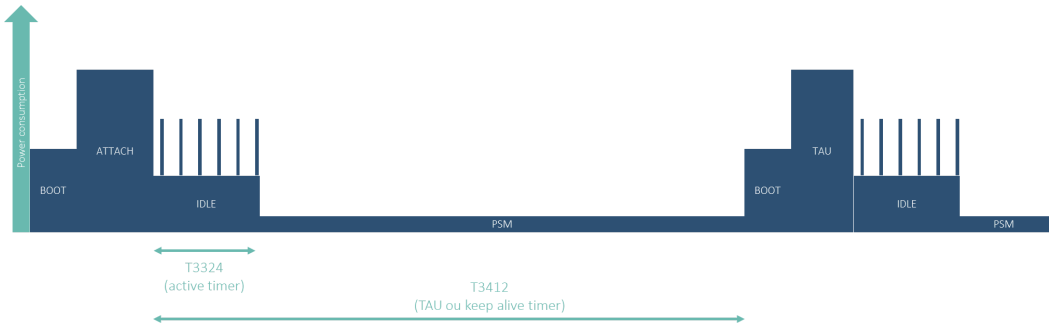
Battery life depends on non-predictive network parameters, including :
- Signal quality
- Transmission power

4.2. Power Saving Mode (PSM) Support

The DRY CONTACTS product supports Power Saving Mode (PSM).

The main advantage of PSM is that it allows the product to operate for extended periods with reduced power consumption.

- The product periodically enters an extended inactive phase during which it is disconnected from the network. During these periods, the sensor does not receive signals from the network and does not send data. This significantly saves battery energy, as the product does not need to maintain a continuous connection with the cellular network.
- When the product needs to send data, it exits PSM and temporarily joins the network. It establishes a connection with the base station and transmits the collected data.
- Once the data is transmitted, the product returns to a low-power state.



The user can configure via the **IoT Configurator NB-IoT/LTE-M application:**

- The period during which the product is reachable by the network to receive downlink data (T3324).
- The deep sleep period during which the product remains attached to the network but is unreachable (T3412).

Go to the "CONFIGURATION" menu of the sensor ⇛ Select the "NETWORK" section ⇛ Configure the "T3412 Multiplicator", "T3412 Value", "T3324 Multiplicator", "T3324 Value" parameters ⇛ Apply the new configuration to the product via NFC.

Note that the product informs the network about the desired reachability period and the period during which it will be in PSM. However, these two trigger values (T3324 and T3412) can be changed by the network during the attachment or location update (TAU) procedure.

At any time, the user can check the trigger values (T3324 and T3412) on the **IoT Configurator NB-IoT/LTE-M application**.

Go to the "DETAILS" menu of the sensor ⇛ Select the "DIAGNOSTIC" section ⇛ Monitor the values of the "T3412" and "T3324" parameters.

📌 **NOTE**

If the T3324 value indicated on the application is -1, it means that the network to which the product is connected does not allow access to the PSM mode.

5. PREPARING FOR FIRST USE

5.1. Downloading the NB-IoT/LTE-M IoT Configurator Application

NB-IoT/LTE-M IoT Configurator is an Android/iOS application for mobile/tablet that allows you to configure the network, server, and application parameters of the DRY CONTACTS product via an NFC interface.

Before starting your DRY CONTACTS, download the free application:

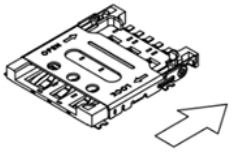
- Google Play Store
- App Store

5.2. SIM Card Installation

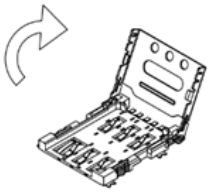
SIM CARD INSTALLATION PROCEDURE:

1. Ensure that the product is in PARK mode via the **NB-IoT/LTE-M IoT Configurator** application
2. Remove the screws from the sole
3. Pull on the cable gland to detach the sole

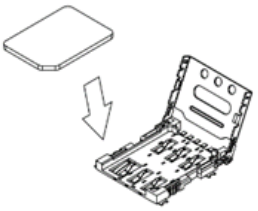
4. Carefully slide the metal cover from the "LOCK" position to the "OPEN" position



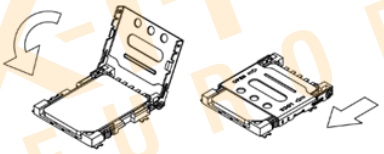
5. Open the metal cover to allow the insertion of the Nano SIM card



6. Place the Nano SIM card against the contacts, chip facing down



7. Close the metal cover and slide it to the "LOCK" position



8. Reinsert the card following the guide rails inside the housing and tighten it for sealing

ATTENTION

Ensure that the product is in PARK mode when inserting or removing a SIM card. Inserting or removing the SIM card with the product powered on can damage it.

> 📌 **NOTE**
>
> The configuration of a PIN code is not supported in the DRY CONTACTS product.

5.3. LEDs indicator

DRY CONTACTS is equipped with a red LED and a green LED on the underside of the casing, enabling the user to follow the start-up and network connection process, and to be informed of the battery status.

PRODUCT STATUS	RED LED STATE	GREEN LED STATE
Product in PARK mode (i.e., turned off)	OFF	OFF
Product Startup	OFF	Flashing 5 cycles 100 ms ON / 100 ms OFF
Product Startup Failure	ON for 15 sec	OFF
Network Attachment Process in Progress	Flashing 50 ms ON / 1 sec OFF	Flashing 50 ms ON / 1 sec OFF
Successful Network Attachment	OFF	ON for 5 sec
Network Attachment Failure	ON for 5 sec	OFF
SIM Not Detected at Product Startup	Flashing 1 sec ON / 500 ms OFF for 30 sec	OFF
Low Battery Level	Flashing 500 ms ON every 60 seconds	OFF

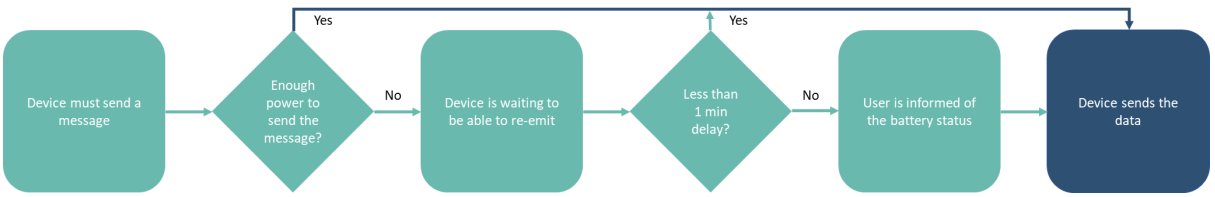
5.4. Power supply

5.4.1 Power Supply Type

The DRY CONTACTS is powered by a double FANSO Li-SOCI2 ER18505H-2 Battery Pack (max current 50 mA).

5.4.2 Low Battery Management

When the product detects that the battery is unable to deliver the necessary energy for transmission (extreme temperatures or end of battery life), it waits until it is capable of transmitting. If it detects that the delay incurred is more than 1 minute, it informs the user that the battery level is low.

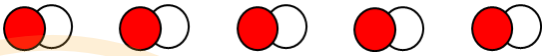


The user can be informed of the product's battery status:

- Locally via the **NB-IoT/LTE-M IoT Configurator** application,
- Locally via the LED display,
- Or remotely via a MQTT broker.

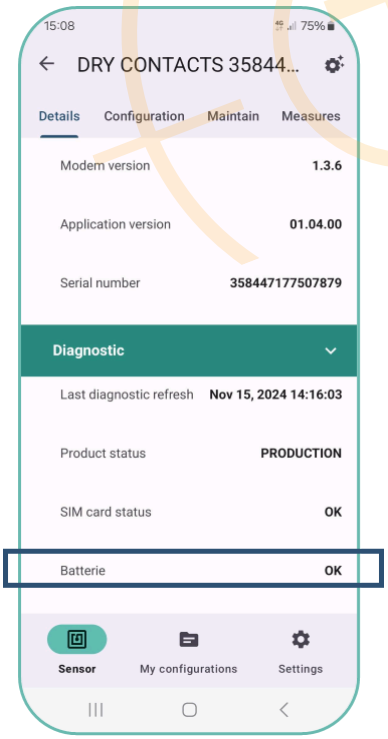
The low battery indication changes automatically when the battery is replaced or when temperature conditions favor the proper functioning of the battery.

USER INFORMATION VIA VISUAL INDICATOR ON PRODUCT LEDs:



The red LED flashes every 60 seconds for 500 ms if the product's battery level is low.

USER INFORMATION VIA THE NB-IoT/LTE-M IOT CONFIGURATOR APPLICATION:



Go to the "DIAGNOSTIC" section of the sensor to check the battery status: "OK" or "LOW".

USER INFORMATION VIA A LwM2M SERVER:

The LwM2M server can request the product to return its battery status.

For this, the user must trigger, via the server, a READ operation on the "error code" resource, which will return the current value of this resource, or an OBSERVE operation that will allow tracking the battery status at a predefined interval.

URI	Object Name	Resource Name	Access Type	Unit	Description
/3/0/11	Device	Error code	R	-	0= No error 1= Low battery

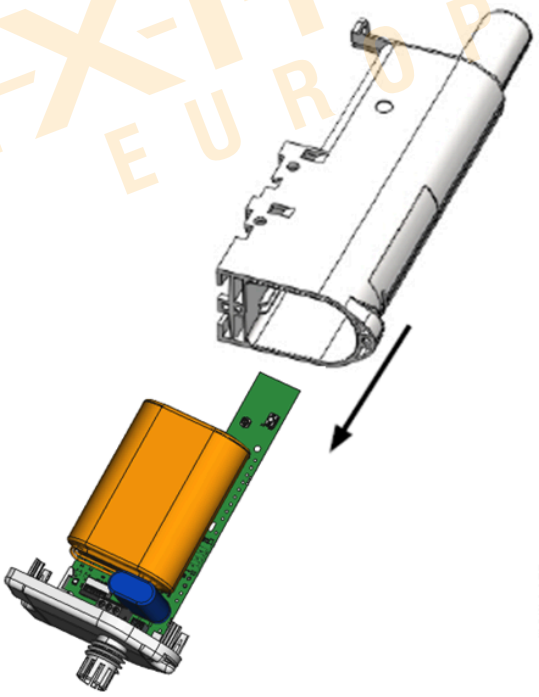
5.4.3 Double Battery Pack Replacement

When the low battery indicator is activated, it is advisable to change the internal battery.

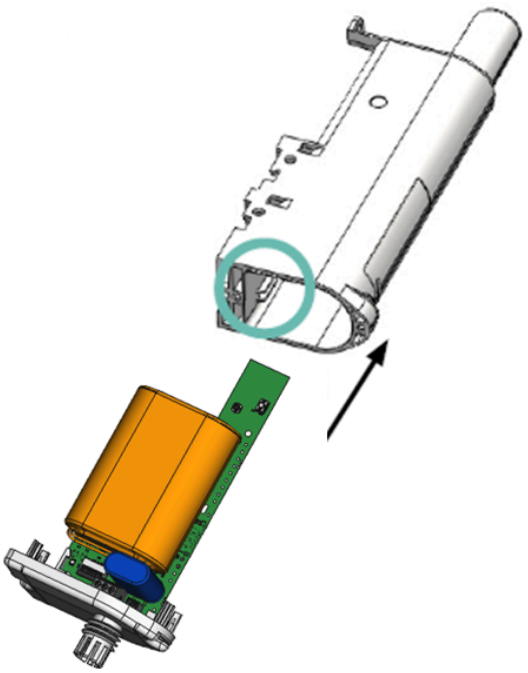
It is important to keep the same battery reference, namely ER18505-2.

DOUBLE BATTERY PACK REPLACEMENT PROCEDURE:

1. Remove the soleplate screws
2. Pull the cable gland to detach the soleplate
3. Disconnect and remove the NFC antenna.
4. Slide the cable tie
5. Disconnect the present battery wire and remove the battery
6. Replace it with a new battery and connect the wire
7. Reposition the cable tie
8. Reconnect the NFC antenna



9. Reinsert the card following the guide rails inside the casing and screw it tight for waterproofing

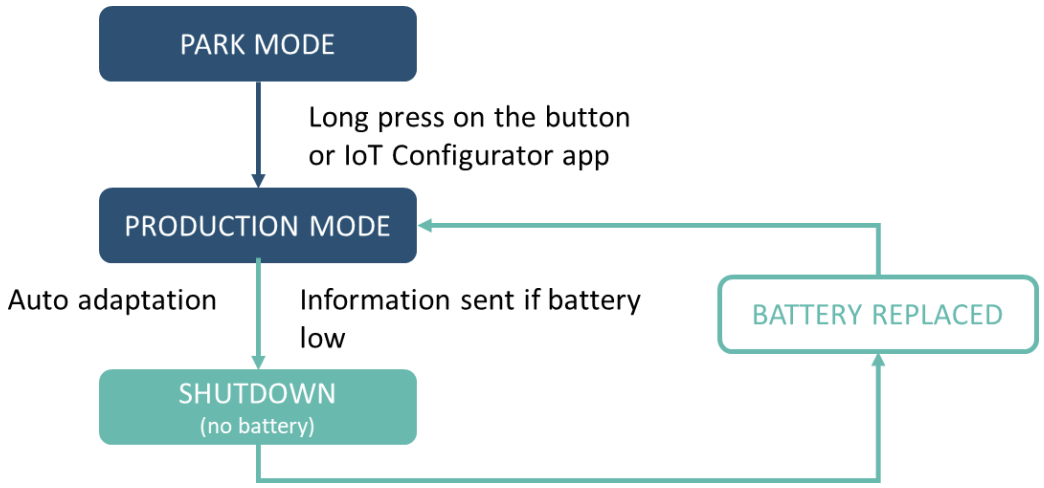


After this battery replacement procedure, the product will automatically resume its "normal" operation and erase the low battery indicators (status and LED).

6. GETTING STARTED

6.1. Product Operating Modes

The product has 2 operating modes.



6.1.1 PARK Mode

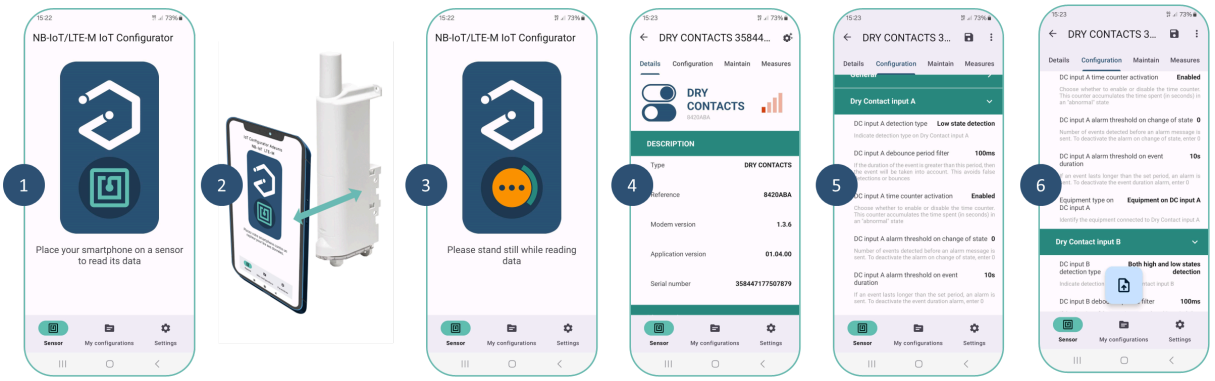
The product is delivered in PARK mode, where it is on standby, and its consumption is minimal. The NFC interface of the product remains active to allow the user to read and modify the product configuration via the
NB-IoT/LTE-M IoT Configurator application.

6.1.2 PRODUCTION Mode

This mode allows the product to operate in its final use.

The NFC interface of the product is active to allow the user to read and modify the product configuration via the **NB-IoT/LTE-M IoT Configurator** application at any time.

6.2. Starting DRY CONTACTS with the NB-IoT/LTE-M IoT Configurator application



1. Enable NFC on your smartphone and launch the **NB-IoT/LTE-M IoT Configurator** application
2. Place your smartphone against the product.
3. The application recognizes the product and reads the information it contains
4. The product's current information and configuration are automatically displayed on the **NB-IoT/LTE-M IoT Configurator** application
5. Modify the product's server, network and application parameters quickly and intuitively, using the application's drop-down menus.
6. Switch the product to “PRODUCTION” mode in the sensor's “CONFIGURATION” menu**,** “PRODUCT ACTIVATION” section
7. Press the “Apply changes” button on the NB-IoT/LTE-M IoT Configurator application to apply the new configuration to the product and start it up

The green LED then flashes rapidly during the mode change phase (rapid blinking of 5 cycles with 100 ms ON / 100 ms OFF).

In case of a product fault, the red LED will light up for 15 seconds, and then the product will reboot.

Once the product is configured in PRODUCTION mode, it will immediately attempt to attach to the network to measure and communicate with a server.

The application also allows you to save, export, and import an application configuration to quickly duplicate it on other products.

📌 **NOTE 1**

The use of the NFC antenna has an impact on the product's battery life. To preserve autonomy, it is preferable to bring the smartphone close to the DRY CONTACTS product's NFC antenna only to perform a read/write operation of the information. As soon as the read/write operation is complete, remember to move the smartphone away from the DRY CONTACTS product's NFC antenna.

NOTE 2

The sensor is protected against unauthorized external access by an NFC security key consisting of 8 alphanumeric characters. Thus, only authorized personnel can modify the sensor configuration via this interface.

The NFC security key of the sensor can be changed by the user after the first connection. If a sensor's security key is changed, the new key must also be entered in the application settings to allow it to continue communicating with the sensor.

6.3. Using the "Quick Start" Function

The **NB-IoT/LTE-M IoT Configurator** application offers the user a "Quick Start" function for the product, allowing you to configure the server's URI, configure network connection preferences, and finally, start the product automatically (switch from PARK mode to PRODUCTION mode). During "Quick Start," the user can also specify a detection type of DC input A and DC input B.

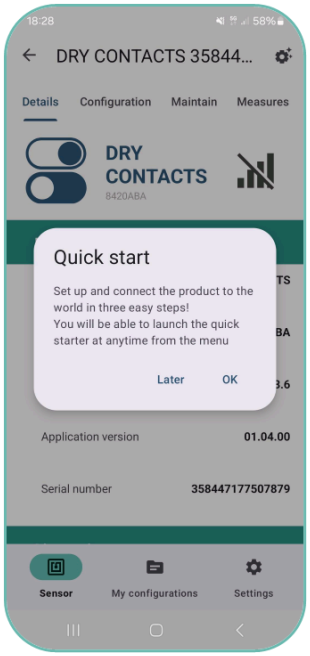
The DRY CONTACTS product will then communicate with the LwM2M server in "PUSH" mode and according to its default application configuration:

Parameters	Description	Default configuration
Product-Server communication	Type of communication with the LwM2M server. In PUSH mode, the product controls data transmission to the LwM2M server. In OBSERVE mode, data transmission is only possible on request from the server via a READ or an OBSERVATION operation.	LwM2M PUSH

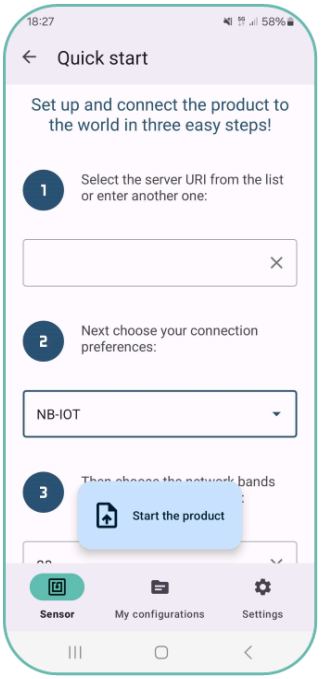
Parameters	Description	Default configuration
Lifetime	Period of automatic transmission of a life frame (prevents the LwM2M server from considering the product to be offline/disconnected).	43200 sec
Active Dry Contact inputs	Select the dry contact inputs to activate.	Dry Contact inputs A and B enabled
Guard interval	To limit data consumption and guarantee product autonomy, you can choose the minimum internal between 2 transmissions. Minimal value is 60 seconds. To deactivate the guard period, enter 0.	Deactivated
Detection type	Indicate detection type on DC input A and DC input B.	Both high and low state detection
Debounce period filter	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detection or bounces.	100 ms
Time counter activation	Choose whether to enable or disable the time counter on input A and input B. This counter accumulates the time spent (in seconds) in an “abnormal” state.	Deactivated
Alarm threshold on event duration	If an event lasts longer than the set period, an alarm is sent.	1
Alarm threshold on event duration	If an event lasts longer than the set period, an alarm is sent.	Deactivated
LEDs operating mode	LED display power to optimize product autonomy.	ON - 100%

ATTENTION

Ensure that the DRY CONTACTS product contains a Nano SIM card before using the "Quick Start" function. If the product does not detect a SIM card during startup, the red LED will flash for 30 seconds, and then the product will automatically return to PARK mode.



