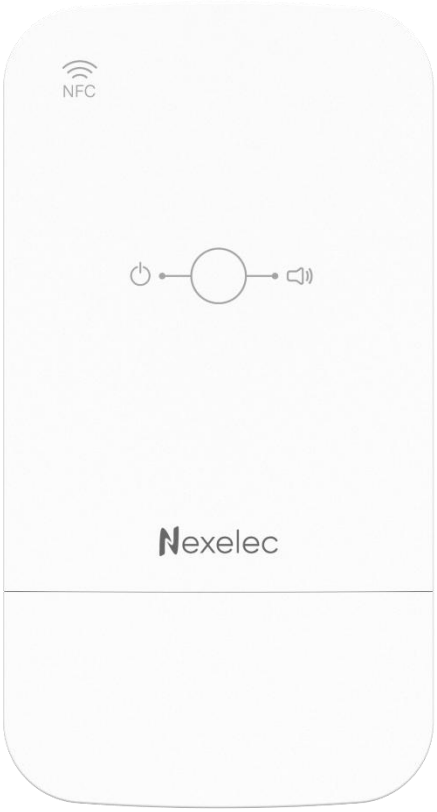


D1161A_Technical Guide

Relay

LoRaWAN Class C

I. General product overview

1. Product features

The Connected Relay (RELAY) is a module designed to control and monitor the energy consumption of electrical devices.

It combines two essential functions:

Controlling the power supply to equipment via an integrated relay.

Measuring and transmitting electricity consumption for accurate energy monitoring.

Main functions:

- Relay opening/closing

  The RELAY controls the power supply to an electrical device by opening or closing a built-in relay. This function allows the equipment to be switched on or off remotely, manually or according to programmed scenarios.

- Measurement and transmission of power consumption

  The RELAY includes a system for continuously measuring the consumption of the connected device. The data collected is then automatically transmitted at regular intervals.

Secondary functions:

- Overload protection:

The product can automatically open the relay if a predefined power threshold is exceeded. If the threshold is exceeded, action must be taken to close the relay again. This threshold can be configured via NFC and downlink (between 1 and 3680W) and is disabled by default.

- Control for a programmable duration:

It is possible to change the relay status via downlink for a programmable duration between 1 and 1140 minutes (corresponding to 24 hours). At the end of this period, the relay returns to its previous status.

Function	Description
Cut frame	A frame sent during a power cut
Max power	Maximum power measured over the last measurement period in W.
Overpower protection	Relay forced to OFF if power exceeds a configured threshold
Programmable duration	In downlink mode, the relay can be forced to a state for 1 to 1440 minutes (24 hours), after which the relay will return to its previous value.
Measured energy	Energy measured in cumulative W.h and since the last measurement period (default 10 minutes)
Relay status	Forcing the relay ON or OFF (button/downlink/NFC/programmed time)

Consumption measurement accuracy:

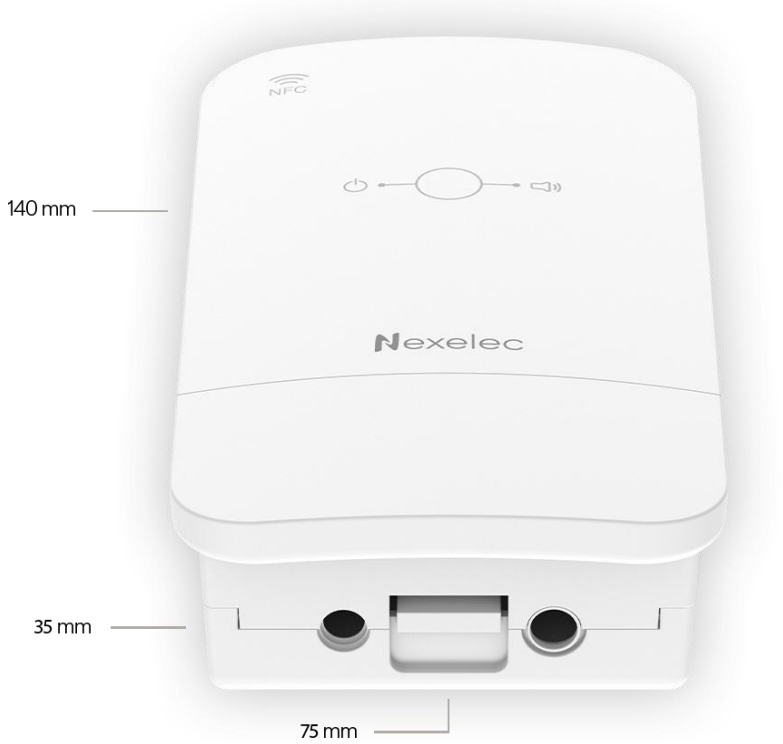
- Max active power in W: 1%
- Energy in Wh 1%

The product measures the current and then returns the value in watts, assuming that the mains voltage is 230V.

