NODER EWE4 / EWE4-LCD

IP CONTROLLER ACCESS CONTROL SYSTEM

Technical Documentation

Ver.1.7_052025

TABLE OF CONTENTS

1. Protection

Read this instruction before installing this product. The manufacturer is not responsible for any malfunction or damage to the equipment resulting from failure to follow the instructions. Damage caused by incorrect installation, maintenance or operation is not covered by the warranty. Making any changes to the unit that are not authorised by the manufacturer or carrying out independent repairs will result in the loss of rights under the warranty. Installation should be carried out by a person with appropriate electrical authorization.

2. Warning

Electric device under voltage! Before performing any activities related to the power supply (connecting wires, installing the device, etc.), make sure that **this device is not connected to the power supply**. Before connecting peripheral devices (electric lock, readers, etc.), it is necessary to verify the correctness of the installation
(e.g., no short circuits between wires). During the installation, before each connection, it is necessary to discharge your electrostatic charge by contact with a grounded element to avoid voltage surges, and remember to ground the **housing and door** before applying voltage to the device. In parallel with the electric lock (electromagnetic lock, electric strike, relay), it is necessary to use **a semiconductor diode**, which should be installed as close as possible to the electric lock. Communication buses should not be installed along 230/400V voltage lines at a distance of less than 25 cm. If the infrastructure does not allow it, it is recommended to use screen wiring, which should be grounded on the controller side. It is necessary that the connection of wiring in the enclosure be done in an orderly manner, allowing access to the components mounted inside. Unconnected wires should be insulated.

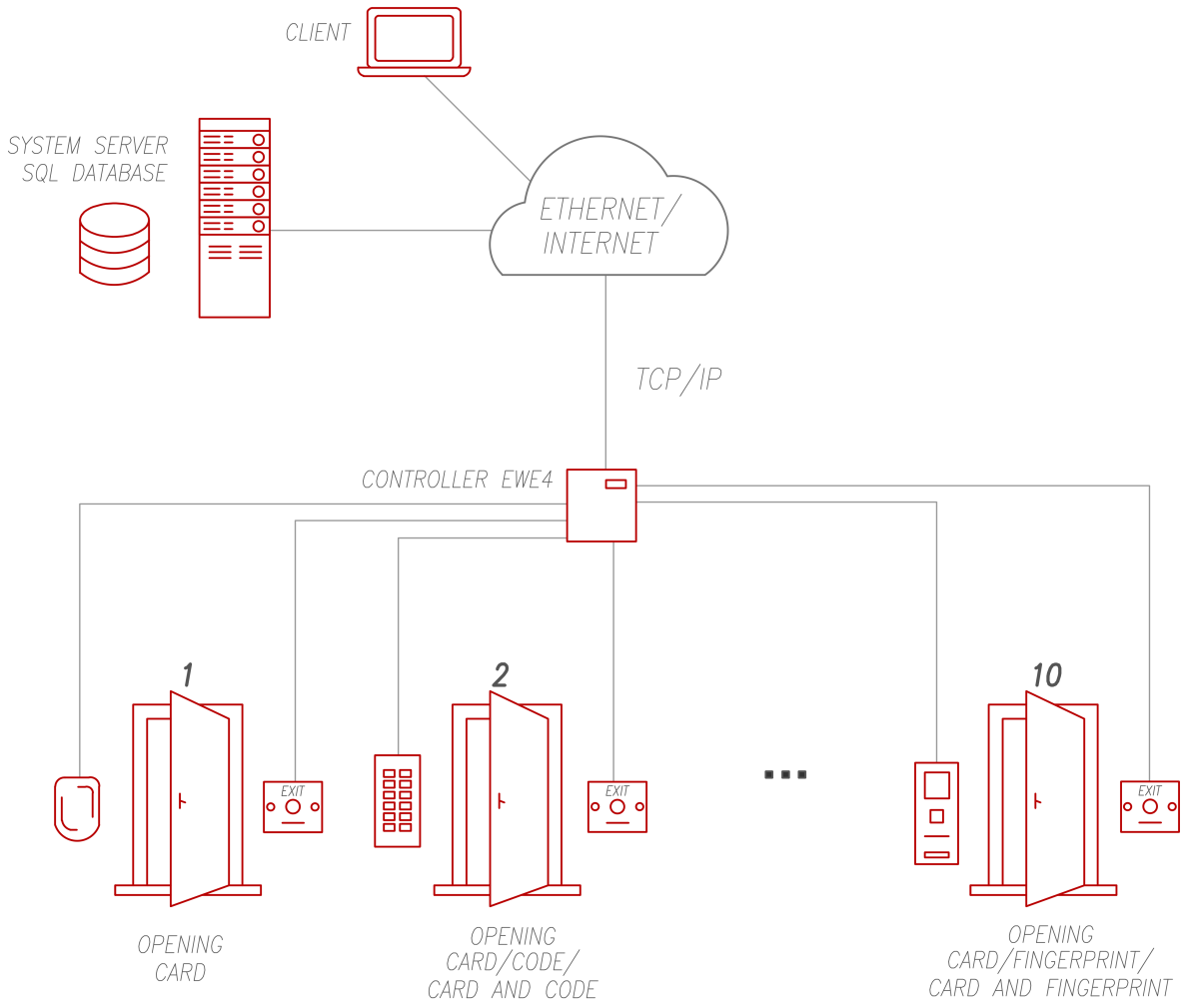
3. Device description

The IP Controller of the Access Control System is an advanced microprocessor I/O device for automated user identification. It can be used in building security system, access control, time registration, hotel and recreational facilities or elevators and passenger elevators. The operation of the device is managed by an integrated platform via TCP/IP protocol.