The quick start function is automatically offered to the user during the initial connection of the product to the IoT Configurator NB-IoT/LTE-M application.



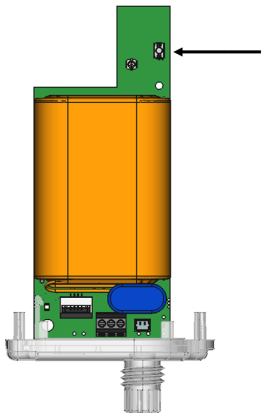
Later on, the user can access the quick start function of the IoT Configurator NB-IoT/LTE-M application from the secondary menu in the "DETAILS" section of the sensor.

6.4. Product Startup via Push Button

To use other startup modes of the product, the user must have previously configured the server and network settings of the DRY CONTACTS product through the NB-IoT/LTE-M IoT Configurator application.

Refer to the following sections of this User Guide:

- **7.1 Section « Server-Related Parameter Configuration »**
- **7.2 Section « Configuration Of Cellular Network Parameters »**



To start the product via the push button, remove the screws from the sole, pull on the cable gland to detach the sole, and take out the electronic board from the case.

Then, press the button for more than 5 seconds.

The green LED lights up to indicate the button press.

Reinsert the board following the guiding rails inside the case and tighten it securely for sealing.

6.5. Network Attachment

6.5.1 Network Attachment at Startup and Configuration

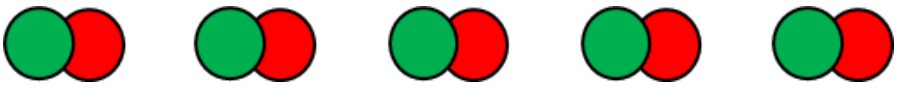
The product undergoes a network attachment phase during startup (when transitioning to PRODUCTION mode).

AUTOMATIC NETWORK ATTACHMENT

If a single-operator Nano SIM is inserted into the product, it automatically attaches to the network.

If a multi-operator or multi-technology Nano SIM is inserted, the product automatically searches and selects the best operator or technology during startup (based on the list of operators supported by the SIM card).

During the network attachment process, the green and red LEDs blink successively for 50 ms every second.



If the network attachment fails, the red LED lights up for 5 seconds. By default, the product will attempt two network attachments every 12 hours. This mechanism helps protect the product's autonomy in case of poor network connection. These two parameters (number of network attachment attempts and waiting time between two network attachment attempts) are configurable via the **NB-IoT/LTE-M IoT Configurator** application.

Until the product has been attached to the network at least once, for each failed attachment attempt, the red LED will light up for 5 seconds.

MANUAL NETWORK ATTACHMENT

Once the network attachment is done, the user can choose to attach manually to a specific operator via the **IoT Configurator NB-IoT/LTE-M** application.

📱 Go to the "CONFIGURATION" menu of the sensor

➔ Select the "NETWORK" section

➔ Configure the "Network Selection" parameter in manual mode

➔ Specify the MCC-MNC code corresponding to the network the product should connect to in manual mode from the "Network to use in manual mode" parameter

➔ Apply the new configuration to the product via NFC.

It is also possible to select the technology used by the product to connect to the network (NB-IoT or LTE-Cat-M1) from the "Connection Preference" parameter.

Once the operator is selected, the product will automatically restart and operate on that operator, even during subsequent power-ups.

CAUTION

If the manually selected network is not accessible (not supported by the SIM card or no network available), the product will not be attached to any network.

📌 **NOTE**

If the manually selected network is not accessible (not supported by the SIM card or no network available), the product will not be attached to any network.

6.5.2 Monitoring Network Attachment Status

At any time, the user can check the network connection status on the **NB-IoT/LTE-M IoT Configurator** application.

📱 Go to the "DETAILS" menu of the sensor

➔ Select the "DIAGNOSTIC" section

➔ Monitor the network attachment status with the "Network Connection Status" parameter.

Network Attachment Status	Description
Not Connected	Product in PARC mode or no network at the installation location
Disconnected (timeout)	Network attachment time exceeds the timeout configured in the product (120 seconds by default)
Searching	Product searching for a network connection
Connected	Product connected to the network

6.6. Network Quality Verification

Adeunis recommends that the installer verify the network coverage level before installing the product at its final location.

Once the product is installed and connected to the network, it automatically performs a diagnostic of the network quality (RSRQ, RSRP, Tx power) each time it comes out of its sleep mode.

The installer/user can access this network quality information at any time through the **NFC IoT Configurator application** or via the **LwM2M server** and potentially relocate the product to an area with better network quality.

6.6.1 Verification via the NB-IoT/LTE-M IoT Configurator Application

Go to the "DETAILS" menu of the sensor

➔ Select the "DIAGNOSTIC" section

➔ View the values of the parameters RSRQ, SNR, RSRP, Transmission Power.

To facilitate the evaluation of the product's proper functioning, an icon, visible at the top of the "DIAGNOSTIC" section, also provides a visual indication of the signal quality.

6.6.2 Verification via an LwM2M Server

The LwM2M server can request the product to return information related to the network type and network quality. To do this, the user must trigger, via the server, a READ operation returning the current value of the following resources:

URI	Object Name	Resource Name	Access Type	Unit	Description
/4/0/2	Connectivity monitoring	Radio Signal Strength	R	dBm	RSRP Average Power received from a reference signal or the base station
/4/0/3	Connectivity monitoring	Link Quality	R	dB	RSRQ Quality of the received reference signal
/4/0/7	Connectivity monitoring	APN	R	-	Name of the access point determining the connection parameters of the product to

URI	Object Name	Resource Name	Access Type	Unit	Description
					the Internet (network and operator).
/4/0/8	Connectivity monitoring	Cell ID	R	-	Serving cell ID
/4/0/9	Connectivity monitoring	SMNC	R	-	"Serving Mobile Network Code" Corresponds to the code of the cellular network used by the product to connect
/4/0/10	Connectivity monitoring	SMCC	R	-	"Serving Mobile Country Code". Corresponds to the country code of the cellular network used by the product to connect
/34452/0/33	DRY CONTACTS	Tx Power	R	dBm	Power of the signal transmitted by the product
/34452/0/37	DRY CONTACTS	TAU-T3412 value	RW	-	Timer defining the period for sending the periodic Tracking Area Update (TAU) signal to the network At the expiration of the T3412 timer, the product exits a deep sleep state with no radio activity (PSM cycle)
/34452/0/38	DRY CONTACTS	Active time-T3324 value	R	-	Timer indicating the

URI	Object Name	Resource Name	Access Type	Unit	Description
					period during which the sensor remains reachable by the network after a transmission At the expiration of the T3324 timer, the product enters PSM mode but remains registered on the network

The user can also configure an "OBSERVE" observation operation on these resources.

6.7. Specific Case of Starting without a Nano SIM

It is possible to use the DRY CONTACTS product in "non-connected" mode, meaning without inserting a Nano SIM card. By activating this mode, the product will not connect to a cellular network and will not transmit its data to a remote server. Data will only be accessible locally via the **NB-IoT/LTE-M IoT Configurator** application.

📌 **Features accessible in "non-connected" mode**

- Configuration via the **NB-IoT/LTE-M IoT Configurator** application
- **Save event counter and time counter** for each digital input
- **Read the current status** of each digital input (high, low) via the NB-IoT/LTE-M IoT Configurator application
- **Read the event counter** for each digital input via the NB-IoT/LTE-M IoT Configurator application
- **Read the time counter** for each digital input via the NB-IoT/LTE-M IoT Configurator application

📱 **Activation of the "non-connected" operating mode without Nano SIM via the IoT Configurator NB-IoT/LTE-M application**
Go to the "CONFIGURATION" menu of the sensor

➾ Select the "PRODUCT ACTIVATION" section

➾ Enable "PRODUCTION WITHOUT SIM" mode

➾ Apply the new configuration to the product via NFC.

7. PRODUCT CONFIGURATION

7.1. Server-Related Parameter Configuration

There are 2 options for registering the DRY CONTACTS on an LwM2M server:

- Using a bootstrap procedure
- Direct connection to the LwM2M server

📌 The use of a bootstrap LwM2M server is preferred for mass deployments because this server allows products to securely, automatically, and without human intervention retrieve their data encryption PSK keys.

ATTENTION

Some LwM2M server providers may require the use of a bootstrap LWM2M server.

7.1.1 Using a Bootstrap Service to Register the Product

Bootstrap is a mechanism that allows the product to register with an LwM2M server securely:

- Initialization on the product of "necessary" objects to be able to register with an LwM2M server via the "Write bootstrap" operation.

- Management of keys necessary for secure communication between the product and the LwM2M server.
- Transmission of information about access rights to perform an operation for the LwM2M server.
- Fallback mechanism allowing the product to automatically reconnect to the bootstrap server in case of connection problems with the LwM2M server.

The following table lists the parameters to configure on the product to connect to a bootstrap LwM2M server.

Parameters	Description	Configuration
Identity PSK	PSK identity configured in the product for the product's identification on the bootstrap server (unique ID)	A unique ID is configured by default in the product before delivery. This unique ID can be modified by the user.
PSK Key	Key configured in the product to enable data encryption. To recognize the product, this key must also be provided on the bootstrap server side.	A unique key in hexadecimal characters is configured by default in the product before delivery. This key can be modified by the user (be cautious to adhere to the hexadecimal format).
Bootstrap Server URI	URI of the bootstrap server (including the port) with which the product should communicate.	To be specified by the user.
Unique Product Name	Name allowing unique identification of the product on the server.	A unique ID is configured by default in the product before delivery. This unique ID can be modified by the user.

📱 **To configure the bootstrap server using the NB-IoT/LTE-M IoT Configurator application**, navigate to the "CONFIGURATION" menu ➔ Then, choose the "LwM2M CONFIGURATION" section » ➔ Apply the new configuration to the product using NFC.

7.1.2 Registering the Product on an LwM2M Server Without Using a Bootstrap Service

The following table outlines the parameters to configure on the product to connect to an LwM2M server without using a bootstrap service.

Parameters	Description	Configuration
Identity PSK	PSK identity configured in the product for the product's identification on the LwM2M server (unique ID)	A unique ID is pre-configured in the product by default before delivery. This ID can be modified by the user.
PSK Key	Key configured in the product to enable data encryption. To recognize the product, this key must also be provided on the LwM2M server side.	A unique key in hexadecimal characters is pre-configured in the product by default before delivery. This key can be modified by the user (attention should be paid to adhere to the hexadecimal format).
LwM2M Server URI	URI of the LwM2M server (including the port) with which the product should communicate.	To be specified by the user.
Unique Product Name	Name to uniquely identify the product on the server.	A unique ID is pre-configured in the product by default before delivery. This ID can be modified by the user.

📱 **To configure the LwM2M server via the NB-IoT/LTE-M IoT Configurator application,** go to the "CONFIGURATION" menu ⇛ Then select the "LwM2M CONFIGURATION" section ⇛ Apply the new configuration to the product using NFC.

Once the LwM2M server connection parameters are configured in the product, it is ready to be registered on an LwM2M server.

📌 In the scenario where both the bootstrap server connection parameters and the LwM2M server connection parameters are configured in the product, the product will attempt to connect to the LwM2M server five times over a 24-hour period if it encounters a connection problem before switching to the bootstrap server.

7.2. Configuration of Cellular Network Parameters

The DRY CONTACTS product must be connected to a network to transmit its data to a MQTT broker.

The following table lists all the network parameters of the DRY CONTACTS product and their default values.

Parameters	Description	Default Configuration
Network Selection	Automatic or manual selection of the cellular network used by the product to connect during startup	Automatic
Connection Preference	Technology used by the product to connect to the network	NB-IoT then LTE-Cat-M1
Frequency Bands	Frequency bands used by the product to connect to the network The default configured bands are European bands. It is possible to limit the bands to reduce the product's attachment time. For example, in France, only band 20 is used by operators	1,3,8,20,28
Maximum Network Attachment Duration	Maximum duration of the modem's network attachment If this time is exceeded without the modem being able to attach, the attachment is interrupted	120 seconds
Number of Network Attachment Attempts	Number of successive attempts to attach to the network	2
Wait Time Between 2 Network Attachment Attempts	Wait time between 2 successive attempts to attach to the network	12 hours
APN	Forces the name of the access point determining the product's internet connection settings (network and operator)	-
T3412 Value	Timer defining the period for sending the periodic Tracking Area Update (TAU) signal to the network At the expiration of the T3412 timer, the product exits a deep sleep state with no radio activity (PSM cycle) The value of T3412 will be	1

Parameters	Description	Default Configuration
	multiplied by its multiplier to obtain the Keep-alive duration	
T3412 Multiplier	Multiplier of the T3412 timer	31 hours
T3324 Value	Timer indicating the period during which the sensor remains reachable by the network after a transmission At the expiration of the T3324 timer, the product enters PSM mode but remains registered on the network The value of the T3324 timer will be multiplied by its multiplier to obtain the Active-time duration	5
T3324 Multiplier	Multiplier of the T3324 timer	2 seconds

📱 **The user can, if desired, modify the default cellular network connection settings in the product via the NB-IoT/LTE-M IoT Configurator application:**

Go to the "CONFIGURATION" menu of the sensor

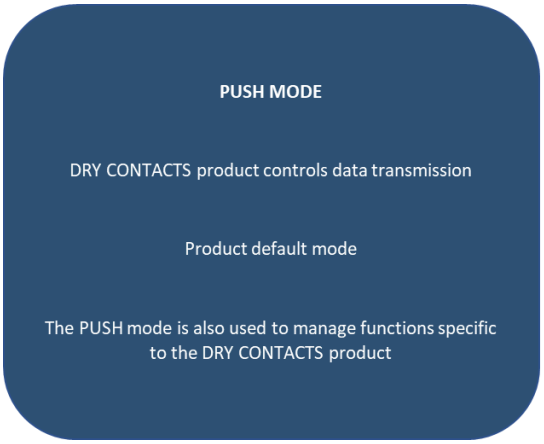
➔ Select the "NETWORK" section

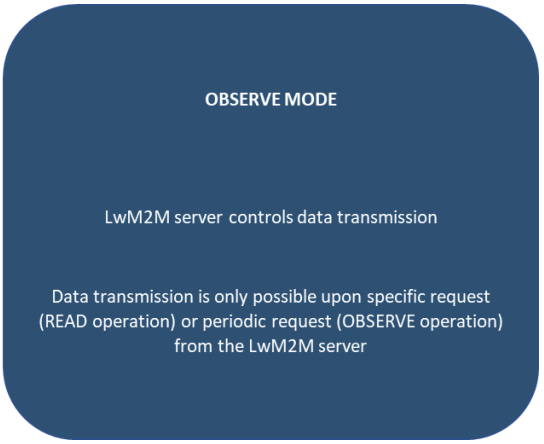
➔ Configure the product

➔ Apply the new configuration to the product via NFC.

7.3. Configuration Of Application Parameters

The DRY CONTACTS product can be configured to communicate with the LwM2M server in "OBSERVE" or "PUSH" mode.





Configuration of the communication mode via the IoT Configurator NB-IoT/LTE-M application:

Go to the "CONFIGURATION" menu of the sensor
⇒ Select the "CONNECTIVITY" section
⇒ Choose the "PROTOCOLS" subsection
⇒ Configure the "Product-Server Communication" parameter
⇒ Apply the new configuration to the product using NFC.

Configuration of the communication mode via an LwM2M server

The LwM2M server can modify the communication mode configuration through a WRITE operation, changing the value of the "LWM2M mode" resource.

URI	Object Name	Resource Name	Access Type	Unit	Description
/34453/0/0	DRY CONTACTS	Product-Server communication	R/W	-	false = OBSERVE mode true = PUSH mode

📌 **NOTE 1**
Adeunis recommends that you do not create OBSERVATIONS (OBSERVE mode) on application-related data and send the same application-related data in PUSH mode at the same time. Otherwise, OBSERVATIONS will only be updated when data is sent in PUSH mode.

7.3.1 Configuration of Application Parameters in "PUSH" Mode

📌 **When to Use PUSH Mode**

- I want to be able to record several successive event counter values, for each input, before sending them.
- I want to be able to log several successive time counter values, for each input, before sending them.
- I want to be able to manage change-of-state alarms for each input
- I want to be able to manage event duration alarms for each input

CONFIGURATION OF DATA SAMPLING AND LOGGING FREQUENCY

DRY CONTACTS continuously detects and counts changes of state on each of its 2 digital inputs.

Event counter

For each digital input, the product increments an event counter each time a change of state is detected, and saves the event counter value at the configured sampling frequency.

Time counter (function can be enabled)

For each digital input, the product counts the time spent (in seconds) in an “abnormal” state. It increments a time counter each time a change is detected, and saves the counter value at the configured sampling rate.

When the time counter is activated on a digital input, this must be configured as “detect high” or “detect low”. If the input is configured as “detect high and low”, then the time counter value will be 0.

- The default sampling frequency for the event counter and time counter is 24 hours.
- The user can select any sampling rate between 60 and 604800 seconds, i.e. 7 days.
- The minimum interval between 2 samplings is 1 minute.
- Sampling granularity is the minute, rounded down to the nearest value (e.g. 90 s = 1 min).

📌 **NOTE 1**
The sampling frequency must be common to the 2 digital inputs and the 2 counters (events and time) in order to avoid desynchronization of data transmission, which will impact the autonomy of the DRY CONTACTS.

NOTE 2
Event monitoring on digital inputs remains functional even when the cellular network is not available.

📱 **Configuration of the sampling frequency via the NB-IoT/LTE-M IoT Configurator application:**
Go to the "CONFIGURATION" menu of the sensor

➔ Select the "APPLICATION" section

➔ Configure the "Sampling Frequency" parameter

➔ Apply the new configuration to the product via NFC.

💻 **Configuration de la fréquence d'échantillonnage via un serveur LwM2M**

The LwM2M server can modify the configuration of the sampling interval through a WRITE operation, changing the value of the "Sampling period" resource.

URI	Object Name	Resource Name	Access Type	Unit	Description
/34453/0/2	DRY CONTACTS	Sampling frequency	R/W	Secondes	86400 sec for the default configuration

CONFIGURATION OF DATA TRANSMISSION MODE CONFIGURATION

DRY CONTACTS continuously detects and counts changes of state on each of its 2 digital inputs.

The product increments an event counter and a time counter (if enabled) and saves the value of these counters at the configured sampling rate.

Event and time counters are sent in 4 transmission modes.

Practical use cases and examples of associated configurations are provided in the User Guide appendices.

Transmission Mode	Definition	Practical Use Case
Periodic transmission of event counters and current input status	With this transmission mode, DRY CONTACTS continuously detects and counts changes of state on each of its 2 digital inputs. For each digital input : The product increments an event counter each time a change of state is detected, and saves the event counter value at the configured sampling rate. The product transmits the last saved event counter value and the current state of the input to the broker. With the historization mechanism, if the sampling frequency is lower than the transmission frequency, the product will save the successive counter values and the input status in local memory and then transmit them in a single message sent at the end of the transmission period.	ANNEX 3
Periodic Transmission of event counters, time counters and current input status	With this transmission mode, DRY CONTACTS can continuously detect and count changes in status on each of its 2 digital inputs. For each digital input : The product increments an event counter each time a change of state is detected, and	ANNEX 4

Transmission Mode	Definition	Practical Use Case
	saves the value of this counter at the configured sampling rate. The product also counts the time spent (in seconds) in an “abnormal” state. It increments a time counter each time a change of state is detected, and saves the value of this counter at the configured sampling frequency. The product transmits the last saved value of the event counter and the last saved value of the time counter, as well as the current state of the input, to the broker. With the historization mechanism, if the sampling frequency is lower than the transmission frequency, the product saves the successive counter values and the input status in local memory, and then transmits them in a single message sent at the end of the transmission period.	
Transmission on change of state (alarm)	With this transmission mode, the DRY CONTACTS continuously detects and counts changes of state on each of its 2 digital inputs, and sends a notification only if a threshold (number of detected changes of state) is exceeded.	ANNEX 5
Transmission on event duration (alarm)	With this transmission mode, DRY CONTACTS continuously detects and counts changes of state on each of its 2 digital inputs. The product counts the time spent (in seconds) in an “abnormal” state and sends a notification only if it detects that the duration of an event exceeds a threshold (time spent in	ANNEX 6

Transmission Mode	Definition	Practical Use Case
	seconds in a state different from the current state).	

📌 **NOTE 1**

Maximum number of samples per message and per digital inputs in the case of periodic transmission with historization: 48

NOTE 2

The granularity of periodic transmissions is per minute, rounded down to the nearest value (e.g. 90 s = 1 min).