2. Product diagram

DIMENSIONS & WEIGHT

Weight: 200g



3. Kit description

The Relay product is supplied with 3 screws and fixing plugs, 1 bracket and its locking screw.

4. Operating environment and certifications

PRODUCT USAGE CONDITIONS

> Indoor environment
> Temperature*: -4°F to 122°F
> Relative humidity: 0% to 95% RH (non-condensing)

CERTIFICATIONS

The applicable certifications and associated declarations of conformity are available on the Nexelec support website support.nexelec.fr

5. Support and integration tools

Documentation for this product and tools can be found on our website support.nexelec.fr
There you will find:

- CODEC, JavaScript code for decoding LoRaWAN messages: https://github.com/nexelec/Decoders
- Online tool for decoding LoRaWAN messages: https://nexelec-support.fr/n/decoder/
- Online downlink calculation tool for remote product reconfiguration: https://nexelec-support.fr/n/downlink/

If you have any questions, our support team can be reached by email at:support@nexelec.fr .

II. Product installation

1. installation locations

The equipment must not be mounted on a wall more than 2 m above the ground.

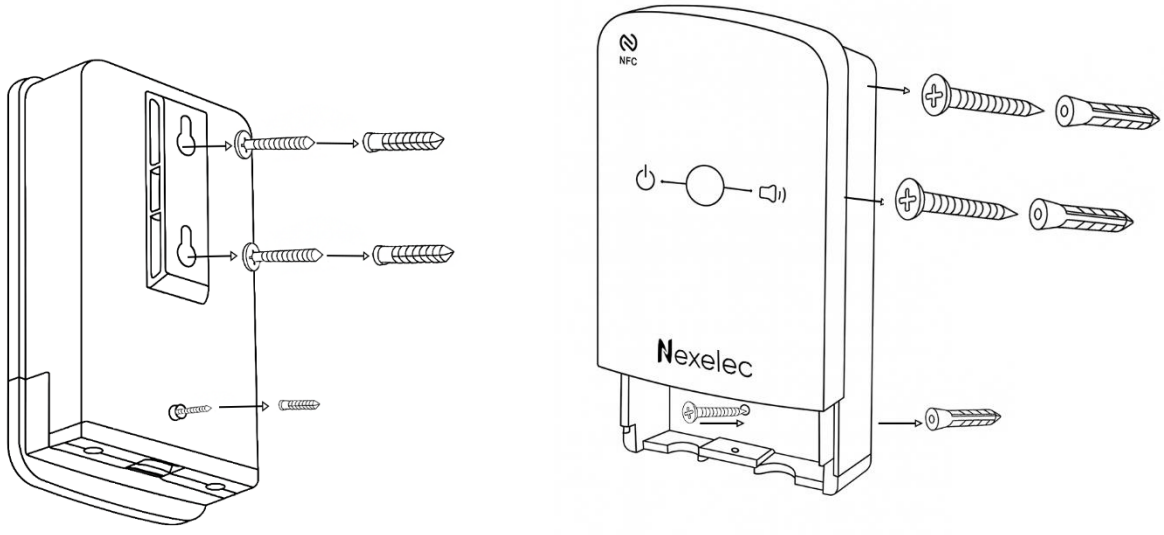
2. product mounting

ATTACHING THE DETECTOR TO A WALL

The product must be fixed to the wall:

> using screws and plugs, supplied with the product

Follow the procedure below:



ELECTRICAL INSTALLATION

⚠ WARNING! Risk of electric shock.

The device must be connected to the electrical network with care by a **qualified electrician.**

⚠ WARNING!

Before installing the device, **turn off the circuit breakers**.

Use a **suitable testing device** to ensure that there is **no voltage** on the wires to be connected.

Once you are certain that there is no voltage, proceed with the installation.

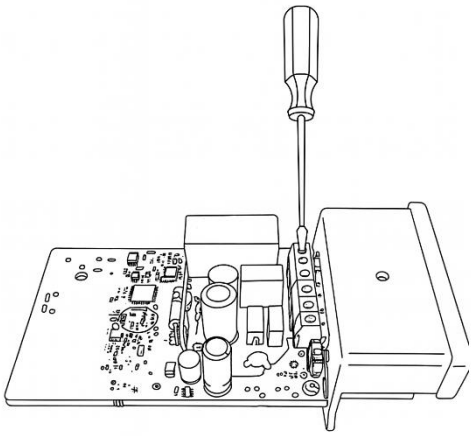
> Remove the cover from the box (unscrew the safety screw).