CONFIGURATION OF ALARM THRESHOLDS

The user can configure conditional operating rules of the “if a condition is met, trigger an action” type.
These rules can be used to alert the user immediately if a threshold is exceeded, and/or to limit the number of transmissions made by the product, thereby increasing its lifetime.

The following table lists the DRY CONTACTS product's threshold configuration parameters and their default values.

Parameter	Description	Default configuration
Alarm threshold on change of state of digital input A	Number of events detected before an alarm message is sent.	1 event
Alarm threshold on event duration of digital input A	If an event lasts longer than the set period, an alarm is sent.	OFF
Alarm threshold on change of status of digital input B	Number of events detected before an alarm message is sent.	1 event
Alarm threshold on event duration of digital input B	If an event lasts longer than the set period, an alarm is sent.	OFF

📱 **To configure thresholds via the NB-IoT/LTE-M IoT Configurator application**, go to the “CONFIGURATION” menu

⇒ Then select the “APPLICATION” section

⇒ Select the “DC input A” or “DC input B” sub-section

⇒ Configure the “Alarm threshold on change of state” parameter

⇒ Configure the “Alarm threshold on event duration” parameter

⇒ Apply the new configuration to the product via NFC.

💻 **Threshold configuration via the LwM2M server**

URI	Object Name	Resource Name	Access Type	Unit	Description
/34453/0/15	DRY CONTACTS	DC input A alarm threshold on change of state	R/W	-	Number of events detected before an alarm message is sent.
/34453/0/16	DRY CONTACTS	DC input A alarm threshold on event duration (in seconds)	R/W	Secondes	If an event lasts longer than the set period, an alarm is sent
/34453/0/25	DRY CONTACTS	DC input B alarm threshold on change of state	R/W	-	Number of events detected before an alarm message is sent.
/34453/0/26	DRY CONTACTS	DC input B alarm threshold on event duration (in seconds)	R/W	Secondes	If an event lasts longer than the set period, an alarm is sent

Examples of threshold settings are shown in APPENDICES 5 and 6.

CONFIGURATION OF TIME COUNTER ACTIVATION/DEACTIVATION

The time counter counting the time spent (in seconds) in an abnormal state can be enabled or disabled for each discrete input by the user.

When the time counter is activated on a digital input, this must be configured as “detect high” or “detect low”. If the input is configured as “detect high and low”, then the time counter value will be 0.

📱 **Configuring the time counter via the NB-IoT/LTE-M IoT Configurator application,** go to the sensor's “CONFIGURATION” menu

⇒ Then select the “APPLICATION” section
⇒ Select the “DC input A” or “DC input B” sub-section

⇒ Configure the “Time counter activation” parameter

⇒ Apply the new configuration to the product via NFC.

💻 **Configuring the time counter via the LwM2M server**

URI	Object Name	Resource Name	Access Type	Unit	Description
/34453/0/12	DRY CONTACTS	DC input A time counter activation	R/W	-	0 = counter disabled 1 = counter enabled
/34453/0/22	DRY CONTACTS	DC input B time counter activation	R/W	-	0 = counter disabled 1 = counter enabled

DATA RETRANSMISSION IN CASE OF SERVER CONNECTION PROBLEM

To avoid data loss in the event of a connection problem with the MQTT broker, if data transmission to the broker fails, the product will buffer the collected data and make 2 successive connection attempts (with a 30-second interval) to the MQTT broker. If all 2 attempts fail, the data will be cleared.

7.3.2 Configuration of Application Parameters in "OBSERVE" Mode

CONFIGURATION OF DATA SAMPLING AND LOGGING FREQUENCY

DRY CONTACTS continuously detects and counts changes of state on each of its 2 digital inputs.

Event counter

For each digital input, the product increments an event counter each time a change of state is detected, and saves the event counter value at the configured sampling frequency.

Time counter (function can be enabled)

For each digital input, the product counts the time spent (in seconds) in an “abnormal” state. It increments a time counter each time a change is detected, and saves the counter value at the configured sampling rate.

When the time counter is activated on a digital input, this must be configured as “detect high” or “detect low”. If the input is configured as “detect high and low”, then the time counter value will be 0.

- The default sampling frequency for the event counter and time counter is 24 hours.
- The user can select any sampling rate between 60 and 604800 seconds, i.e. 7 days.
- The minimum interval between 2 samplings is 1 minute.
- Sampling granularity is the minute, rounded down to the nearest value (e.g. 90 s = 1 min).

📌 **NOTE 1**
The sampling frequency must be common to the 2 digital inputs and the 2 counters (events and time) in order to avoid desynchronization of data transmission, which will impact the autonomy of the DRY CONTACTS.

NOTE 2
Event monitoring on digital inputs remains functional even when the cellular network is not available.

NOTE 3
Any configuration on the LwM2M server of the attributes "minimum evaluation period (epmin) and maximum evaluation period (epmax)" in an observation operation will not be taken into account by the product.

📱 **Configuration of the sampling frequency via the NB-IoT/LTE-M IoT Configurator application:**
Go to the "CONFIGURATION" menu of the sensor

➔ Select the "APPLICATION" section

➔ Configure the "Sampling Frequency" parameter

➔ Apply the new configuration to the product via NFC.

💻 **Configuration de la fréquence d'échantillonnage via un serveur LwM2M**

The LwM2M server can modify the configuration of the sampling interval through a WRITE operation, changing the value of the "Sampling period" resource.

URI	Object Name	Resource Name	Access Type	Unit	Description
/34453/0/2	DRY CONTACTS	Sampling frequency	R/W	Secondes	86400 sec for the default configuration

CONFIGURATION OF DATA TRANSMISSION MODE CONFIGURATION

DRY CONTACTS continuously detects and counts changes of state on each of its 2 digital inputs.

The product increments an event counter and a time counter (if enabled) and saves the value of these counters at the configured sampling rate.

Event and time counters are sent in 3 transmission modes.

Practical use cases and examples of associated configurations are provided in the User Guide appendices.

Transmission Mode	Definition	Practical Use Case
Single Transmission	Single transmission is used to send the last known value of a digital input to the server: current state, event counter, time counter, etc.	ANNEX 7

Transmission Mode	Definition	Practical Use Case
	LwM2M READ OPERATION	
Periodic transmission of event counters	With this transmission mode, DRY CONTACTS continuously detects and counts changes of state on each of its 2 digital inputs. For each digital input : The product increments an event counter each time a change of state is detected, and saves the event counter value at the configured sampling rate. The product transmits the last saved event counter value (no history) upon the server's request through an OBSERVE operation on the corresponding resource(s). If no change of state is detected and the counter value does not change, the product will not send a message to the server. This optimizes product autonomy, saves message sending costs, and reduces data processing. **LwM2M OBSERVE OPERATION**	ANNEX 8
Periodic Transmission of time counters	With this transmission mode, DRY CONTACTS can continuously detect and count changes in status on each of its 2 digital inputs. For each digital input : The product counts the time spent (in seconds) in an “abnormal” state. It increments a time counter each time a change of state is detected, and saves the value of this counter at the configured sampling frequency. The product transmits the last saved time counter value (no	ANNEX 9

Transmission Mode	Definition	Practical Use Case
	history) upon the server's request through an OBSERVE operation on the corresponding resource(s). If no change of state is detected and the counter value does not change, the product will not send a message to the server. This optimizes product autonomy, saves message sending costs, and reduces data processing. **LwM2M OBSERVE OPERATION**	

Other product transmission modes are possible: transmission on threshold exceedance, periodic transmission, and threshold exceedance transmission.

These transmission modes are configurable by modifying the attribute settings during the creation of an OBSERVATION operation via the server:

OBSERVATION Parameters	Description
Minimum Period (Pmin)	The Minimum Period attribute indicates the minimum time the product must wait between 2 notifications.
Maximum Period (Pmax)	The Maximum Period attribute indicates the maximum duration the product can wait between 2 notifications
Greater than (Greater than)	This attribute sets a high threshold value
Less than (Less than)	This attribute sets a low threshold value
Step (Step)	This attribute sets a minimum change value between 2 notifications

📌 **NOTE**
Any configuration on the LwM2M server of the attributes "minimum evaluation period (epmin) and maximum evaluation period (epmax)" in an observation operation will not be taken into account by the product.

⚠️ **Adeunis strongly advises against configuring these attributes, as it may generate uncontrolled connections to the server, significantly impacting the product's autonomy and the volume of exchanged data.**

CONFIGURATION OF TIME COUNTER ACTIVATION/DEACTIVATION

The time counter counting the time spent (in seconds) in an abnormal state can be enabled or disabled for each discrete input by the user.

When the time counter is activated on a digital input, this must be configured as “detect high” or “detect low”. If the input is configured as “detect high and low”, then the time counter value will be 0.

📱 **Configuring the time counter via the NB-IoT/LTE-M IoT Configurator application,** go to the sensor's “CONFIGURATION” menu

⇒ Then select the “APPLICATION” section
⇒ Select the “DC input A” or “DC input B” sub-section

⇒ Configure the “Time counter activation” parameter

⇒ Apply the new configuration to the product via NFC.

💻 **Configuring the time counter via the LwM2M server**

URI	Object Name	Resource Name	Access Type	Unit	Description
/34453/0/12	DRY CONTACTS	DC input A time counter activation	R/W	-	0 = counter disabled 1 = counter enabled
/34453/0/22	DRY CONTACTS	DC input B time counter activation	R/W	-	0 = counter disabled 1 = counter enabled

CONFIGURATION OF NON-APPLICATION RELATED DATA MONITORING

Observation requests by the LwM2M server are not limited to application-related data (index value/number of pulses of a counter or equipment) and can be made for all supported and present objects, object instances, and resources (OIR).

Any observation operation on non-application related data **MANDATORILY** requires configuration on the LwM2M server of the attributes "minimum period (pmin) and maximum period (pmax).

CONFIGURATION OF RELIABLE NOTIFICATION OPTION

To prevent data loss in a degraded network quality context, the user can activate the "reliable notifications" option. This option ensures that notifications are reliably received by the LwM2M server.

Caution, activating this option has an impact on the product's consumption.

📱 **Activation of the "reliable notifications" option via the IoT Configurator NB-IoT/LTE-M application:**
Go to the "CONFIGURATION" menu of the sensor

➔ Select the "LwM2M Configuration" section

➔ Configure the "Reliable Notifications" parameter

➔ Apply the new configuration to the product via NFC.

💻 **Activation of the "reliable notifications" option via an LwM2M server**

The LwM2M server can activate this option through a WRITE operation, changing the value of the "reliable notifications" resource.

URI	Object Name	Resource Name	Access Type	Unit	Description
/34453/0/36	DRY CONTACTS	Reliable notifications	R/W	-	False = Disabled True = Enabled

CONTEXT ERASE

The user can activate or deactivate LwM2M context clearing.

In the context of a product configured in OBSERVE mode, deactivating the "context erase" option allows all the OBSERVATIONS configured on the server to be saved and reapplied if the product is restarted.

In a context where the user wishes to switch the product from OBSERVE mode to PUSH mode, Adeunis recommends activating the "context erase" option in order not to keep in memory the OBSERVATIONS configured on the server in the event of a product restart.

📱 **Erasing the context save via the IoT Configurator NB-IoT/LTE-M application:**
Go to the "MAINTAIN" menu of the sensor

➔ Select the "LwM2M Context erase parameter"

➔ Apply the new configuration to the product via NFC.

💻 **Erasing the context save via an LwM2M server**

The LwM2M server can activate this option by a WRITE operation modifying the value of the “Erase LwM2M context” resource.

URI	Object Name	Resource Name	Access Type	Unit	Description
/34453/0/39	DRY CONTACTS	Erase LwM2M context	W	-	False = No LwM2M context erase True = LwM2M context erase

7.4. Factory Reset

The DRY CONTACTS product can be updated with the default settings of the product range using the **NB-IoT/LTE-M IoT Configurator application.**

📱 **To restore factory settings via the IoT Configurator application**, go to the secondary menu at the top of the "CONFIGURATION" screen

➾ Then select the action "Set back default configuration"

➾ Apply the new configuration to the product via NFC.

7.5. Data Timestamping

Each value reported by the DRY CONTACTS product is automatically associated with a UTC timestamp.

The clock is remotely synchronized via the network.

The timestamp is provided in EPOCH format.

8. REMOTE UPDATES

The DRY CONTACTS product allows the execution of updates for application firmware and modem firmware over the air (FOTA) to implement new functions in the product or to remotely correct any bugs.

The user must contact the Adeunis support team to obtain the firmware update file(s) and then use an LwM2M server to download the firmware to the product via the COAP protocol.

💻 **Step 1**

Download an update by writing to the "Package" resource of the "Firmware update" standard object.

URI	Object Name	Resource Name	Access Type	Unit	Description
/5/0/0	FIRMWARE UPDATE	Package	W	-	Installing a firmware package

Step 2

Once the firmware file is downloaded to the server, the user must execute the "Update" resource to start downloading the file to the product.

URI	Object Name	Resource Name	Access Type	Unit	Description
/5/0/2	FIRMWARE UPDATE	Update	Exe	-	Downloading a firmware package to the product

The size of the application firmware for the DRY CONTACTS product is approximately 400 KB.

Depending on the type of network used, it will take an average of 5 to 15 minutes to download the update file to the product.

Step 3

The user can be notified at any time of the progress of the update file download to the product by reading (READ) the "State" resource of the "Firmware update" standard object.

URI	Object Name	Resource Name	Access Type	Unit	Description
/5/0/3	FIRMWARE UPDATE	State	R	-	0 = ready for download 1 = download in progress 2 = download completed

Step 4

Once the update is completely downloaded to the product, it will automatically restart.

9. PREPARATION AND INSTALLATION OF THE PRODUCT

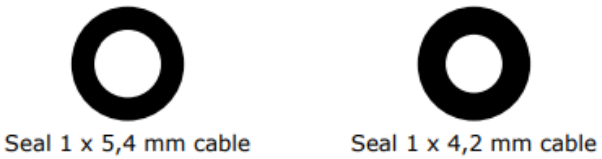
To install the product please refer to the Adeunis INSTALLATION GUIDE (NB-IoT / LTE-M IP68 Industrial Box)

9.1. Dismantling the casing

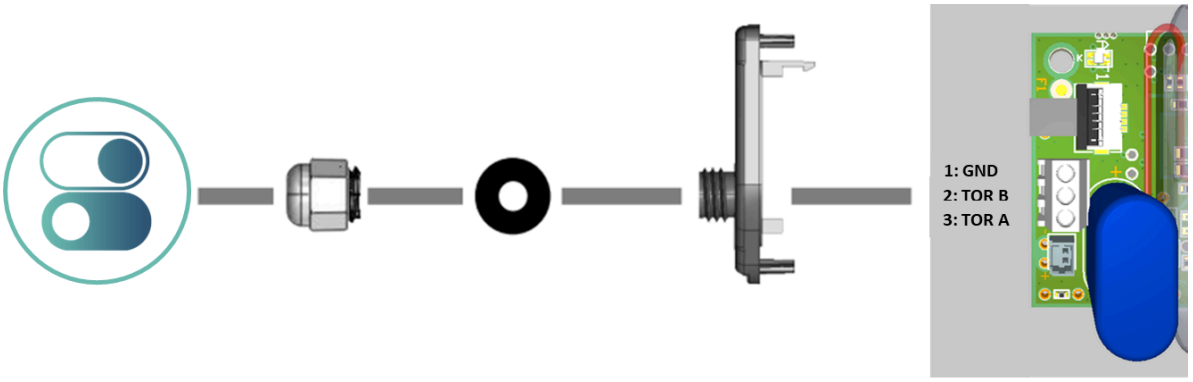
The product is delivered assembled, and the base must be removed to allow the connection of the counter(s) to the screw terminals. Once the wiring is completed, the housing can be closed.

9.2. Installation of the Compression Seal

Before connecting the cable strands from your equipment to the screw terminals of the product, you must insert the cable gland nut and the seal suitable for your configuration. Two types of seals are provided with DRY CONTACTS: for a cable diameter of 5 mm and for a cable diameter of 4 mm.



Assembly Procedure:



1 - Votre équipement et son câble

2 – Pass the cable through the compression gland nut

3 – Pass the cable through the compression gland seal

4 – Pass the cable through the DRY CONTACTS' case plate

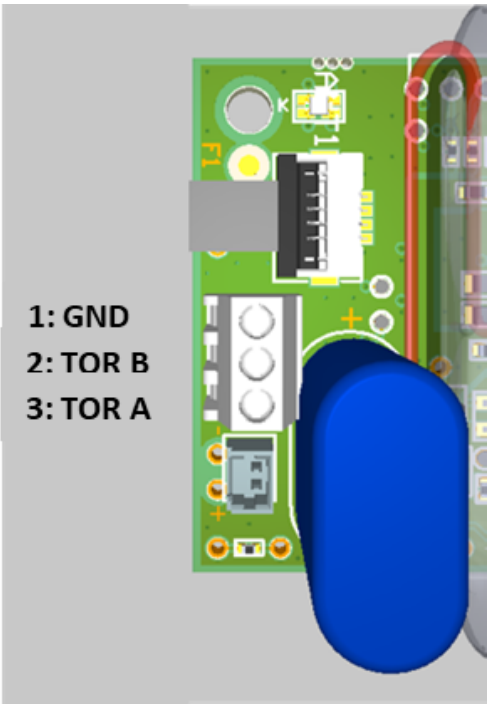
5 – Connect the cable to the screw terminal

9.3. Mounting the equipment on the screw terminals

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

📌 2 equipment can be connected in parallel.

Below is the identification of each terminal block:



9.4. Product Positioning

There are two key rules for optimizing radio ranges.

- The first one consists of positioning your product as high as possible.
- The second one consists of limiting the number of obstacles in order to avoid excessive attenuation of the radio wave.

Position

To the extent possible, install the transmitter at a minimum height of 1.50 m and do not attach it to the wall.

Obstacles

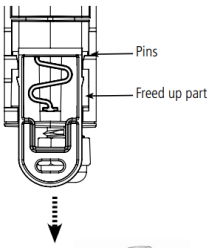
Ideally, the product must be 20 cm away from any obstacle and, if possible, near an opening (the closer the obstacle is, the more the emitted power will be absorbed). All the materials encountered by a radio wave will attenuate it. Bear in mind that metal (metal cabinets, beams, etc.) and concrete (reinforced concrete, partitions, walls, etc.) are the most critical materials for the propagation of radio waves.

9.5. Product Mounting

The DRY CONTACTS offers 3 mounting options, allowing for various setups depending on the environment where it needs to be deployed.

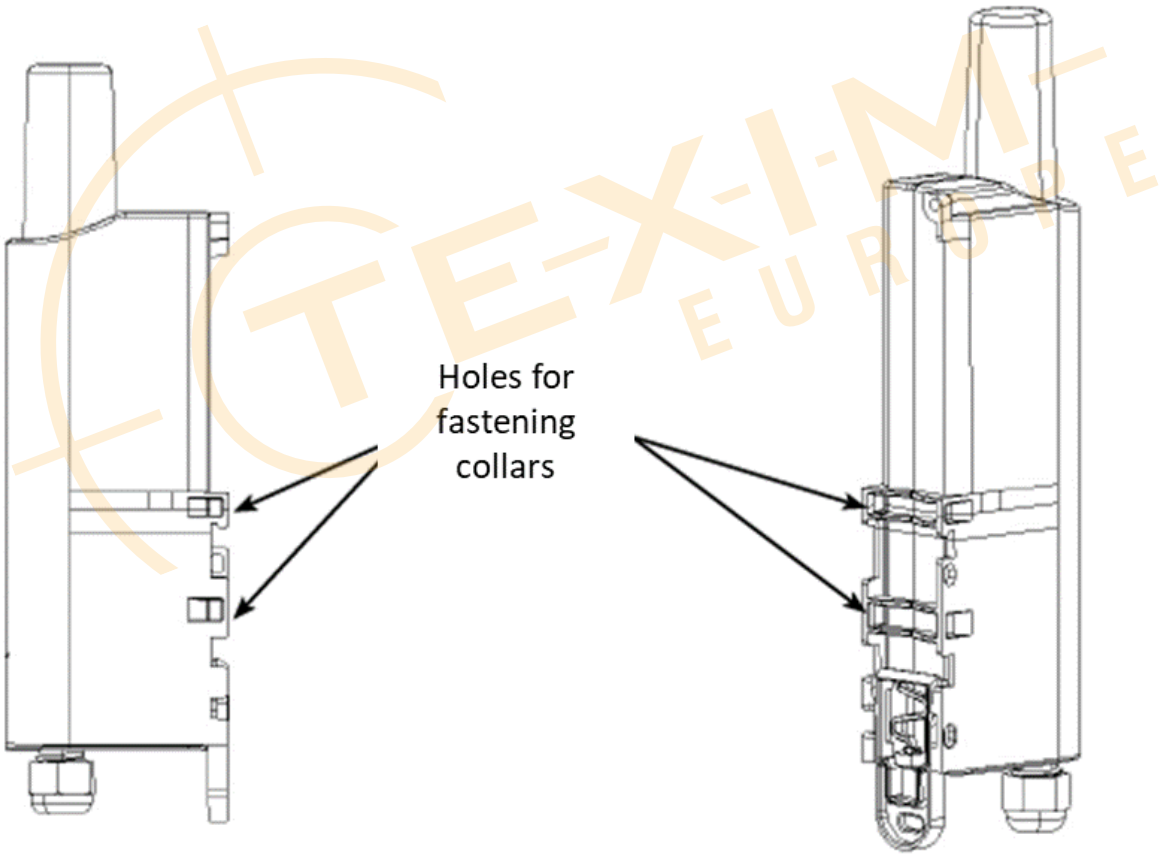
FIXING ON TUBE OR MAST

The fastening collar fastenings enable the product to be fastened on a mast or tube under completely safe conditions.