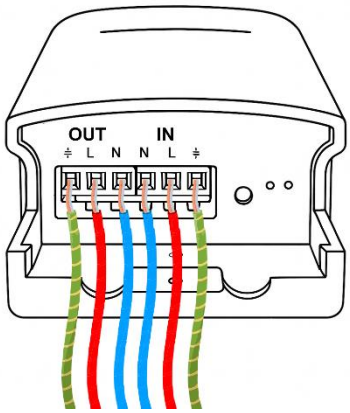
> Pull on the base to remove the circuit board from its housing.

Screw the phase/neutral/ground of each cable into its associated terminal block. **Be sure to connect the equipment's protective ground to the terminal block provided.**

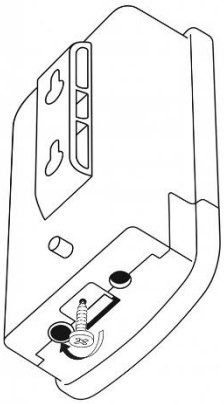
> Replace the circuit board in its housing.

> Tighten the anti-pullout screw.

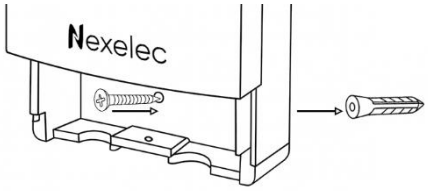




A bracket and locking screw are also provided to secure the cover once installation is complete.



3. Anti-theft fastening



The product comes with a screw for locking it to the wall.

4. Product commissioning

Powering the product

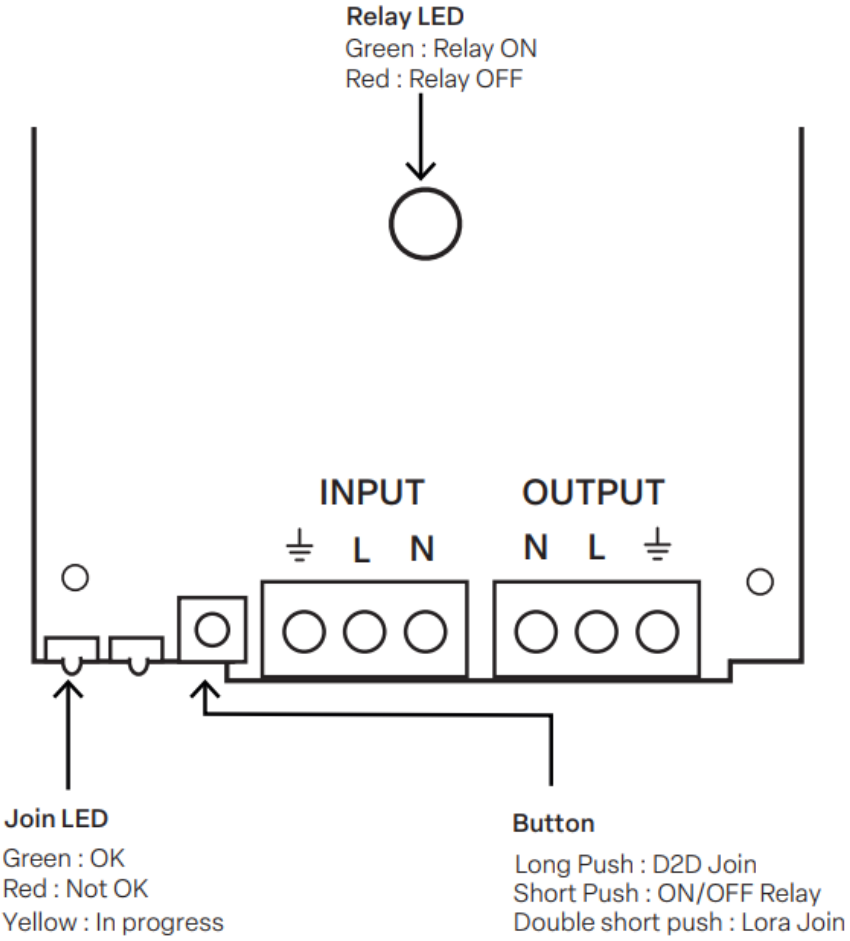
Once the electrical installation is complete, the product will start up once the circuit breaker is reset.