To optimize fastening onto a tube or mast, we recommend you remove the Rail-DIN locking/unlocking lever.

To remove it, pull the lever down until the locking pins are opposite a freed-up part and then remove the lever.



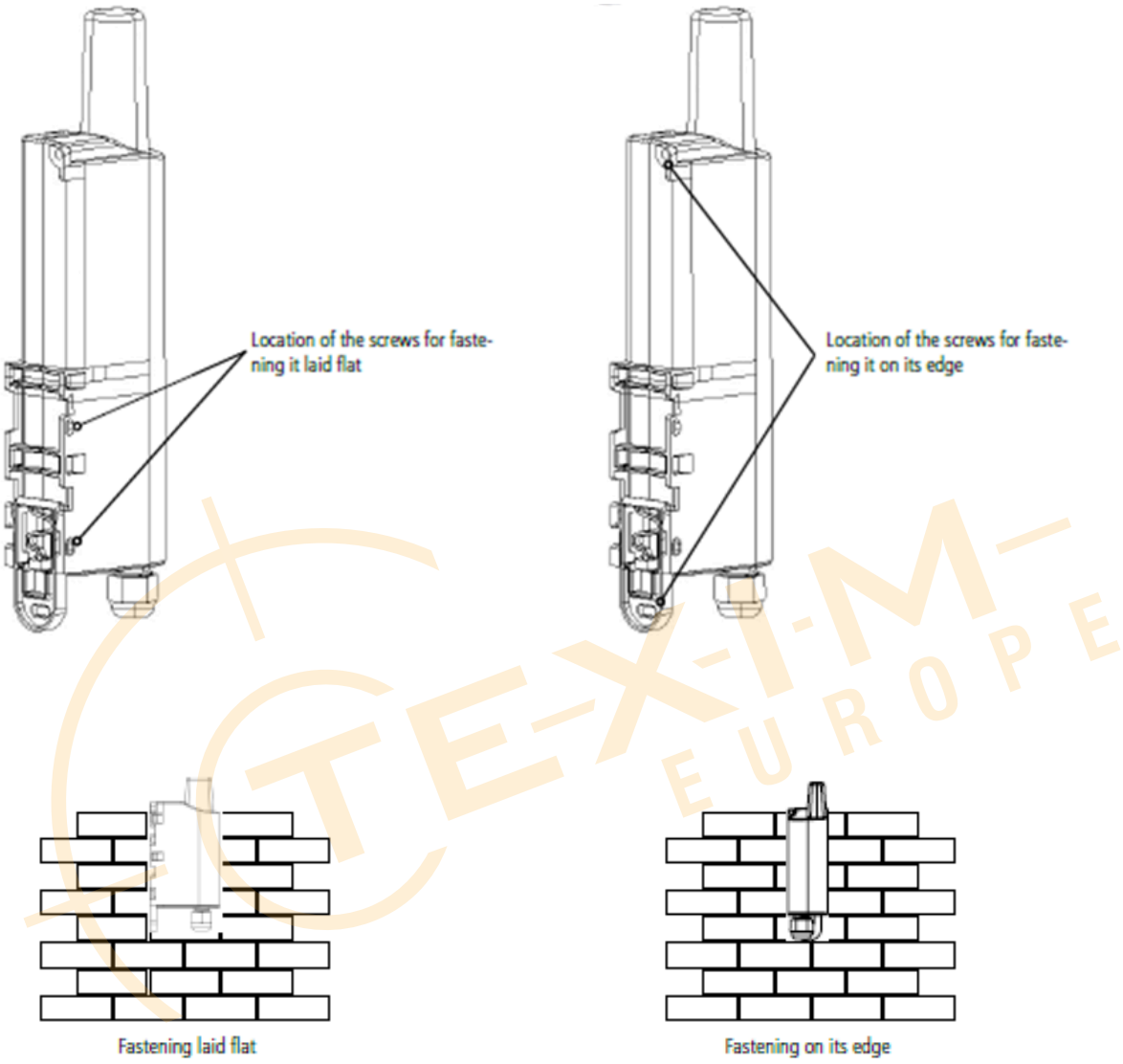
FIXING WITH SCREWS

The product comes with 2 CBLZ 2.2 × 19mm screws and 2 SX4 plugs.

Use these products or equivalent products to attach your product to a flat surface.

Two positions can be chosen, flat or on the edge

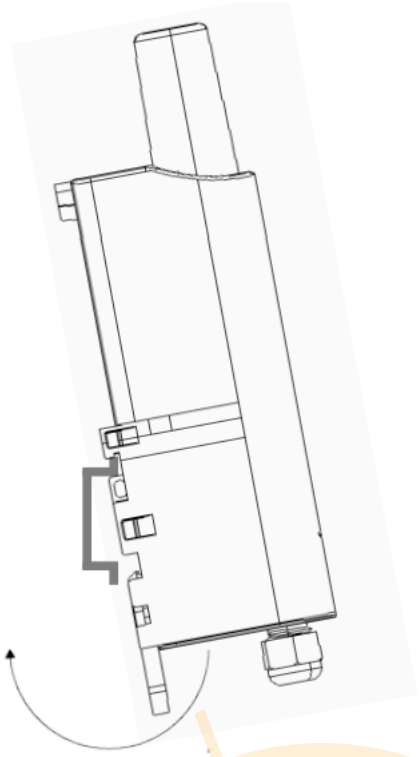
- The position on the edge keeps the product away from its support and contributes to better radio wave propagation.
- If you choose the flat position, please remove the Rail-DIN locking/unlocking lever as explained above.



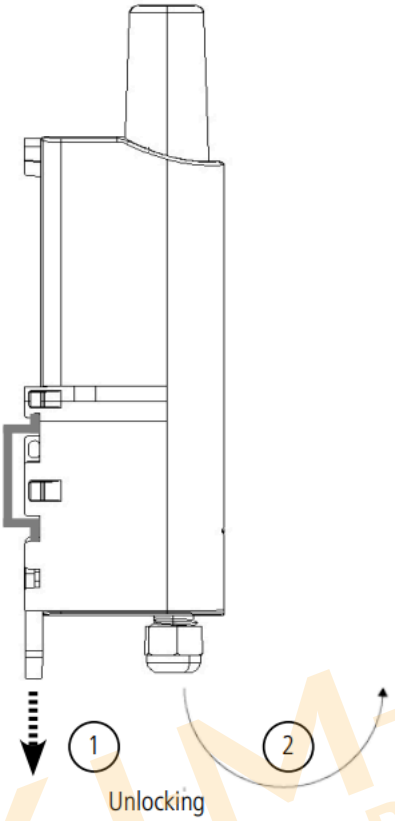
Rail-DIN FIXATION

This system, integrated into the casing, enables the product to be fastened onto a standard 35 mm rail.

- To fit the casing, place the upper inserts on the rail and lower the product to clip it into position.
- To remove the product, pull the unlocking lever down and disengage the product from the rail.



Locking onto the DIN-Rail



Unlocking

10. DOCUMENT HISTORY

Version	Content
V1.0	Creation

ANNEX 1: LwM2M PROTOCOL

The DRY CONTACTS product can be configured to use one of the following two protocols to exchange data with an IoT platform: MQTT or LwM2M.

> ! **Adeunis recommends the use of the LwM2M protocol as it is the ONLY protocol that minimizes the consumption of the product and ensures remote operational management.**

Description of the LwM2M Protocol

Lightweight M2M (LwM2M) is a communication protocol for operational management, data reporting, provisioning, and lifecycle management of machine-to-machine (M2M) and Internet of Things (IoT) devices.

This protocol was defined in 2012 by the Open Mobile Alliance (OMA) SpecWorks organization.

Specifically designed for constrained connected devices (limited computing capacity, memory space), this protocol relies on:

- A secure data transfer standard called Constrained Application Protocol (CoAP). CoAP is an application-layer protocol similar to HTTP in its philosophy and general semantics but specifically designed to be lightweight. CoAP allows transmitting messages with low overhead - the minimum header size is only 4 bytes, enabling significant content to be sent in single, unfragmented UDP datagrams.
- A variety of ready-to-use standard objects such as the Smart Objects from the IPSO alliance, for standardized management of data models.

For more information about this protocol, visit the website

http://www.openmobilealliance.org/iot/lightweight-m2m-lwm2m

LwM2M Features Supported by the DRY CONTACTS Product and Limitations

- The DRY CONTACTS product is compatible with the LwM2M 1.1 standard (over UDP).
- The DRY CONTACTS product exposes publicly defined standard profiles by the OMA or standardization organizations for the event counter value, the time counter value and the

current state of each digital input, for the management of network-related parameters and product-related parameters.

- The DRY CONTACTS product exposes a custom profile for managing application parameters (including communication mode, transmission period, input activation, guard period and debounce timer period).
- Bootstrap support allows the DRY CONTACTS product to securely register with an LwM2M server and communicate with it.
- The DRY CONTACTS product supports the following data formats: SENML_JSON, TLV, CBOR, SENML_CBOR.
- The DRY CONTACTS product supports remote firmware update for both the application firmware and modem firmware via OTA (the server pushes the firmware to the product using the COAP protocol).
- Communication between the DRY CONTACTS product and the LwM2M server is secured with DTLS using Pre-Shared Keys (PSK).
- The DRY CONTACTS product can be remotely managed by the LwM2M server.

LwM2M Object Format

Object Name	Object Description
ID	Numeric identifier of the object (16-bit unsigned integer)
Instance	Unique (always has an instance with ID=0) or Multiple
Mandatory	Mandatory (must be supported by all LwM2M Client implementations) or Optional (may not be supported)
URN	urn:oma:lwm2m:{oma,ext,x}:{Object ID}

LwM2M Resource Format

ID	Numeric identifier of the resource
Resource Name	Brief description of the resource
Operation	R - read-only Resource W - write-only Resource RW - writeable Resource E - executable Resource

ID	Numeric identifier of the resource
Instance	Unique / Multiple
Mandatory	Mandatory or Optional Mandatory resources must be present in all instances on all devices. Optional resources may not be present in all instances and may not be supported at all by some devices.
Type	Data type of the resource value (or its instances in the case of multiple resources) String, Integer, Float, Boolean, Opaque, Time, Objlnk none
Range	Specification of valid values for the resource
Unit	Units in which a numerical value is given
Description	Detailed description of the resource

ANNEX 2 : DATA MODEL OF THE DRY CONTACTS PRODUCT

The DRY CONTACTS product communicates with an LwM2M server, which manages and monitors the product's resources exposed through a standardized data model (symbolic representation of its configuration and state).

Standardized Objects for the DRY CONTACTS Product

The product exposes standard profiles defined publicly by the OMA or by standardization bodies for the event counter value, the time counter value and the current state of each input, for the management of network-related parameters and product-related parameters.

Object Name	ID	Number of Instances	Object URN
LwM2M Server	1	1	urn:oma:lwm2m:oma:1
Device	3	1	urn:oma:lwm2m:oma:3
Connectivity Monitoring	4	1	urn:oma:lwm2m:oma:4

Object Name	ID	Number of Instances	Object URN
Firmware Update	5	1	urn:oma:lwm2m:oma:5
Generic Sensor	3300	2 (0: Channel A, 1: Channel B)	urn:oma:lwm2m:ext:3300

These objects are standardized on LwM2M servers, ensuring DRY CONTACTS' interoperability.

The list of resources supported by the product for the standardized "**LwM2M Server**" object is detailed in the table below.

Resource ID	Resource Name	Operation	Description
0	Short Server ID	R	Used as link to associate server Object Instance.
1	Lifetime	RW	Specify the lifetime of the registration in seconds (see Client Registration Interface).
2	Default Minimum Period	RW	The default value the LwM2M Client should use for the Minimum Period of an Observation in the absence of this parameter being included in an Observation. If this Resource doesn't exist, the default value is 0.
3	Default Maximum Period	RW	The default value the LwM2M Client should use for the Maximum Period of an Observation in the absence of this parameter being included in an Observation.
6	Notification Storing When Disabled or Offline	RW	If true, the LwM2M Client stores "Notify" operations to the LwM2M Server while the LwM2M Server account is disabled or the LwM2M Client is offline. After the LwM2M Server account is enabled or the LwM2M Client is online, the LwM2M Client reports the stored "Notify" operations to the Server. If false, the LwM2M Client discards all the "Notify" operations or temporarily disables the Observe function while the LwM2M Server is disabled or the LwM2M Client is offline. The default value is true. The maximum number of storing Notifications per Server is up to the implementation.
7	Binding	RW	This Resource defines the transport binding configured for the LwM2M Client. If the LwM2M Client supports the binding specified in this Resource, the LwM2M Client MUST use that transport for the Current Binding Mode.
8	Registration Update Trigger	EXE	If this Resource is executed the LwM2M Client MUST perform an "Update" operation with this LwM2M Server. The LwM2M Client can use a transport binding supported in the Current Binding Mode, Preferred Transport resource or the transport specified as an argument in the Registration Update Trigger.

Resource ID	Resource Name	Operation	Description
23	Mute Send		If true or the Resource is not present, the LwM2M Client Send command capability is de-activated. If false, the LwM2M Client Send Command capability is activated.

The list of resources supported by the product for the standardized "**Device**" object is detailed in the table below.

Resource ID	Resource Name	Operation	Description
0	Manufacturer	R	Human readable manufacturer name
1	Human readable manufacturer name	R	A model identifier (manufacturer specified string)
2	Serial Number	R	Serial Number
3	Firmware Version	R	Current firmware version of the Device.The Firmware Management function could rely on this resource.
4	Reboot	Exe	Reboot the LwM2M Device to restore the Device from unexpected firmware failure.
11	Error Code	R	0=No error 1=Low battery power 2=External power supply off 3=GPS module failure 4=Low received signal strength 5=Out of memory 6=SMS failure 7=IP connectivity failure 8=Peripheral malfunction When the single Device Object Instance is initiated, there is only one error code Resource Instance whose value is equal to 0 that means no error. When the first error happens, the LwM2M Client changes error code Resource Instance to any non-zero value to indicate the error type.
12	Reset Error Code	EXE	Delete all error code Resource Instances and create only one zero-value error code that implies no error, then re-evaluate all error conditions and update and create Resources Instances to capture all current error conditions.
13	Current Time	RW	Current UNIX time of the LwM2M Client. The LwM2M Client should be responsible to increase this time value as every second elapses. The LwM2M Server is able to write this Resource to make the LwM2M Client synchronized with the LwM2M Server.
16	Supported Binding and Modes	R	Indicates which bindings and modes are supported in the LwM2M Client. The possible values are those listed in the LwM2M Core Specification.

Resource ID	Resource Name	Operation	Description
17	Device Type	R	Type of the device (manufacturer specified string: e.g. smart meters / dev Class / ...)
18	Hardware Version	R	Current hardware version of the device
19	Software Version	R	Current software version of the device (manufacturer specified string). On elaborated LwM2M device, SW could be split in 2 parts: a firmware one and a higher level software on top. Both pieces of Software are together managed by LwM2M Firmware Update Object (Object ID 5)

The list of resources supported by the product for the standardized "**Connectivity Monitoring**" object is detailed in the table below.

Resource ID	Resource Name	Operation	Description
0	Network Bearer	R	Indicates the network bearer used for the current LwM2M communication session from the network bearer list.
1	Available Network Bearer	R	Indicates a list of current available network bearer. Each Resource Instance has a value from the network bearer list.
2	Radio Signal Strength	R	Indicates the average value of the received signal strength indication used in the current network bearer (as indicated by Resource 0 of this Object). The value is expressed in dBm.
3	Link Quality	R	This contains received link quality e.g. LQI for IEEE 802.15.4 (range 0...255), RxQual Downlink for GSM (range 0...7, refer to [3GPP 44.018] for more details on Network Measurement Report encoding), RSRQ for LTE, (refer to [3GPP 36.214]), NRSRQ for NB-IoT (refer to [3GPP 36.214]).
4	IP Addresses	R	The IP addresses assigned to the connectivity interface. (e.g. IPv4, IPv6, etc.)
7	APN	R	Access Point Name in case Network Bearer Resource is a Cellular Network.
8	Cell ID	R	Serving Cell ID in case Network Bearer Resource is a Cellular Network.
9	SMNC	R	Serving Mobile Network Code. This is applicable when the Network Bearer Resource value is referring to a cellular network. As specified in TS [3GPP 23.003].
10	SMCC	R	Serving Mobile Country Code. This is applicable when the Network Bearer Resource value is

Resource ID	Resource Name	Operation	Description
			referring to a cellular network. As specified in TS [3GPP 23.003].

The list of resources supported by the product for the standardized "**Firmware Update**" object is detailed in the table below.

Resource ID	Resource Name	Operation	Description
1	Package URI	RW	URI from where the device can download the firmware package by an alternative mechanism. As soon the device has received the Package URI it performs the download at the next practical opportunity. The URI format is defined in RFC 3986. For example, coaps://example.org/firmware is a syntactically valid URI. The URI scheme determines the protocol to be used. For CoAP this endpoint MAY be a LwM2M Server but does not necessarily need to be. A CoAP server implementing block-wise transfer is sufficient as a server hosting a firmware repository and the expectation is that this server merely serves as a separate file server making firmware images available to LwM2M Clients.
2	Update	Exe	Updates firmware by using the firmware package stored in Package, or, by using the firmware downloaded from the Package URI. This Resource is only executable when the value of the State Resource is Downloaded.
3	State	R	Indicates current state with respect to this firmware update. This value is set by the LwM2M Client. 0: Idle (before downloading or after successful updating) 1: Downloading (The data sequence is on the way) 2: Downloaded 3: Updating If writing the firmware package to Package Resource has completed, or, if the device has downloaded the firmware package from the Package URI the state changes to Downloaded.
5	Update Result	R	Contains the result of downloading or updating the firmware 0: Initial value. Once the updating process is initiated (Download /Update), this Resource MUST be reset to Initial value. 1: Firmware updated successfully. 2: Not enough flash memory for the new firmware package. 3: Out of RAM during downloading process. 4: Connection lost during downloading process. 5: Integrity check failure for new downloaded package. 6: Unsupported package type. 7: Invalid URI. 8: Firmware update failed. 9: Unsupported protocol.

Resource ID	Resource Name	Operation	Description
6	PkgName	R	Name of the Firmware Package
7	PkgVersion	R	Version of the Firmware Package
9	Firmware Update Delivery Method	R	The LwM2M Client uses this resource to indicate its support for transferring firmware images to the client either via the Package Resource (=push) or via the Package URI Resource (=pull) mechanism. 0: Pull only 1: Push only 2: Both. In this case the LwM2M Server MAY choose the preferred mechanism for conveying the firmware image to the LwM2M Client.

The list of resources supported by the product for the standardized "**Generic Sensor**" object is detailed in the table below.

Resource ID	Resource Name	Operation	Description
5700	Sensor Value	R	Last or Current Measured Value from the Sensor.
5701	Sensor Units	R	Measurement Units Definition.
5601	Min Measured Value	R	The minimum value measured by the sensor since power ON or reset.
5602	Max Measured Value	R	The maximum value measured by the sensor since power ON or reset.
5603	Min Range Value	R	The minimum value that can be measured by the sensor.
5604	Max Range Value	R	The maximum value that can be measured by the sensor.
5750	Application Type	RW	The application type of the sensor or actuator as a string depending on the use case.
5605	Reset Min and Max Measured ValueS	EXE	Reset the Min and Max Measured Values to Current Value.

Custom Objects for the DRY CONTACTS Product

DRY CONTACTS exposes a custom profile for managing application parameters (including communication mode, sampling frequency, guard period, transmission frequency, input activation, anti-bounce timer period, counter reset).

Object Name	ID	Instance	Object URN
DRY CONTACTS	34453	5	urn:oma:lwm2m:x:34453

To use this CUSTOM object, the user needs to import the corresponding XML file for the CUSTOM object into the LwM2M server. The CUSTOM object can be downloaded from the Adeunis website.

The list of resources supported by the product for the custom "**DRY CONTACTS**" object is detailed in the table below.

Resource ID	Resource Name	Operation	Description
0	Product-Server communication	RW	Choose the communication type with the LwM2M server. In PUSH mode (TRUE), the product the data emission flow to the LwM2M server. In OBSERVE mode (FALSE), the data emission flow is only done when the server request it with a READ operation or an OBSERVATION. After modification of this parameter an automatic restart of the product will be performed.
1	Transmission frequency (in seconds)	RW	Select the frequency of periodic transmission of event and time counters. Data will be logged if the transmission frequency is at least 2 times higher than the sampling frequency. To disable periodic transmission, enter 0.
2	Sensors sampling frequency (in seconds)	RW	Acquisition and save frequency of event counter and time counter for each activated DC input. Note: in OBSERVE mode, this value is also used by default by the server as its observation frequency.
3	Active dry contact inputs	RW	Select the dry contact inputs to activate : 1 = Dry contact input A enabled, 2 = Dry contact input B enabled, 3 = Dry contact inputs A and B enabled. The device will reboot automatically after changing this value.
4	Guard interval (in seconds)	RW	To limit data consumption and guarantee product autonomy, you can choose the minimum time interval between sending 2 messages. To deactivate the guard period, enter 0.
10	DC input A debounce period filter (in milliseconds)	RW	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detections or bounces The device will reboot automatically after changing this value.
11	DC input A detection type	RW	Indicate detection type on Dry Contact input A. 0 = Low state detection, 1 = High state detection, 2 = Both high and low states detection. The device will reboot automatically after changing this value.
12	DC input A time counter activation	RW	Choose whether to enable or disable the time counter. This counter accumulates the time spent

Resource ID	Resource Name	Operation	Description
			(in seconds) in an “abnormal” state. 0 = disable, 1 = Enable.
13	Reset event counter of DC input A to 0	EXE	Reset Dry Contact input A event counter to 0. This counter accumulates the number of change of state detected. This counter is not saved in EEPROM; the contents will be reset to zero if the product is no longer powered
14	Reset time counter of DC input A to 0	EXE	Reset Dry Contact input A time counter to 0. This counter accumulates the time spent (in seconds) in an “abnormal” state. This counter is not saved in EEPROM; the contents will be reset to zero if the product is no longer powered
15	DC input A alarm threshold on change of state	RW	Number of events detected before an alarm message is sent. To deactivate the alarm on change of state, enter 0.
16	DC input A alarm threshold on event duration (in seconds)	RW	If an event lasts longer than the set period, an alarm is sent. To deactivate the event duration alarm, enter 0.
20	DC input B debounce period filter (in milliseconds)	RW	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detections or bounces.
21	DC input B detection type	RW	Indicate detection type on Dry Contact input B. 0 = Low state detection, 1 = High state detection, 2 = Both high and low states detection. The device will reboot automatically after changing this value.
22	DC input B time counter activation	RW	Choose whether to enable or disable the time counter. This counter accumulates the time spent (in seconds) in an “abnormal” state. 0 = disable, 1 = Enable.
23	Reset event counter of DC input B to 0	EXE	Reset Dry Contact input A event counter to 0. This counter accumulates the number of change of state detected. This counter is not saved in EEPROM; the contents will be reset to zero if the product is no longer powered
24	Reset time counter of DC input B to 0	EXE	Reset Dry Contact input B time counter to 0. This counter accumulates the time spent (in seconds) in an “abnormal” state. This counter is not saved in EEPROM; the contents will be reset to zero if the product is no longer powered
25	DC input B alarm threshold on change of state	RW	Number of events detected before an alarm message is sent. To deactivate the alarm on change of state, enter 0.

Resource ID	Resource Name	Operation	Description
26	DC input B alarm threshold on event duration (in seconds)	RW	If an event lasts longer than the set period, an alarm is sent. To deactivate the event duration alarm, enter 0.
33	Tx Power	R	Power of the signal transmitted in dBm.
34	Number of reboot	R	Number of times the device rebooted.
36	Reliable notifications	RW	Ensure (1) or not (0) that notifications are received by the LwM2M Server. Warning: Activating this option will increase consumption. The device will reboot automatically after changing this value.
37	TAU - T3412 value	RW	Tracking Area Update period, from 1H up to 31H (for T3412 factor=1H), The device will reboot automatically after changing this value.
38	Active time - T3324 value	R	Current active time (T3324) used by the network in seconds
39	Erase LwM2M context	W	Erase LwM2M context (TRUE). The device will reboot automatically after changing this value.
40	Dev info	R	Dev info Adeunis

ANNEX 3: PERIODIC TRANSMISSION, WITH OR WITHOUT HISTORY, OF EVENT COUNTERS AND CURRENT STATUS OF INPUTS IN PUSH MODE

With this transmission mode, DRY CONTACTS continuously detects and counts status changes on each of its 2 digital inputs.

For each digital input:

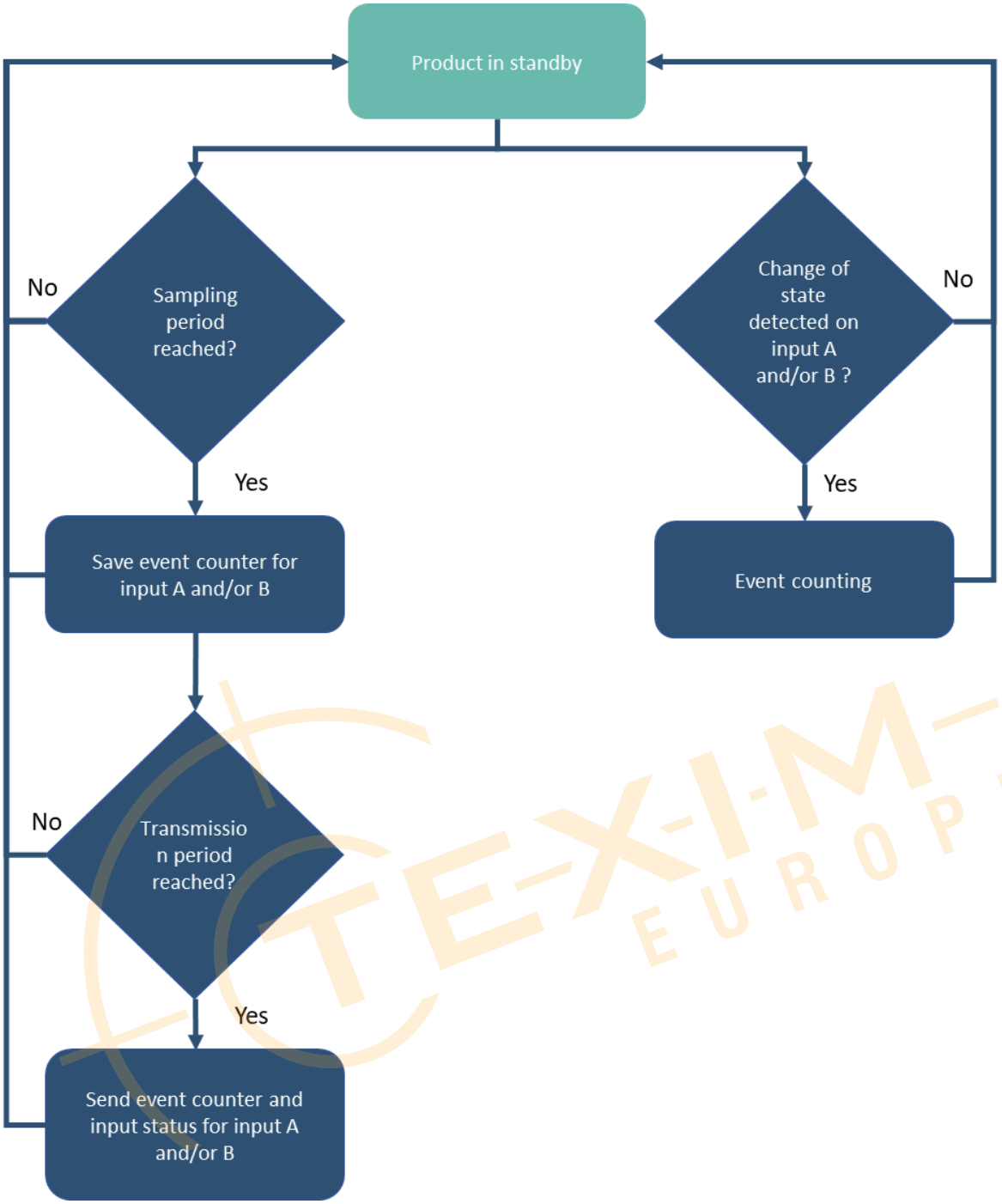
The product increments an event counter each time a change of state is detected, saves the event counter value at the configured sampling rate, and transmits the last saved event counter value and the current state of the input to the server.

With the historization mechanism, if the sampling frequency is lower than the transmission frequency, the product will save the successive counter values and the input status in local memory and then transmit them in a single message sent at the end of the transmission period.

📌 **Maximum number of samples per message and per input in the case of periodic transmission with historization: 48**

Block Diagram

The periodic transmission is performed according to the following block diagram



The table below lists the parameters to configure to use this transmission mode:

Parameters	Description	Possible Configuration	Default Configuration
Product-Server communication	Type of communication with the LwM2M server. In PUSH mode, the product controls data transmission to	OBSERVE PUSH	PUSH

Parameters	Description	Possible Configuration	Default Configuration
	the LwM2M server. In OBSERVE mode, data transmission is only possible on request from the server via a READ or an OBSERVATION operation.		
Active Dry Contact inputs	Select the dry contact inputs to activate.	DC input A enabled DC input B enabled DC inputs A and B enabled	DC inputs A and B enabled
Sampling frequency	Acquisition and save frequency of event counter and time counter for each activated DC input.	Between 60 and 604800 seconds (i.e. 7 days)	86400 seconds
Transmission frequency	Select the frequency of periodic transmission of event and time counters. Data will be logged if the transmission frequency is at least 2 times higher than the sampling frequency. To disable periodic transmission enter 0.	Between 60 and 604800 seconds (i.e. 7 days)	0 (disabled)
DC input A detection type	Indicate detection type on DC input A.	Low state detection High state detection Both high and low state detection	Both high and low state detection
DC input A debounce period filter	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detection or bounces.	Between 10 ms and 10 min	100 ms
DC input A time counter activation	Choose whether to enable or disable the time counter. This counter accumulates the time spent (in seconds) in an “abnormal” state.	Enabled Disabled	Disabled

Parameters	Description	Possible Configuration	Default Configuration
DC input A alarm threshold on change of state	Number of events detected before an alarm message is sent. To deactivate the alarm on change of state, enter 0.	Between 0 and 2147483647	1
DC input A alarm threshold on event duration	If an event lasts longer than the set period, an alarm is sent. To deactivate the event duration alarm, enter 0.	Between 0 and 2147483647 seconds	0 (disabled)
Equipment type on DC input A	Identify the equipment connected to DC input A.	Any information in alphanumeric format	Equipment on DC input A
DC input B detection type	Indicate detection type on DC input B.	Low state detection High state detection Both high and low state detection	Both high and low state detection
DC input B debounce period filter	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detection or bounces.	Between 10 ms and 10 min	100 ms
DC input B time counter activation	Choose whether to enable or disable the time counter. This counter accumulates the time spent (in seconds) in an “abnormal” state.	Enabled Disabled	Disabled
DC input B alarm threshold on change of state	Number of events detected before an alarm message is sent. To deactivate the alarm on change of state, enter 0.	Between 0 and 2147483647	1
DC input B alarm threshold on event duration	If an event lasts longer than the set period, an alarm is sent. To deactivate the event duration alarm, enter 0.	Between 0 and 2147483647 seconds	0 (disabled)
Equipment type on DC input B	Identify the equipment connected to DC input B.	Any information in alphanumeric format	Equipment on DC input B

These parameters can be configured via the **NB-IoT/LTE-M IoT Configurator** application or via a **LwM2M server**.

📌 **NOTE 1**
The sampling frequency must be the same for both digital inputs, to avoid desynchronization of data transmission, which would affect the autonomy of the DRY CONTACTS.

NOTE 2
Event monitoring on digital inputs remains functional even when the cellular network is not available.

NOTE 3
Event monitoring on activated inputs continues even during message transmission.

NOTE 4

The granularity of sampling and periodic transmission is per minute, rounded down to the nearest value (e.g. 90 s = 1 min).

NOTE 5
For transmission without logging, simply set the transmission frequency equal to the sampling frequency.

Example

- DRY CONTACTS continuously detects and counts contact openings and closings on digital input A (50 ms anti-bounce).
- The product continuously detects and counts contact openings on digital input B (500 ms anti-bounce).
- The event counter for digital input A and digital input B is saved every 10 minutes.
- The product transmits the event counter value and current status of discrete input A and discrete input B every 60 minutes, i.e. every 6 backups.

Configuration of Application Parameters to Use

Parameters	Value	Description
Product-Server communication	PUSH	The product controls data transmission to the LwM2M server.
Active Dry Contact inputs	DC inputs A and B enabled	Activation of the 2 digital inputs.
Sampling frequency	600 seconds	Event counter for each digital input acquired and saved every 10 minutes.
Transmission frequency	3600 seconds	1 transmission per hour of the last 6 event counter values for each input.
DC input A detection type	Both high and low state detection	Detection of contact opening and closing on digital input A.
DC input A debounce period filter	50 ms	Pulses (contact openings and closings) whose duration is less than 50 ms will be ignored.
DC input A time counter activation	Disabled	Time counter disabled.
DC input A alarm threshold on change of state	0	No alarm on status change.
DC input A alarm threshold on event duration	0 (disabled)	No alarm on event duration.
DC input B detection type	Low state detection	Detection of TOR input B contact openings.
DC input B debounce period filter	500 ms	Pulses (contact openings) whose duration is less than 500 ms will not be taken into account.
DC input B time counter activation	Disabled	Time counter disabled.
DC input B alarm threshold on change of state	0	No alarm on status change.
DC input B alarm threshold on event duration	0 (disabled)	No alarm on event duration.

Configuration via the NB-IoT/LTE-M IoT Configurator application

1. Go to the sensor's “CONFIGURATION” menu

⇛ Select the “CONNECTIVITY” section

⇛ Go to the “Protocol” sub-section
⇛ Set the “Data transfer protocol” parameter to “MQTT”

2. Go to the “APPLICATION” section
⇛ Go to the “General” sub-section
⇛ Configure the “Active dry contact inputs” parameter by selecting the activation of dry contact inputs A and B
⇛ Configure the sampling frequency to 600 seconds
⇛ Configure the transmission frequency to 3600 seconds

3. Go to dry contact input A sub-section
⇛ Set input detection type to “High and low state detection”
⇛ Set anti-bounce period filter to 50 ms
⇛ Disable “Time counter” parameter
⇛ Disable alarm on state change by indicating “0”
⇛ Disable alarm on event duration by indicating “0”

4. Go to dry contact B input sub-section
⇛ Configure input detection type as “Detect low states”
⇛ Configure anti-bounce period filter at 500 ms
⇛ Deactivate “Time counter” parameter
⇛ Deactivate alarm on state change by indicating “0”
⇛ Deactivate alarm on event duration by indicating “0”

5. Apply the new configuration to the product via NFC

Configuration via a LwM2M server

URI	Object Name	Resource Name	Value to Configure
/34453/0/0	DRY CONTACTS	Product-Server communication	TRUE
/34453/0/1	DRY CONTACTS	Transmission frequency (in seconds)	3600

URI	Object Name	Resource Name	Value to Configure
/34453/0/2	DRY CONTACTS	Sensors sampling frequency (in seconds)	600
/34453/0/3	DRY CONTACTS	Active dry contact inputs	3
/34453/0/10	DRY CONTACTS	DC input A debounce period filter (in milliseconds)	50
/34453/0/11	DRY CONTACTS	DC input A detection type	2
/34453/0/12	DRY CONTACTS	DC input A time counter activation	0
/34453/0/15	DRY CONTACTS	DC input A alarm threshold on change of state	0
/34453/0/16	DRY CONTACTS	DC input A alarm threshold on event duration (in seconds)	0
/34453/0/20	DRY CONTACTS	DC input B debounce period filter (in milliseconds)	500
/34453/0/21	DRY CONTACTS	DC input B detection type	0
/34453/0/22	DRY CONTACTS	DC input B time counter activation	0
/34453/0/25	DRY CONTACTS	DC input B alarm threshold on change of state	0
/34453/0/26	DRY CONTACTS	DC input B alarm threshold on event duration (in seconds)	0

📌 **NOTE 1**
When the message is sent to the LwM2M server, the counters are not reset for all inputs. The user can reset the counters to 0 via the NB-IoT/LTE-M IoT Configurator application or via the LwM2M server.

NOTE 2
If a digital input is not activated, the information related to this input is not sent to the LwM2M server.

ANNEX 4: PERIODIC TRANSMISSION, WITH OR WITHOUT HISTORY, OF EVENT COUNTERS, TIME COUNTERS AND CURRENT STATUS OF INPUTS IN PUSH MODE

With this transmission mode, DRY CONTACTS continuously detects and counts status changes on each of its 2 digital inputs.

For each digital input:

The product increments an event counter each time a change of state is detected, saves the event counter value at the configured sampling rate.

The product also counts the time spent (in seconds) in an “abnormal” state. It increments a time counter each time a change of state is detected, and saves the value of this counter at the configured sampling frequency.

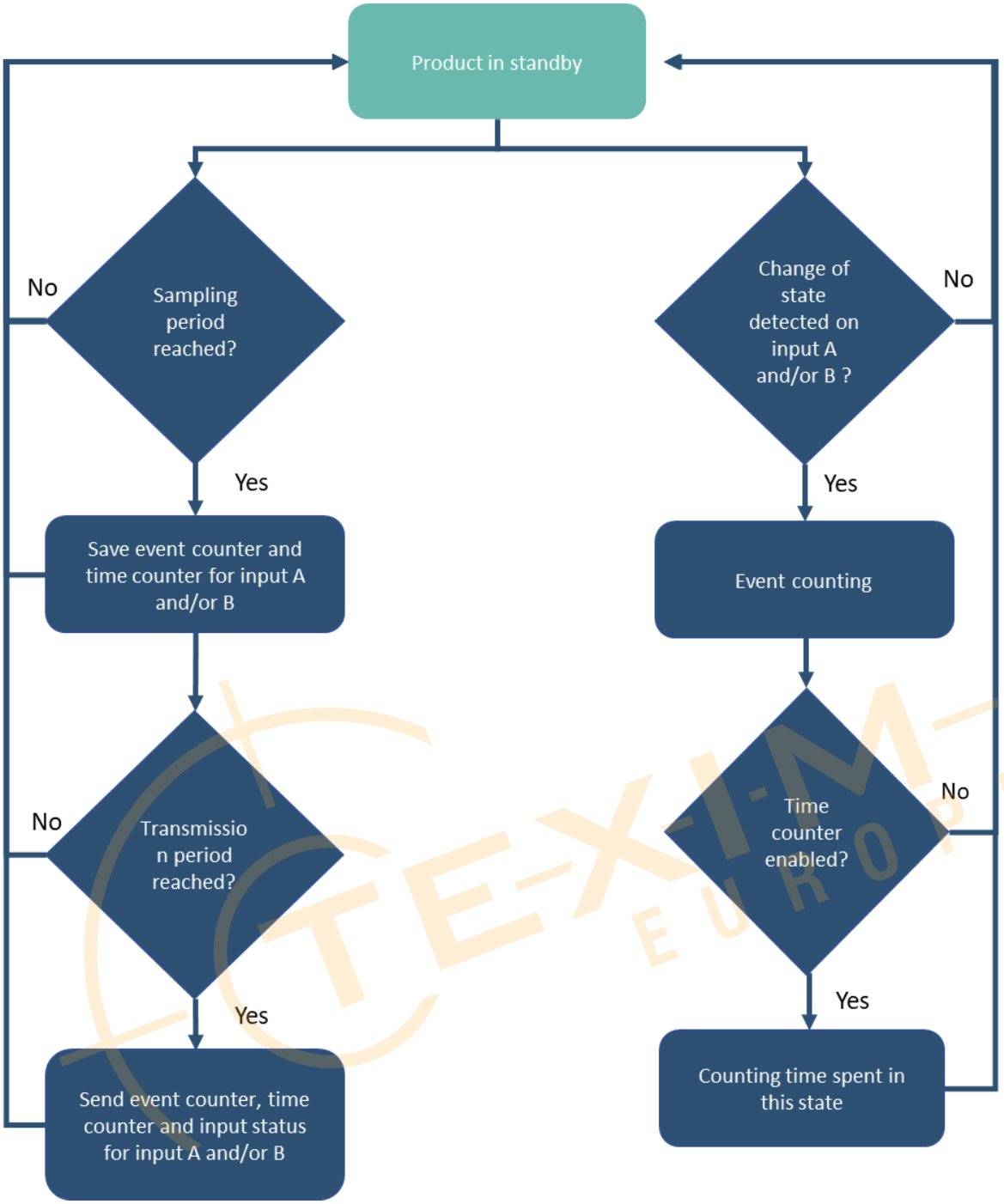
The product transmits the last saved value of the event counter and the last saved value of the time counter, as well as the current state of the input, to the broker.