Automatic network connection

After being powered up for the first time, the product will attempt to connect automatically to the LoRaWAN network. The result of this process is indicated by the join LED. If unsuccessful, the product will attempt to join again after 20 minutes, then 40 minutes, 60 minutes, and then 2 hours after startup. If all attempts fail, the product will attempt to join once a day.

If the product is restarted (following a power cut, for example), it will attempt to join the network for the first time at a random time between 0 and 3 minutes maximum. If this fails, the same repetition process as for initial startup will be followed.

III. s button and LED



The button is accessible by removing the product cover.

Type of press	Actions triggered	Main LED	Secondary LED
2x push	Manual attempt to connect to the LoRaWAN network (join)	Flashing 🟡 : Connection attempt in progress 🟢 : Connection successful 🔴 : Connection failed	
Short press	ON/OFF Relay		🟢: Relay ON 🔴: Relay OFF

IV. LoRaWAN settings

1. Recommended LoRaWAN settings

LoRaWAN protocol version: Product compatible with versions 1.1.0 and 1.0.4
Regional settings: Product compatible with settings RP001 1.1 rev B and RP002 1.0.3
Profile: Class C
Available frequencies: EU868
Join type: OTAA
AppEUI: 0x
DevEUI: Unique identifier for each product. Information available on the label and provided upon delivery of the product.
AppKey: Unique security key for each product. Information provided upon delivery of the product.
Application port (uplink/downlink): 56
ADR: Yes

2. Network connection

AUTOMATIC CONNECTION WHEN FIRST POWERED ON

When the device is powered on, two attempts are made to connect to the network. If the connection is successful, the product will send its configuration and status.

INITIAL FAILURE COMMISSIONING STRATEGY

If the initial connection process fails, the product will automatically attempt to join the network with an increasing interval between each attempt:

The first attempt will take place 20 minutes after initial commissioning.

The second attempt will take place 40 minutes after the first.

The third attempt will take place 80 minutes after the second attempt.

If unsuccessful, the product will then attempt to join the network every 24 hours.

SCHEDULE A NEW REMOTE NETWORK CONNECTION

You can schedule a connection request via a downlink command. The typical use case is when you want to switch from one LoRaWAN network server to another . A configuration message is sent with the "Deferred network connection" field set to 1, which means that the request has been taken into account by the product.

PERIODIC NETWORK CONNECTION CHECK

The product checks its network connection every day when sending the "product status" message via the standardized LoRaWAN "LinkCheck" system. After 3 attempts without a response from the network, the product will automatically attempt to rejoin the network as described in the sectionInitial failure commissioning strategy .

3. General description of messages

The different types of messages are described below:

Function details	Message index	Message transmission	Configurable
Periodic data	0x01	Periodic and event-driven	Yes
Product configuration	0x03	Periodic 24 hours and on event	No
Product status	0x02	Periodic 24 hours and on event	No
Relay status frame	0x04	On change	No
Cut frame	0x05	On event	No

PERIODIC DATA FRAME

Offset	Size (bits)	Data	Description	Valid range	Scale	Unit
0	8	Product type	Product configuration		Relay 0xD3	
8	8	Message type	Real time		0x01	
16	1	Relay status	Open-closed	0-1	0: Open 1: Closed	
17	12	Max power	Max instantaneous power	0-3680	1	W
29	14	Measured energy	Energy between two transmission periods	0-16384	1	W.h
43	25	Cumulative energy	Energy measured since last reset	0-32236 kW.h	1	W.h

FRAME RELAY STATUS

Offset	Size (bit)	Data	Description	Valid range	Scale	Unit
0	8	Product type	Product configuration		Relay 0xD3	
8	8	Message type	Relay status		0x04	
16	1	Relay status	Open-closed	0-1	0: Open 1: Closed	
17	3	Source of state change	Source of relay status change	NFC 0 DOWNLINK 1 STARTUP 2		

				INTERCO 3 BUTTON 4 WEEKLY 5 OVERPOWER 6 TIMER 7		

CUT FRAME

Offset	Size (bit)	Data	Description	Valid range	Scale	Unit
0	8	Product type	Product configuration		Relay 0xD3	
8	8	Message type	Cut frame		0x05	

STATUS FRAME

Offset	Size (bit)	Data	Description	Valid range	Scale	Unit
0	8	Product type	Product configuration		Relay 0xD3	
8	8	Message type	Status frame		0x02	
16	8	Hardware version	Hardware version	0-256		
24	8	Software version	Software version	0-256		
32	1	Product status	Product status	0-1	0: OK 1: Default	
33	1	Overpower flag*	Flag set to 1 if overpower event	0: no event 1: overpowering occurred		

*The overpower flag remains at 1 in the status frame until the relay status is changed by an action (NFC, downlink, button).