With the historization mechanism, if the sampling frequency is lower than the transmission frequency, the product will save the successive counter values and the input status in local memory and then transmit them in a single message sent at the end of the transmission period.

📌 **Maximum number of samples per message and per input in the case of periodic transmission with historization: 48**

Block Diagram

The periodic transmission is performed according to the following block diagram



The table below lists the parameters to configure to use this transmission mode:

Parameters	Description	Possible Configuration	Default Configuration
Product-Server communication	Type of communication with the LwM2M server. In PUSH mode, the product controls data transmission to the LwM2M server. In OBSERVE mode, data	OBSERVE PUSH	PUSH

Parameters	Description	Possible Configuration	Default Configuration
	transmission is only possible on request from the server via a READ or an OBSERVATION operation.		
Active Dry Contact inputs	Select the dry contact inputs to activate.	DC input A enabled DC input B enabled DC inputs A and B enabled	DC inputs A and B enabled
Sampling frequency	Acquisition and save frequency of event counter and time counter for each activated DC input.	Between 60 and 604800 seconds (i.e. 7 days)	86400 seconds
Transmission frequency	Select the frequency of periodic transmission of event and time counters. Data will be logged if the transmission frequency is at least 2 times higher than the sampling frequency. To disable periodic transmission enter 0.	Between 60 and 604800 seconds (i.e. 7 days)	0 (disabled)
DC input A detection type	Indicate detection type on DC input A.	Low state detection High state detection Both high and low state detection	Both high and low state detection
DC input A debounce period filter	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detection or bounces.	Between 10 ms and 10 min	100 ms
DC input A time counter activation	Choose whether to enable or disable the time counter. This counter accumulates the time spent (in seconds) in an “abnormal” state.	Enabled Disabled	Disabled
DC input A alarm threshold on change of state	Number of events detected before an alarm message is sent.	Between 0 and 2147483647	1

Parameters	Description	Possible Configuration	Default Configuration
	To deactivate the alarm on change of state, enter 0.		
DC input A alarm threshold on event duration	If an event lasts longer than the set period, an alarm is sent. To deactivate the event duration alarm, enter 0.	Between 0 and 2147483647 seconds	0 (disabled)
Equipment type on DC input A	Identify the equipment connected to DC input A.	Any information in alphanumeric format	Equipment on DC input A
DC input B detection type	Indicate detection type on DC input B.	Low state detection High state detection Both high and low state detection	Both high and low state detection
DC input B debounce period filter	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detection or bounces.	Between 10 ms and 10 min	100 ms
DC input B time counter activation	Choose whether to enable or disable the time counter. This counter accumulates the time spent (in seconds) in an “abnormal” state.	Enabled Disabled	Disabled
DC input B alarm threshold on change of state	Number of events detected before an alarm message is sent. To deactivate the alarm on change of state, enter 0.	Between 0 and 2147483647	1
DC input B alarm threshold on event duration	If an event lasts longer than the set period, an alarm is sent. To deactivate the event duration alarm, enter 0.	Between 0 and 2147483647 seconds	0 (disabled)
Equipment type on DC input B	Identify the equipment connected to DC input B.	Any information in alphanumeric format	Equipment on DC input B

These parameters can be configured via the **NB-IoT/LTE-M IoT Configurator** application or via the **LwM2M serve**r.

📌 **NOTE 1**
The sampling frequency must be the same for both digital inputs, to avoid desynchronization of data transmission, which would affect the autonomy of the DRY CONTACTS.

NOTE 2

When the time counter is activated on a dry contact input, this must be configured for “high state detection” or “low state detection”. If the input is configured as “detect high and low”, then the time counter value will be 0.

NOTE 3
Event monitoring on digital inputs remains functional even when the cellular network is not available.

NOTE 4
Event monitoring on activated inputs continues even during message transmission.

NOTE 5

The granularity of sampling and periodic transmission is per minute, rounded down to the nearest value (e.g. 90 s = 1 min).

NOTE 6
For transmission without logging, simply set the transmission frequency equal to the sampling frequency.

Example

- DRY CONTACTS continuously detects and counts contact openings and closings on digital input A (50 ms anti-bounce).
- The product continuously detects and counts contact openings on digital input B (500 ms anti-bounce).
- The time counter is activated on input B. The product will count the time that input B has spent (in seconds) in the open state (low state).

- The event counter value of input A and input B is saved every 10 minutes.
- The product transmits the event counter value and current status of digital input A every 60 minutes, i.e. every 6 saves.
- The product transmits the event counter value, the time counter value and the current status of digital input B every 60 minutes, i.e. every 6 backups.

Configuration of Application Parameters to Use

Parameters	Value	Description
Product-Server communication	PUSH	The product controls data transmission to the LwM2M server.
Active Dry Contact inputs	DC inputs A and B enabled	Activation of the 2 digital inputs.
Sampling frequency	600 seconds	Event counter for each digital input acquired and saved every 10 minutes.
Transmission frequency	3600 seconds	1 transmission per hour of the last 6 event counter values for each input.
DC input A detection type	Both high and low state detection	Detection of contact opening and closing on digital input A.
DC input A debounce period filter	50 ms	Pulses (contact openings and closings) whose duration is less than 50 ms will be ignored.
DC input A time counter activation	Disabled	Time counter disabled.
DC input A alarm threshold on change of state	0	No alarm on status change.
DC input A alarm threshold on event duration	0 (disabled)	No alarm on event duration.
DC input B detection type	Low state detection	Detection of TOR input B contact openings.
DC input B debounce period filter	500 ms	Pulses (contact openings) whose duration is less than 500 ms will not be taken into account.
DC input B time counter activation	Enabled	Time counter activated.

Parameters	Value	Description
DC input B alarm threshold on change of state	0	No alarm on status change.
DC input B alarm threshold on event duration	0 (disabled)	No alarm on event duration.

📱 **Configuration via the NB-IoT/LTE-M IoT Configurator application**

1. Go to the sensor's “CONFIGURATION” menu

➔ Select the “CONNECTIVITY” section

➔ Go to the “Protocol” sub-section
⇒ Set the “Data transfer protocol” parameter to “MQTT”

2. Go to the “APPLICATION” section
⇒ Go to the “General” sub-section
⇒ Configure the “Active dry contact inputs” parameter by selecting the activation of dry contact inputs A and B
⇒ Configure the sampling frequency to 600 seconds
⇒ Configure the transmission frequency to 3600 seconds

3. Go to dry contact input A sub-section
⇒ Set input detection type to “High and low state detection”
⇒ Set anti-bounce period filter to 50 ms
⇒ Disable “Time counter” parameter
⇒ Disable alarm on state change by indicating “0”
⇒ Disable alarm on event duration by indicating “0”

4. Go to dry contact B input sub-section
⇒ Configure input detection type as “Detect low states”
⇒ Configure anti-bounce period filter at 500 ms
⇒ Activate “Time counter” parameter
⇒ Deactivate alarm on state change by indicating “0”
⇒ Deactivate alarm on event duration by indicating “0”

5. Apply the new configuration to the product via NFC

Configuration via a LwM2M server

URI	Object Name	Resource Name	Value to Configure
/34453/0/0	DRY CONTACTS	Product-Server communication	TRUE
/34453/0/1	DRY CONTACTS	Transmission frequency (in seconds)	3600
/34453/0/2	DRY CONTACTS	Sensors sampling frequency (in seconds)	600
/34453/0/3	DRY CONTACTS	Active dry contact inputs	3
/34453/0/10	DRY CONTACTS	DC input A debounce period filter (in milliseconds)	50
/34453/0/11	DRY CONTACTS	DC input A detection type	2
/34453/0/12	DRY CONTACTS	DC input A time counter activation	0
/34453/0/15	DRY CONTACTS	DC input A alarm threshold on change of state	0
/34453/0/16	DRY CONTACTS	DC input A alarm threshold on event duration (in seconds)	0
/34453/0/20	DRY CONTACTS	DC input B debounce period filter (in milliseconds)	500
/34453/0/21	DRY CONTACTS	DC input B detection type	0
/34453/0/22	DRY CONTACTS	DC input B time counter activation	1
/34453/0/25	DRY CONTACTS	DC input B alarm threshold on change of state	0
/34453/0/26	DRY CONTACTS	DC input B alarm threshold on event duration (in seconds)	0

📌 **NOTE 1**
When the message is sent to the LwM2M server, the counters are not reset for all inputs. The user can reset the counters to 0 via the NB-IoT/LTE-M IoT Configurator application or via the LwM2M server.

NOTE 2
If a digital input is not activated, the information related to this input is not sent to the LwM2M server.

ANNEX 5: EMISSION ON CHANGE OF STATE (ALARM)

With this transmission mode, DRY CONTACTS continuously detects and counts status changes on each of its 2 digital inputs.

For each digital input:

The product increments an event counter each time a change of state is detected, saves the event counter value at the configured sampling rate.

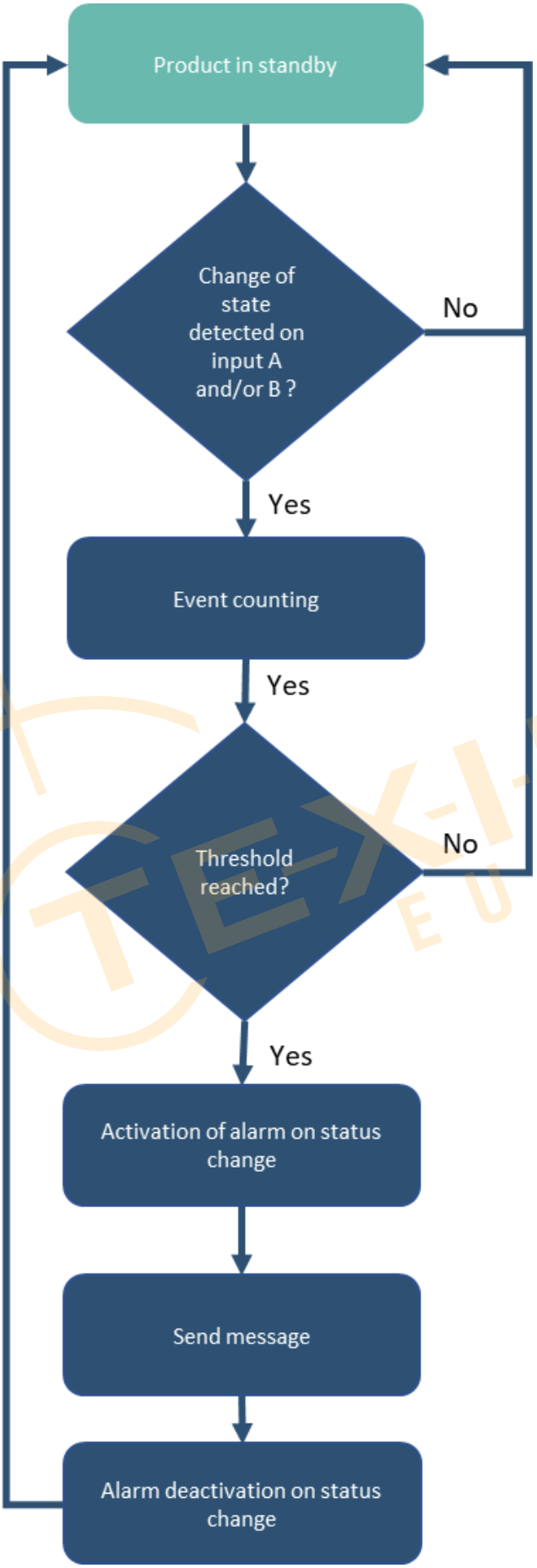
If the product detects that the threshold (number of state changes detected) has been exceeded on one of the 2 DC inputs, it sends a notification to the broker to alert the user.

The product transmits the last saved value of the event counter and the last saved value of the time counter (if activated), as well as the current state of the input, to the broker.

Each time a message is sent, the alarm is deactivated for the 2 digital inputs.

Block Diagram

The periodic transmission is performed according to the following block diagram



The table below lists the parameters to configure to use this transmission mode:

Parameters	Description	Possible Configuration	Default Configuration
Product-Server communication	Type of communication with the LwM2M server. In PUSH mode, the product controls data transmission to the LwM2M server. In OBSERVE mode, data transmission is only possible on request from the server via a READ or an OBSERVATION operation.	OBSERVE PUSH	PUSH
Active Dry Contact inputs	Select the dry contact inputs to activate.	DC input A enabled DC input B enabled DC inputs A and B enabled	DC inputs A and B enabled
Sampling frequency	Acquisition and save frequency of event counter and time counter for each activated DC input.	Between 60 and 604800 seconds (i.e. 7 days)	86400 seconds
Guard period	To limit data consumption and guarantee product autonomy, you can choose the minimum time interval between 2 transmissions	Between 60 seconds and 86400 seconds (i.e. 1 day). To deactivate the guard period enter 0.	0 (disabled)
Transmission frequency	Select the frequency of periodic transmission of event and time counters. Data will be logged if the transmission frequency is at least 2 times higher than the sampling frequency. To disable periodic transmission enter 0.	Between 60 and 604800 seconds (i.e. 7 days)	0 (disabled)
DC input A detection type	Indicate detection type on DC input A.	Low state detection High state detection Both high and low state detection	Both high and low state detection

Parameters	Description	Possible Configuration	Default Configuration
DC input A debounce period filter	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detection or bounces.	Between 10 ms and 10 min	100 ms
DC input A time counter activation	Choose whether to enable or disable the time counter. This counter accumulates the time spent (in seconds) in an “abnormal” state.	Enabled Disabled	Disabled
DC input A alarm threshold on change of state	Number of events detected before an alarm message is sent. To deactivate the alarm on change of state, enter 0.	Between 0 and 2147483647	1
DC input A alarm threshold on event duration	If an event lasts longer than the set period, an alarm is sent. To deactivate the event duration alarm, enter 0.	Between 0 and 2147483647 seconds	0 (disabled)
Equipment type on DC input A	Identify the equipment connected to DC input A.	Any information in alphanumeric format	Equipment on DC input A
DC input B detection type	Indicate detection type on DC input B.	Low state detection High state detection Both high and low state detection	Both high and low state detection
DC input B debounce period filter	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detection or bounces.	Between 10 ms and 10 min	100 ms
DC input B time counter activation	Choose whether to enable or disable the time counter. This counter accumulates the time spent (in seconds) in an “abnormal” state.	Enabled Disabled	Disabled

Parameters	Description	Possible Configuration	Default Configuration
DC input B alarm threshold on change of state	Number of events detected before an alarm message is sent. To deactivate the alarm on change of state, enter 0.	Between 0 and 2147483647	1
DC input B alarm threshold on event duration	If an event lasts longer than the set period, an alarm is sent. To deactivate the event duration alarm, enter 0.	Between 0 and 2147483647 seconds	0 (disabled)
Equipment type on DC input B	Identify the equipment connected to DC input B.	Any information in alphanumeric format	Equipment on DC input B

These parameters can be configured via the **NB-IoT/LTE-M IoT Configurator** application or via the **LwM2M serve**r.

📌 **NOTE 1**
The number of events detected has an impact on battery life.

NOTE 2

If the associated sensors are in a “constantly closed” state, battery life can be severely impacted.

NOTE 3
In the case of a product configured to transmit its data on change of state, Adeunis recommends setting a guard period to limit the number of transmissions.

NOTE 4
Event monitoring on digital inputs remains functional even when the cellular network is not available.

NOTE 5

Event monitoring on activated inputs continues even during message transmission.

NOTE 6
The message is sent 1 sec after detection to avoid 2 consecutive transmissions in the case of a product configured to detect status changes on both edges.

Example

- DRY CONTACTS continuously detects and counts contact closures on digital input A.
- All pulses (contact closures) whose duration is less than 50 ms will be ignored.
- Digital input B is disabled
- Event mode is activated on digital input A, a message will be sent if the product detects 10 contact closures on digital input A.
- A guard period of 300 seconds (minimum time interval between sending 2 messages) is configured on input A to limit data consumption and guarantee product autonomy.

Configuration of Application Parameters to Use

Parameters	Value	Description
Product-Server communication	PUSH	the product controls data transmission to the LwM2M server.
Active Dry Contact inputs	DC input A enabled	Activation of digital input A only.
Sampling frequency	0 second	Event counter for digital input A is disabled.
Guard period	300 seconds	A guard period of 5 minutes (minimum time interval between sending 2 messages) is configured.
Transmission frequency	0 second	Periodic transmission of counters is deactivated.
DC input A detection type	High state detection	Detection of contact closing on digital input A.
DC input A debounce period filter	50 ms	Pulses (contact closings) whose duration is less than 50 ms will be ignored.
DC input A time counter activation	Disabled	Time counter disabled.
DC input A alarm threshold on change of state	10	A message will be sent if the product detects 10 closures of DC input A
DC input A alarm threshold on event duration	0 (disabled)	No alarm on event duration.

Configuration via the NB-IoT/LTE-M IoT Configurator application

1. Go to the sensor's “CONFIGURATION” menu

⇛ Select the “CONNECTIVITY” section

⇛ Go to the “Protocol” sub-section
⇛ Set the “Data transfer protocol” parameter to “MQTT”

2. Go to the “APPLICATION” section
⇛ Go to the “General” sub-section
⇛ Configure the “Active dry contact inputs” parameter by selecting the activation of dry contact input A
⇛ Configure the sampling frequency to 0 seconds
⇛ Configure the guard period to 300 seconds
⇛ Configure the transmission frequency to 0 seconds

3. Go to dry contact input A sub-section
⇛ Set input detection type to “High state detection”
⇛ Set anti-bounce period filter to 50 ms
⇛ Disable “Time counter” parameter
⇛ Enable alarm on state change by indicating “10”
⇛ Disable alarm on event duration by indicating “0”

4. Apply the new configuration to the product via NFC

Configuration via a LwM2M server

URI	Object Name	Resource Name	Value to Configure
/34453/0/0	DRY CONTACTS	Product-Server communication	TRUE
/34453/0/1		Transmission frequency (in seconds)	0
/34453/0/2		Sensors sampling frequency (in seconds)	0
/34453/0/3		Active dry contact inputs	1
/34453/0/4		Guard interval (in seconds)	300

URI	Object Name	Resource Name	Value to Configure
/34453/0/10		DC input A debounce period filter (in milliseconds)	50
/34453/0/11		DC input A detection type	1
/34453/0/12		DC input A time counter activation	0
/34453/0/15		DC input A alarm threshold on change of state	10
/34453/0/16		DC input A alarm threshold on event duration (in seconds)	0

📌 **NOTE 1**
When the message is sent to the LwM2M server, the counters are not reset for all inputs. The user can reset the counters to 0 via the NB-IoT/LTE-M IoT Configurator application or via the LwM2M server.

NOTE 2
If a digital input is not activated, the information related to this input is not sent to the LwM2M server.

NOTE 3
Alarm on change of state and alarm on event duration are cumulative.

ANNEX 6: EMISSION ON EVENT DURATION (ALARM)

With this transmission mode, DRY CONTACTS continuously detects and counts status changes on each of its 2 digital inputs.

For each digital input:

The product increments an event counter each time a change of state is detected, saves the event counter value at the configured sampling rate.

The product also counts the time spent (in seconds) in an “abnormal” state. It increments a time counter each time a change is detected, and saves the value of this counter at the configured sampling frequency.

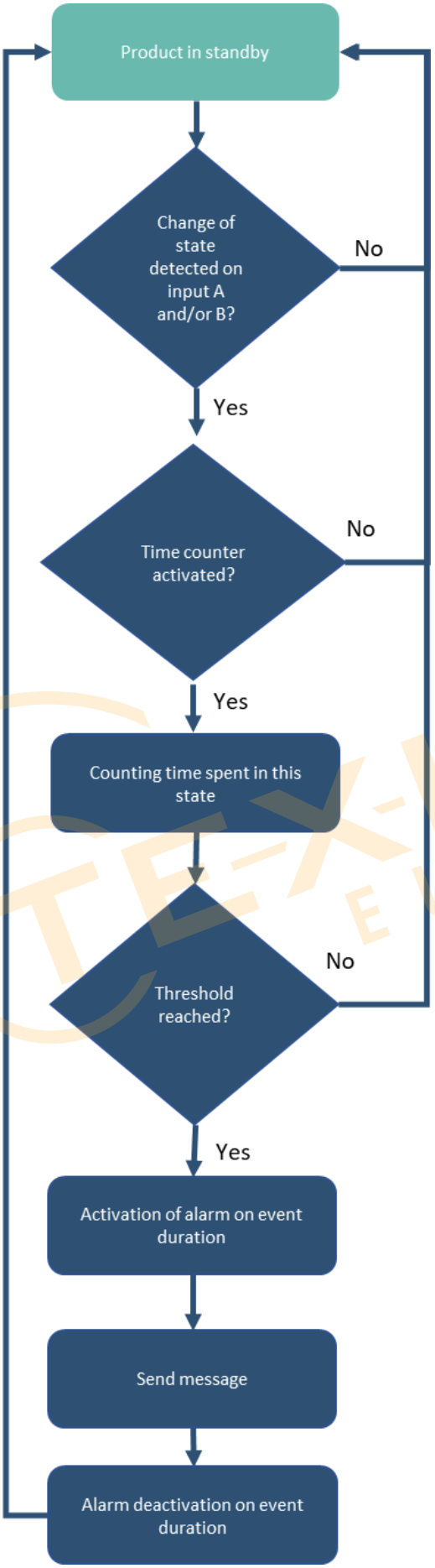
If the product detects a threshold violation (time spent in seconds in an “abnormal” state) on one of the 2 TOR inputs, it sends a notification to the broker to alert the user.

The product transmits the last saved value of the event counter and the last saved value of the time counter (if activated), as well as the current state of the input, to the broker.

Each time a message is sent, the alarm is deactivated for the 2 digital inputs.

Block Diagram

The periodic transmission is performed according to the following block diagram



The table below lists the parameters to configure to use this transmission mode:

Parameters	Description	Possible Configuration	Default Configuration
Product-Server communication	Type of communication with the LwM2M server. In PUSH mode, the product controls data transmission to the LwM2M server. In OBSERVE mode, data transmission is only possible on request from the server via a READ or an OBSERVATION operation.	OBSERVE PUSH	PUSH
Active Dry Contact inputs	Select the dry contact inputs to activate.	DC input A enabled DC input B enabled DC inputs A and B enabled	DC inputs A and B enabled
Sampling frequency	Acquisition and save frequency of event counter and time counter for each activated DC input.	Between 60 and 604800 seconds (i.e. 7 days)	86400 seconds
Guard period	To limit data consumption and guarantee product autonomy, you can choose the minimum time interval between 2 transmissions	Between 60 seconds and 86400 seconds (i.e. 1 day). To deactivate the guard period enter 0.	0 (disabled)
Transmission frequency	Select the frequency of periodic transmission of event and time counters. Data will be logged if the transmission frequency is at least 2 times higher than the sampling frequency. To disable periodic transmission enter 0.	Between 60 and 604800 seconds (i.e. 7 days)	0 (disabled)
DC input A detection type	Indicate detection type on DC input A.	Low state detection High state detection Both high and low state detection	Both high and low state detection

Parameters	Description	Possible Configuration	Default Configuration
DC input A debounce period filter	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detection or bounces.	Between 10 ms and 10 min	100 ms
DC input A time counter activation	Choose whether to enable or disable the time counter. This counter accumulates the time spent (in seconds) in an “abnormal” state.	Enabled Disabled	Disabled
DC input A alarm threshold on change of state	Number of events detected before an alarm message is sent. To deactivate the alarm on change of state, enter 0.	Between 0 and 2147483647	1
DC input A alarm threshold on event duration	If an event lasts longer than the set period, an alarm is sent. To deactivate the event duration alarm, enter 0.	Between 0 and 2147483647 seconds	0 (disabled)
Equipment type on DC input A	Identify the equipment connected to DC input A.	Any information in alphanumeric format	Equipment on DC input A
DC input B detection type	Indicate detection type on DC input B.	Low state detection High state detection Both high and low state detection	Both high and low state detection
DC input B debounce period filter	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detection or bounces.	Between 10 ms and 10 min	100 ms
DC input B time counter activation	Choose whether to enable or disable the time counter. This counter accumulates the time spent (in seconds) in an “abnormal” state.	Enabled Disabled	Disabled

Parameters	Description	Possible Configuration	Default Configuration
DC input B alarm threshold on change of state	Number of events detected before an alarm message is sent. To deactivate the alarm on change of state, enter 0.	Between 0 and 2147483647	1
DC input B alarm threshold on event duration	If an event lasts longer than the set period, an alarm is sent. To deactivate the event duration alarm, enter 0.	Between 0 and 2147483647 seconds	0 (disabled)
Equipment type on DC input B	Identify the equipment connected to DC input B.	Any information in alphanumeric format	Equipment on DC input B

These parameters can be configured via the **NB-IoT/LTE-M IoT Configurator** application.

📌 **NOTE 1**
The sampling frequency must be the same for the 2 digital inputs and the 2 counters (event and time), to avoid desynchronization of data transmission, which would affect the autonomy of the DRY CONTACTS.

NOTE 2

When the time counter is activated on a DC input, the latter must be configured for “high state detection” or “low state detection”. If the input is configured for “high and low detection”, the time counter value will be 0.

NOTE 3
If the associated sensors are in a “constantly closed” state, battery autonomy may be severely affected.

NOTE 4
Event monitoring on digital inputs remains functional even when the cellular network is not available.

NOTE 5
Event monitoring on activated inputs continues even during message transmission.

NOTE 6
In the case of a product configured to transmit its data on event duration, Adeunis recommends setting a guard period to limit the number of transmissions.

Example

- DRY CONTACTS continuously detects and counts contact openings on digital input A (50 ms anti-bounce).
- Digital input B is deactivated
- The time counter is activated on input A. The product will count the time input A has spent (in seconds) in open state (low state).
- Event mode is enabled on input A, a message will be sent if the product detects a contact opening on input A lasting longer than 5 minutes.
- No guard period is configured on input A.

Configuration of Application Parameters to Use

Parameters	Value	Description
Active Dry Contact inputs	DC input A enabled	Activation of digital input A only.
Sampling frequency	0 second	Event counter for digital input A is disabled.
Guard period	0 second (disabled)	A guard period is not configured.
Transmission frequency	0 second	Periodic transmission of counters is deactivated.
DC input A detection type	Low state detection	Detection of contact opening on digital input A.
DC input A debounce period filter	50 ms	Pulses (contact openings and closings) whose duration is less than 50 ms will be ignored.
DC input A time counter activation	Enabled	Event counter enabled.
DC input A alarm threshold on change of state	0	No alarm on change of state.
DC input A alarm threshold on event duration	300 seconds	A message will be sent if the product detects a contact opening on digital input A lasting longer than 5 minutes.

Configuration via the NB-IoT/LTE-M IoT Configurator application

1. Go to the sensor's “CONFIGURATION” menu

⇛ Select the “CONNECTIVITY” section

⇛ Go to the “Protocol” sub-section
⇛ Set the “Data transfer protocol” parameter to “MQTT”

2. Go to the “APPLICATION” section
⇛ Go to the “General” sub-section
⇛ Configure the “Active dry contact inputs” parameter by selecting the activation of dry contact input A
⇛ Configure the sampling frequency to 0 seconds
⇛ Configure the guard period to 0 seconds
⇛ Configure the transmission frequency to 0 seconds

3. Go to dry contact input A sub-section
⇛ Set input detection type to “Low state detection”
⇛ Set anti-bounce period filter to 50 ms
⇛ Enable “Time counter” parameter
⇛ Disable alarm on state change by indicating “0”
⇛ Enable alarm on event duration by indicating “5”

4. Apply the new configuration to the product via NFC

Configuration via a LwM2M server

/34453/0/0	DRY CONTACTS	Product-Server communication	TRUE
/34453/0/1	DRY CONTACTS	Transmission frequency (in seconds)	0
/34453/0/2	DRY CONTACTS	Sensors sampling frequency (in seconds)	0
/34453/0/3	DRY CONTACTS	Active dry contact inputs	1
/34453/0/4	DRY CONTACTS	Guard interval (in seconds)	0

/34453/0/10	DRY CONTACTS	DC input A debounce period filter (in milliseconds)	50
/34453/0/11	DRY CONTACTS	DC input A detection type	0
/34453/0/12	DRY CONTACTS	DC input A time counter activation	1
/34453/0/15	DRY CONTACTS	DC input A alarm threshold on change of state	0
/34453/0/16	DRY CONTACTS	DC input A alarm threshold on event duration (in seconds)	300

📌 **NOTE 1**
When the message is sent to the LwM2M server, the counters are not reset for all inputs. The user can reset the counters to 0 via the NB-IoT/LTE-M IoT Configurator application or via the LwM2M server.

NOTE 2
If a digital input is not activated, the information related to this input is not sent to the LwM2M server.

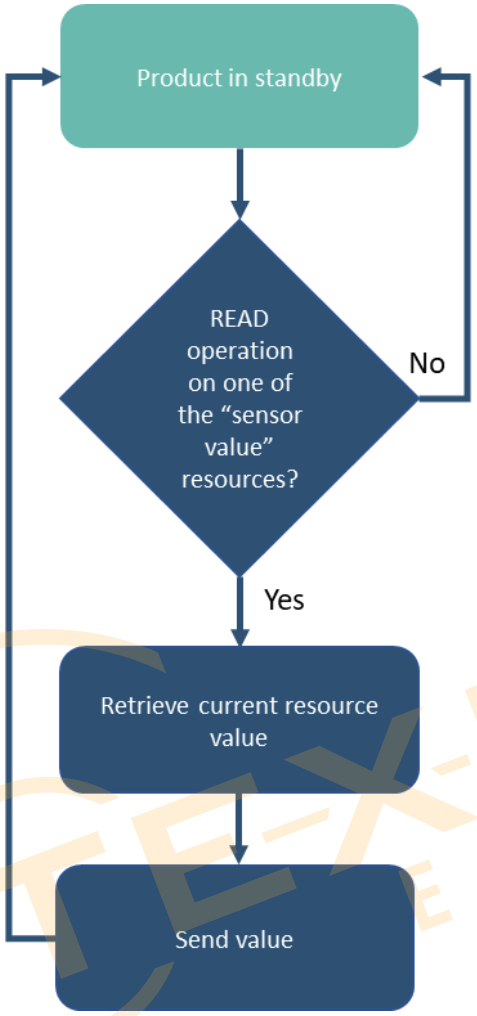
NOTE 3
Alarm on change of state and alarm on event duration are cumulative.

ANNEX 7: SINGLE TRANSMISSION IN OBSERVE MODE

The LwM2M server can request the DRY CONTACTS product to return the last known value of a digital input: current state, event counter value, time counter value.

Block Diagram

The single transmission is performed according to the following block diagram



Read a Value - READ Operation

The DRY CONTACTS continuously detects and counts changes of state on each of its 2 digital inputs.

For each input:

The product increments an event counter each time a change of state is detected, and saves the value of this counter at the configured sampling frequency.

The product also counts the time spent (in seconds) in an “abnormal” state. It increments a time counter each time a change of state is detected, and saves the value of this counter at the configured sampling frequency.

The server can ask the product to return the current value of the status, event counter and time counter for each input by means of a READ operation on one or more sensor value resources.

> 📌 **NOTE**
> The URI of the “sensor value” resource evolves dynamically according to the configuration applied to the DRY CONTACTS product.
>
> To easily identify the resource on which to perform a read operation according to your application configuration, please refer to the tables below.

Product configuration

- Digital inputs A and B activated
- Time counters activated for inputs A and B

URI	Object name	Resource name	Access type	Description
/3300/0/5700	GENERIC SENSOR	Sensor value	R	Status of digital input A
/3300/1/5700	GENERIC SENSOR	Sensor value	R	Event counter value of digital input A
/3300/2/5700	GENERIC SENSOR	Sensor value	R	Time counter value for digital input A
/3300/3/5700	GENERIC SENSOR	Sensor value	R	Status of digital input B
/3300/4/5700	GENERIC SENSOR	Sensor value	R	Event counter value of digital input B
/3300/5/5700	GENERIC SENSOR	Sensor value	R	Time counter value for digital input B

Product configuration

- Digital inputs A and B activated
- Time counters activated for input A and disabled for input B

URI	Object name	Resource name	Access type	Description
/3300/0/5700	GENERIC SENSOR	Sensor value	R	Status of digital input A

URI	Object name	Resource name	Access type	Description
/3300/1/5700	GENERIC SENSOR	Sensor value	R	Event counter value of digital input A
/3300/2/5700	GENERIC SENSOR	Sensor value	R	Time counter value for digital input A
/3300/3/5700	GENERIC SENSOR	Sensor value	R	Status of digital input B
/3300/4/5700	GENERIC SENSOR	Sensor value	R	Event counter value of digital input B

Product configuration

- Digital inputs A and B activated
- Time counters disabled for input A and activated for input B

URI	Object name	Resource name	Access type	Description
/3300/0/5700	GENERIC SENSOR	Sensor value	R	Status of digital input A
/3300/1/5700	GENERIC SENSOR	Sensor value	R	Event counter value of digital input A
/3300/2/5700	GENERIC SENSOR	Sensor value	R	Status of digital input B
/3300/3/5700	GENERIC SENSOR	Sensor value	R	Event counter value of digital input B
/3300/4/5700	GENERIC SENSOR	Sensor value	R	Time counter value for digital input B

Product configuration

- Digital inputs A and B activated
- Time counters disabled for inputs A and B

URI	Object name	Resource name	Access type	Description
/3300/0/5700	GENERIC SENSOR	Sensor value	R	Status of digital input A
/3300/1/5700	GENERIC SENSOR	Sensor value	R	Event counter value of digital input A

URI	Object name	Resource name	Access type	Description
/3300/2/5700	GENERIC SENSOR	Sensor value	R	Status of digital input B
/3300/3/5700	GENERIC SENSOR	Sensor value	R	Event counter value of digital input B

Product configuration

- Digital input A activated and digital input B disabled
- Time counters activated for input A

URI	Object name	Resource name	Access type	Description
/3300/0/5700	GENERIC SENSOR	Sensor value	R	Status of digital input A
/3300/1/5700	GENERIC SENSOR	Sensor value	R	Event counter value of digital input A
/3300/2/5700	GENERIC SENSOR	Sensor value	R	Time counter value for digital input A

Product configuration

- Digital input A disabled and digital input B activated
- Time counters activated for input B

URI	Object name	Resource name	Access type	Description
/3300/0/5700	GENERIC SENSOR	Sensor value	R	Status of digital input B
/3300/1/5700	GENERIC SENSOR	Sensor value	R	Event counter value of digital input B
/3300/2/5700	GENERIC SENSOR	Sensor value	R	Time counter value for digital input B

Product configuration

- Digital input A activated and digital input B disabled
- Time counters disabled for input A

URI	Object name	Resource name	Access type	Description
/3300/0/5700	GENERIC SENSOR	Sensor value	R	Status of digital input A

URI	Object name	Resource name	Access type	Description
/3300/1/5700	GENERIC SENSOR	Sensor value	R	Event counter value of digital input A

Product configuration

- Digital input A disabled and digital input B activated
- Time counters disabled for input B

URI	Object name	Resource name	Access type	Description
/3300/0/5700	GENERIC SENSOR	Sensor value	R	Status of digital input B
/3300/1/5700	GENERIC SENSOR	Sensor value	R	Event counter value of digital input B

📌 **NOTE**
The measurement date is determined by the value of the “Sensor sampling period” resource, and the emission period is determined by the value of the “lifetime” resource.

ANNEX 8: PERIODIC TRANSMISSION OF EVENT COUNTERS IN OBSERVE MODE

With this transmission mode, DRY CONTACTS continuously detects and counts changes of state on each of its 2 digital inputs.

For each digital input :
The product increments an event counter each time a change of state is detected, and saves the event counter value at the configured sampling rate.

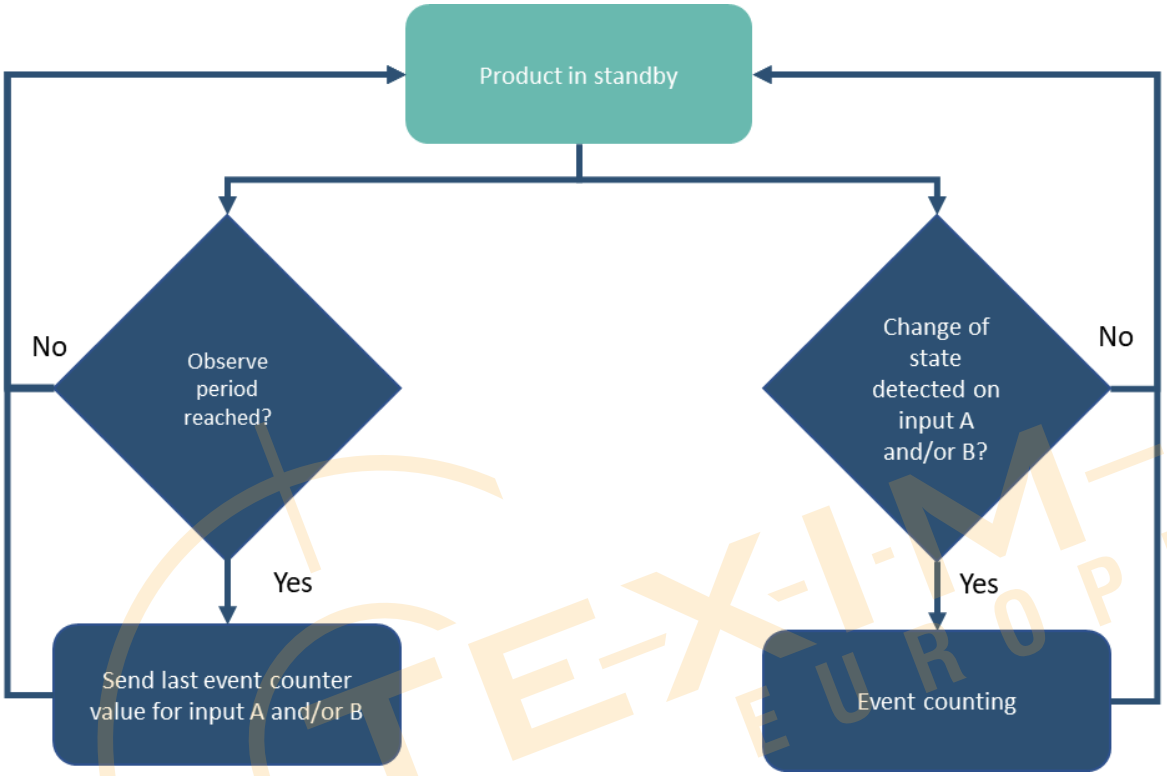
The product transmits the last saved event counter value (no history) upon the server's request through an OBSERVE operation on the corresponding resource(s).

If no change of state is detected and the counter value does not change, the product will not

send a message to the server. This optimizes product autonomy, saves message sending costs, and reduces data processing.

Block Diagram

The periodic transmission is performed according to the following block diagram



Configuring Application Parameters

The user must start by configuring the product-server communication mode, input activation, sampling frequency of event counter values, detection type and anti-bounce timer period by means of a WRITE operation on each of these resources.

URI	Object Name	Resource Name	Description	Possible Configuration
/34453/0/0	DRY CONTACTS	Product-Server communication	Type of communication with the LwM2M server. In PUSH mode, the product	OBSERVE PUSH

URI	Object Name	Resource Name	Description	Possible Configuration
			controls data transmission to the LwM2M server. In OBSERVE mode, data transmission is only possible on request from the server via a READ or an OBSERVATION operation.	
/34453/0/2	DRY CONTACTS	Sampling frequency	Acquisition and save frequency of event counter and time counter for each activated DC input.	Between 60 and 604800 seconds (i.e. 7 days)
/34453/0/3	DRY CONTACTS	Active Dry Contact inputs	Select the dry contact inputs to activate.	DC input A enabled DC input B enabled DC inputs A and B enabled
/34453/0/10	DRY CONTACTS	DC input A detection type	Indicate detection type on DC input A.	Low state detection High state detection Both high and low state detection
/34453/0/11	DRY CONTACTS	DC input A debounce period filter	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detection or bounces.	Between 10 ms and 10 min
/34453/0/12	DRY CONTACTS	DC input A time counter activation	Choose whether to enable or disable the time counter. This counter accumulates the time spent (in seconds) in an	Enabled Disabled

URI	Object Name	Resource Name	Description	Possible Configuration
			“abnormal” state.	
/34453/0/20	DRY CONTACTS	DC input B detection type	Indicate detection type on DC input B.	Low state detection High state detection Both high and low state detection
/34453/0/21	DRY CONTACTS	DC input B debounce period filter	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detection or bounces.	Between 10 ms and 10 min
/34453/0/22	DRY CONTACTS	DC input B time counter activation	Choose whether to enable or disable the time counter. This counter accumulates the time spent (in seconds) in an “abnormal” state.	Enabled Disabled

📌 **NOTE 1**
The sampling frequency must be the same for both digital inputs, to avoid desynchronization of data transmission, which would affect the DRY CONTACTS autonomy.

NOTE 2
If the associated sensors are in a “constantly closed” state, battery autonomy may be severely affected.