CONFIGURATION FRAME

Offset	Size (bit)	Data	Description	Valid range	Scale	Unit
0	8	Product type	Product configuration	Relay 0xD3		
8	8	Message type	Config frame	0x03		
16	2	Reconfiguration status	Reconfiguration process results: Success or failure?	0: Total success 1: Partial success 2: Total failure 3: RFU		
18	8	Transmission period	Transmission period between two measurements	5-60	1	min
26	3	Reconfiguration source	Reconfiguration source	NFC 0 DOWNLINK 1 STARTUP 2 INTERCO 3 BUTTON 4 WEEKLY 5 OVERPOWER 6 TIMER 7		
29	2	NFC status	NFC interface usable	0: Modifiable 1: Not editable		

31	12	Overpower protection	Protection threshold	0: Disabled 1-3680	1	W
43	1	Pending join	Join request scheduled	0: No join scheduled 1: Join scheduled		

V. Product reconfiguration via NFC

The product has an NFC interface that allows it to communicate with a smartphone equipped with the NFC TOUCH application. This interface allows you to:

> Configure the product according to your use case,
> Update the product software.

The NFC interface can be enabled and disabled remotely via a LoRaWAN downlink message. This prevents the NFC memory from being detected by a phone, thereby preventing the product from being reconfigured once deployed.

1. Antenna location NFC

The NFC antenna is located at the NFC logo at the top left of the product.

2. Mobile app download

The *TOUCH* product reconfiguration app is available on Android and iOS for devices (mobile phones, tablets) equipped with an NFC interface.

3. Access to documentation for the Android TOUCH app

Documentation related to the Touch app is available on the support website.
Link: https://support.nexelec.fr/fr/support/solutions/folders/80000680573

4. Configurations accessible via NFC

CONFIGURATION TYPE	DEFAULT VALUE	POSSIBLE CONFIGURATION
Configuration of the sending period	10 minutes	5–60 minutes
Forcing the relay to a state	1 (ON)	0
Request to join the next communication	0	1
Overpower protection	0 (disabled)	1-3680W

VI. Remote product configuration via a LoRaWAN network

The product can be reconfigured via a downlink in response to a message. The downlink must be sent on port 56.

RECONFIGURATION ACKNOWLEDGMENT

After reconfiguration, the product will send a message with its updated configuration.

DOWNLINK MESSAGE STRUCTURE

The first byte is the header: 0x55.

The following bytes can then be used to reconfigure the product. Regarding the format: Command ID and DATA.

Note: Downlink features will certainly evolve in the future. To ensure backward compatibility, Nexelec recommends sending IDs from the lowest value to the highest value.

LIST OF LORAWAN DOWNLINK COMMANDS

ID	Length (Bytes)	Range	Values	Description
0x0A	1	0/1	0: disabled 1: enabled	NFC interface enabled
0x1C	2	1 - 1008	10 - 10080 minutes	Schedule a join request in x minutes
0x2F	1	5	5 to 60 minutes	Period between two measurements
0x61	1	0/1	0: off 1: on	Relay ON/OFF

0x88	2	0-3680 W	0-3680W	Overpower protection (0 disabled)
0x89	3	0-1 0-1440	0-1 1-1440	The relay is switched to ON (1) or OFF for 1 to 1440 minutes, then switches to the opposite state after this time.
0x92	1	1	1	Reset of the cumulative energy in the data frame

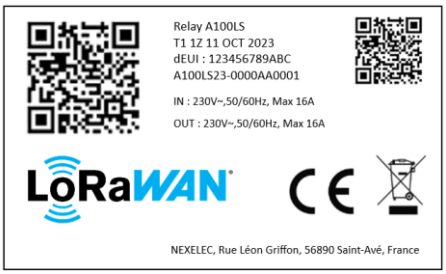
Example:

0x55 0x61 0x01: forcing the relay to 1 (ON)

0x55 0x89 0x00 0x01 0x68: forces the relay to 0 (OFF) for 6 hours (360 minutes) then returns to 1 (ON) after this period

0x55 0x92 0x01: reset the cumulative energy in the data frame

VII. Markings



Tension dangereuse. Manipulation réservée à une personne qualifiée.

Dangerous voltage. Handling by qualified personnel only.

VIII. velopment tracking

Document revision	Details	Date
A	Created	11/25/2025