NOTE 3
Event monitoring on digital inputs remains functional even when the cellular network is not available.

NOTE 4
Event monitoring on activated inputs continues even during message transmission.

Observing a Value - "OBSERVE" Operation

The user must then create an observation for each of the “Sensor Value” attributes for which the product is to notify the LwM2M server of new values.

The observation parameters for the “Sensor Value” attribute do not need to be configured for periodic transmission. The DRY CONTACTS product will automatically notify the server of new values after each sampling.

📌 **NOTE**

Any server-side configuration of attributes' "minimum evaluation period (epmin)" and "maximum evaluation period (epmax)" in an observation operation will not be considered by the product.

Example

The LwM2M server requests the DRY CONTACTS product to:

- Activate digital input A and deactivate digital input B

- Continuously detect and count contact openings and closings on digital input A (50 ms anti-bounce)
- Save the event counter value of digital input A every hour
- Disable time counter on discrete input A

An observation is configured so that the server is notified :

- By transmission of the last event counter value on input A 1 time per hour

Configuration of Application Parameters to Use

URI	Object Name	Resource Name	Value to Configure
/34453/0/0	DRY CONTACTS	Product-Server communication	False (= OBSERVE mode)
/34453/0/2	DRY CONTACTS	Sensors sampling frequency (in seconds)	3600
/34453/0/3	DRY CONTACTS	Active dry contact inputs	1 (= input A activated)
/34453/0/10	DRY CONTACTS	DC input A debounce period filter (in milliseconds)	50
/34453/0/11	DRY CONTACTS	DC input A detection type	2 (= high and low states detection)
/34453/0/12	DRY CONTACTS	DC input A time counter activation	0 (= disabled)

Observations to Create for "Sensor Value" Attributes

The user must then create an observation for the following attribute without configuring any observation parameters (minimum period, maximum period, minimum evaluation period, maximum evaluation period, etc.)

Observation Name to Create	Object Name	Instance	Attribute
Event counter monitoring on digital input A	GENERIC SENSOR	1	Sensor value

NOTE
When the message is sent to the LwM2M server, the counters are not reset for all inputs. The user can reset the counters to 0 via the NB-IoT/LTE-M IoT Configurator application or via the LwM2M server.

ANNEX 9: PERIODIC TRANSMISSION OF TIME COUNTERS IN OBSERVE MODE

With this transmission mode, DRY CONTACTS can continuously detect and count changes in status on each of its 2 digital inputs.

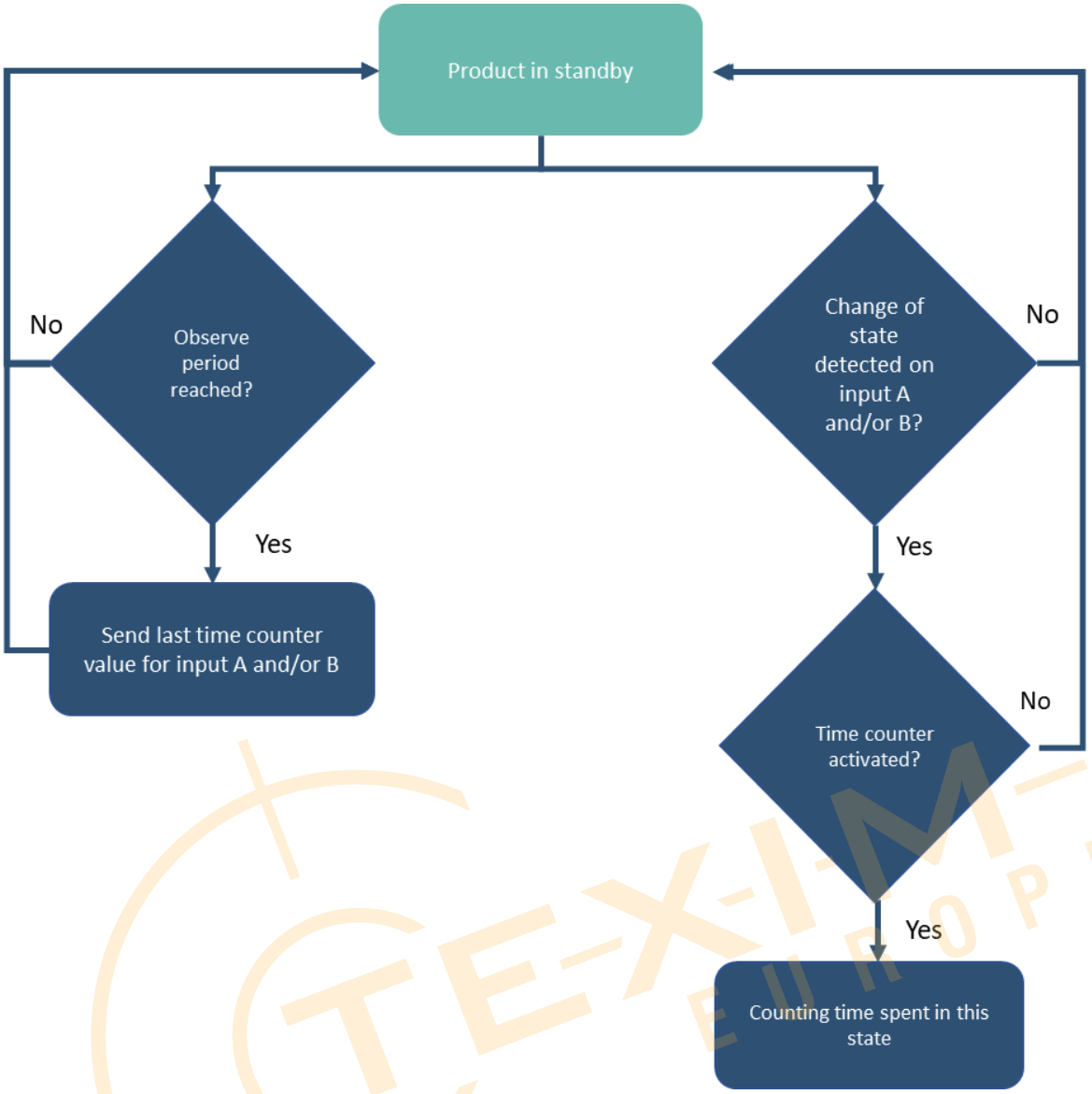
For each digital input :
The product counts the time spent (in seconds) in an “abnormal” state. It increments a time counter each time a change of state is detected, and saves the value of this counter at the configured sampling frequency.

The product transmits the last saved time counter value (no history) upon the server's request through an OBSERVE operation on the corresponding resource(s).

If no change of state is detected and the counter value does not change, the product will not send a message to the server. This optimizes product autonomy, saves message sending costs, and reduces data processing.

Block Diagram

The periodic transmission is performed according to the following block diagram



Configuring Application Parameters

The user must start by configuring the product-server communication mode, input activation, sampling frequency of time counter values, detection type and anti-bounce timer period by means of a WRITE operation on each of these resources.

URI	Object Name	Resource Name	Description	Possible Configuration
/34453/0/0	DRY CONTACTS	Product-Server communication	Type of communication with the LwM2M server. In PUSH mode, the product controls data	OBSERVE PUSH

URI	Object Name	Resource Name	Description	Possible Configuration
			transmission to the LwM2M server. In OBSERVE mode, data transmission is only possible on request from the server via a READ or an OBSERVATION operation.	
/34453/0/2	DRY CONTACTS	Sampling frequency	Acquisition and save frequency of event counter and time counter for each activated DC input.	Between 60 and 604800 seconds (i.e. 7 days)
/34453/0/3	DRY CONTACTS	Active Dry Contact inputs	Select the dry contact inputs to activate.	DC input A enabled DC input B enabled DC inputs A and B enabled
/34453/0/10	DRY CONTACTS	DC input A detection type	Indicate detection type on DC input A.	Low state detection High state detection Both high and low state detection
/34453/0/11	DRY CONTACTS	DC input A debounce period filter	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detection or bounces.	Between 10 ms and 10 min
/34453/0/12	DRY CONTACTS	DC input A time counter activation	Choose whether to enable or disable the time counter. This counter accumulates the time spent (in seconds) in an “abnormal” state.	Enabled Disabled

URI	Object Name	Resource Name	Description	Possible Configuration
/34453/0/20	DRY CONTACTS	DC input B detection type	Indicate detection type on DC input B.	Low state detection High state detection Both high and low state detection
/34453/0/21	DRY CONTACTS	DC input B debounce period filter	If the duration of the event is greater than this period, then the event will be taken into account. This avoids false detection or bounces.	Between 10 ms and 10 min
/34453/0/22	DRY CONTACTS	DC input B time counter activation	Choose whether to enable or disable the time counter. This counter accumulates the time spent (in seconds) in an “abnormal” state.	Enabled Disabled

📌 **NOTE 1**
The sampling frequency must be the same for both digital inputs, to avoid desynchronization of data transmission, which would affect the DRY CONTACTS autonomy.

NOTE 2
If the associated sensors are in a “constantly closed” state, battery autonomy may be severely affected.

NOTE 3
Event monitoring on digital inputs remains functional even when the cellular network is not available.

NOTE 4
Event monitoring on activated inputs continues even during message transmission.

Observing a Value - "OBSERVE" Operation

The user must then create an observation for each of the “Sensor Value” attributes for which the product is to notify the LwM2M server of new values.

The observation parameters for the “Sensor Value” attribute do not need to be configured for periodic transmission. The DRY CONTACTS product will automatically notify the server of new values after each sampling.

📌 **NOTE**

Any server-side configuration of attributes' "minimum evaluation period (epmin)" and "maximum evaluation period (epmax)" in an observation operation will not be considered by the product.

Example

The LwM2M server requests the DRY CONTACTS product to :

- Activate digital input A and digital input B

- Continuously detect and count contact openings and closings on digital input A (50 ms anti-bounce)
- Continuously detect and count contact openings on digital input B (500 ms anti-bounce)
- Activate time counter on digital input B
- Store the event counter value of digital input A and digital input B every hour

Two observations are configured to notify the server:

- By transmission of the last event counter value on channel A 1 time per hour
- By transmission of the last time counter value on channel B 1 time per hour

Configuration of Application Parameters to Use

URI	Object Name	Resource Name	Value to configure
/34453/0/0	DRY CONTACTS	Product-Server communication	False (= OBSERVE mode)
/34453/0/2	DRY CONTACTS	Sensors sampling frequency (in seconds)	3600
/34453/0/3	DRY CONTACTS	Active dry contact inputs	3 (= inputs A and B activated)
/34453/0/10	DRY CONTACTS	DC input A debounce period filter (in milliseconds)	50
/34453/0/11	DRY CONTACTS	DC input A detection type	2 (low and high states detection)
/34453/0/12	DRY CONTACTS	DC input A time counter activation	0 (= disabled)
/34453/0/20	DRY CONTACTS	DC input B debounce period filter (in milliseconds)	500
/34453/0/21	DRY CONTACTS	DC input B detection type	1 (= high state detection)
/34453/0/22	DRY CONTACTS	DC input B time counter activation	1 (= activated)

Observations to Create for "Sensor Value" Attributes

The user must then create an observation for the following attribute without configuring any observation parameters (minimum period, maximum period, minimum evaluation period, maximum evaluation period, etc.)

Observation Name to Create	Object Name	Instance	Attribute
Event counter monitoring on digital input A	GENERIC SENSOR	1	Sensor value
Time counter monitoring on digital input B	GENERIC SENSOR	4	Sensor value

📌 **NOTE**
When the message is sent to the LwM2M server, the counters are not reset for all inputs. The user can reset the counters to 0 via the NB-IoT/LTE-M IoT Configurator application or via the LwM2M server.

ANNEX 10: EVENT COUNTERS

Once connected to a piece of equipment, DRY CONTACTS continuously detects and counts changes of state on each of its 2 digital inputs.

For each digital input, the product increments an event counter each time a change of state is detected, and saves the value of this counter at the configured sampling frequency.

Depending on the configuration of the detection type for each input, the event counters represent the number of contact closures, the number of contact openings, or both.

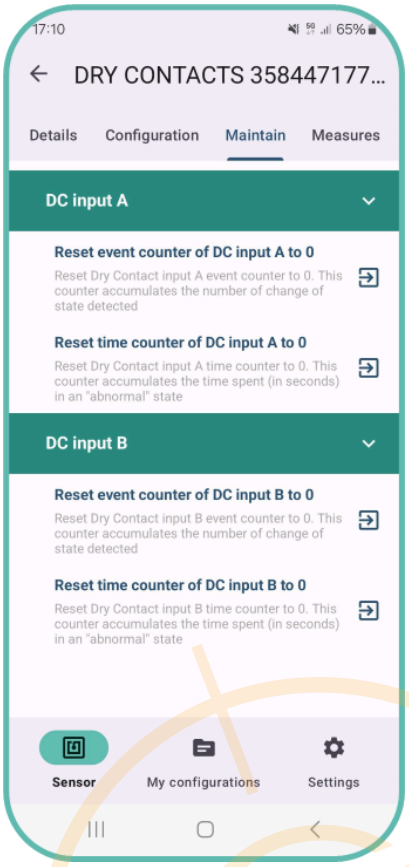
The minimum event counter value is 0.

The maximum event counter value is 2147483647.

When a message is sent to the broker, the counters are not reset for all inputs. The user can reset the counters to 0 via the NB-IoT/LTE-M IoT Configurator application.

Event counter reset to 0 for each digital input

The event counter for each digital input can be reset via the mobile application (maintain tab).



To reset the event counter via the application, go to the “MAINTAIN” menu
⇒ Go to the “DC input A” sub-section
⇒ Click on the “Reset event counter of DC input A to 0” parameter

⇒ Go to the “DC input B” sub-section
⇒ Click on the “Reset event counter of DC input B to 0” parameter

Reset the event counter via a LwM2M server

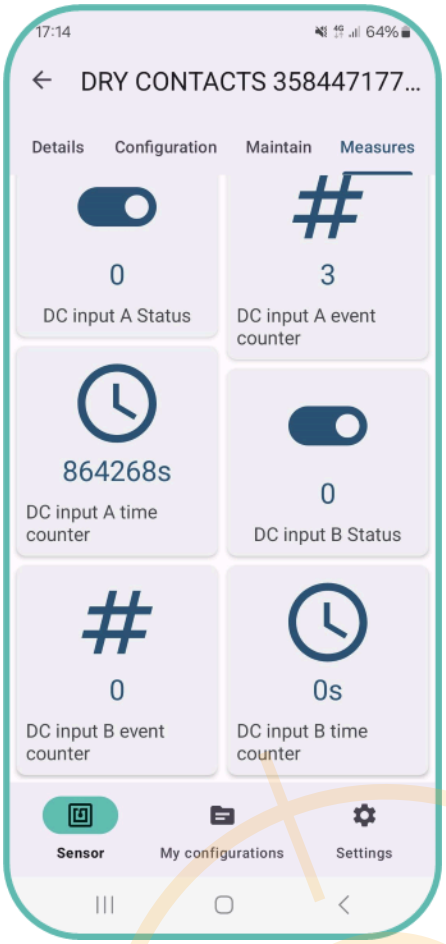
Reset the event counter of each input to 0 by an EXECUTE operation of the following resources of the CUSTOM DRY CONTACTS object.

URI	Object Name	Resource Name	Access type	Unit	Description
/34453/0/13	DRY CONTACTS	Reset event counter of DC input A to 0	EXE	-	Reset Dry Contact input A event counter to 0. This counter accumulates the number of change of state detected. This counter is not saved in

URI	Object Name	Resource Name	Access type	Unit	Description
					EEPROM; the contents will be reset to zero if the product is no longer powered.
/34453/0/23	DRY CONTACTS	Reset event counter of DC input B to 0	EXE	-	Reset Dry Contact input B event counter to 0. This counter accumulates the number of change of state detected. This counter is not saved in EEPROM; the contents will be reset to zero if the product is no longer powered.

Event counter readout for each digital input

The user can display the current value of the event counter for digital input A and/or B at any time via the **NB-IoT/LTE-M IoT Configurator application.**



To read the event counter value via the NB-IoT/LTE-M IoT Configurator application, go to the “MEASURES” menu.

To avoid resetting the counter to 0 in the event of a power failure, the last time counter value is saved by the product every 10 minutes for each digital input, and is automatically retrieved when the product is restarted.

ANNEX 11: TIME COUNTERS

Once connected to a piece of equipment, DRY CONTACTS continuously detects and counts status changes on each of its 2 digital inputs.

For each input, the product increments a time counter and saves the value of this counter at the configured sampling frequency.

The time counters represent the time spent (in seconds) in an “abnormal” state. Depending on

the configuration of each input's detection type, an abnormal state corresponds to either a contact opening or a contact closing.

The minimum event counter value is 0 seconds.

The maximum event counter value is 2147483647 seconds.

When a message is sent to the broker server, the counters are not reset for all inputs. The user can reset the counters to 0 via the NB-IoT/LTE-M IoT Configurator application.

Time counter reset to 0 for each digital input

The time counter for each digital input can be reset via the mobile application (maintain tab).

To reset the time counter via the application, go to the “MAINTAIN” menu
⇒ Go to the “DC input A” sub-section
⇒ Click on the “Reset time counter counter of DC input A to 0” parameter

⇒ Go to the “DC input B” sub-section
⇒ Click on the “Reset time counter of DC input B to 0” parameter

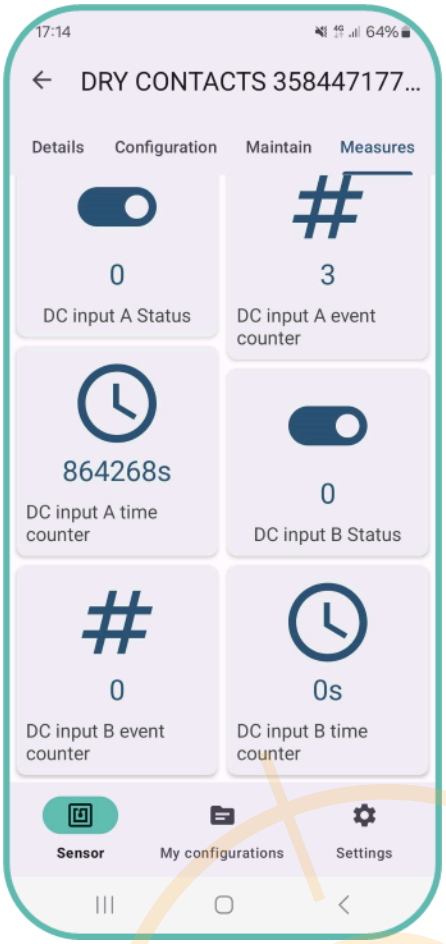
Reset the time counter via a LwM2M server

Reset the timet counter of each input to 0 by an EXECUTE operation of the following resources of the CUSTOM DRY CONTACTS object.

URI	Object Name	Resource Name	Access type	Unit	Description
/34453/0/14	DRY CONTACTS	Reset time counter of DC input A to 0	EXE	-	Reset Dry Contact input A time counter to 0. This counter accumulates the time spent (in seconds) in an “abnormal” state. This counter is not saved in EEPROM; the contents will be reset to zero if the product is no longer powered
/34453/0/24	DRY CONTACTS	Reset time counter of DC input B to 0	EXE	-	Reset Dry Contact input B time counter to 0. This counter accumulates the time spent (in seconds) in an “abnormal” state. This counter is not saved in EEPROM; the contents will be reset to zero if the product is no longer powered

Time counter readout for each digital input

The user can display the current value of the time counter for digital input A and/or B at any time via the **NB-IoT/LTE-M IoT Configurator application.**



To read the event counter value via the NB-IoT/LTE-M IoT Configurator application, go to the “MEASURES” menu.

To avoid resetting the counter to 0 in the event of a power failure, the last time counter value is saved by the product every 10 minutes for each digital input, and is automatically retrieved when the product is restarted.

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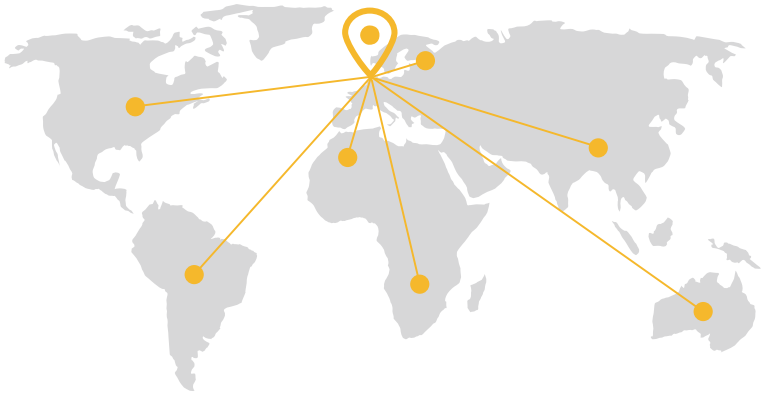

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