The documentation applies to the EWE4 controller in PCB version V1.09.20230328 or later.

4. System architecture

The EWE4 controller operates in a server-client architecture, and connects to the management software via an Ethernet-based computer network. The controller has its own database, enabling autonomous operation of the device and recording of events in case of loos of network connection with the server. After reconnection, the central system of the events is automatically downloaded from the controller.



The entire connection from the card to the server is encrypted using technologies such as:

- Protected server <-> client communications ->TSL 1.2 encryption;
- Protected server <-> controller communication ->SSH tunnel, firewall on the controller (access to the controller only from specific IP address);
- Protected controller <-> reader communication -> AES-256 encryption;
- Protected reader <-> card Mifare DESFire 13,56 MHz communication -> AES-128 encryption;

5. Device construction

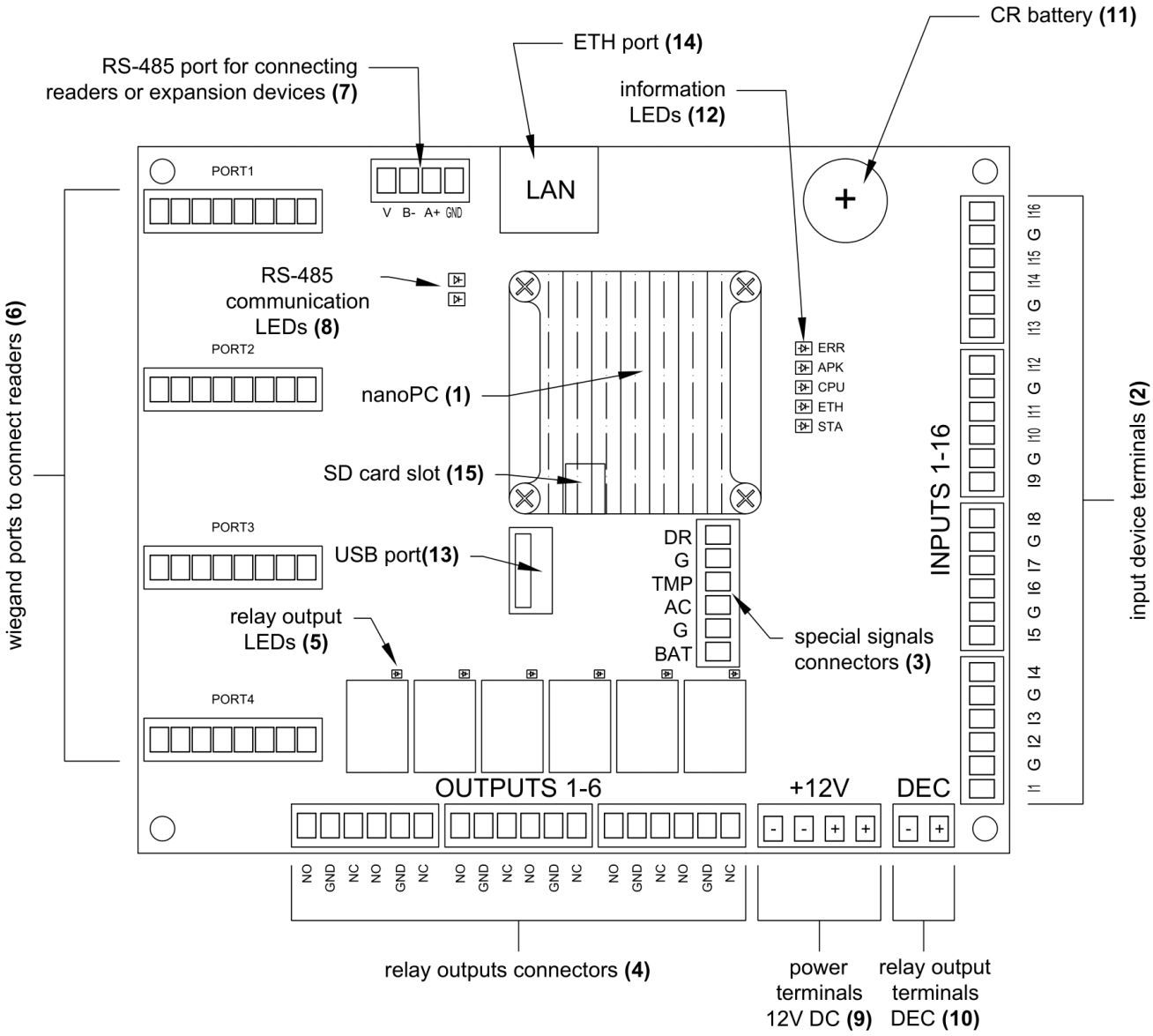
The device is built from a circuit board, where the logic is managed by a **nanoPC chip (1).**

Input device connectors (2) and **special signals connectors (3)** support devices that operate in NO, NC, EOL/NO, EOL/NC, 2EOL/NO and 2EOL/NC logic. **Relay outputs connectors (4)** support executive elements of Access Manager and SSWiN system in NO or NC logic (depending on the selection of the connectors on the relay). The driving status of a particular relay can be checked by the **relay outputs connectors LEDs (5)**.

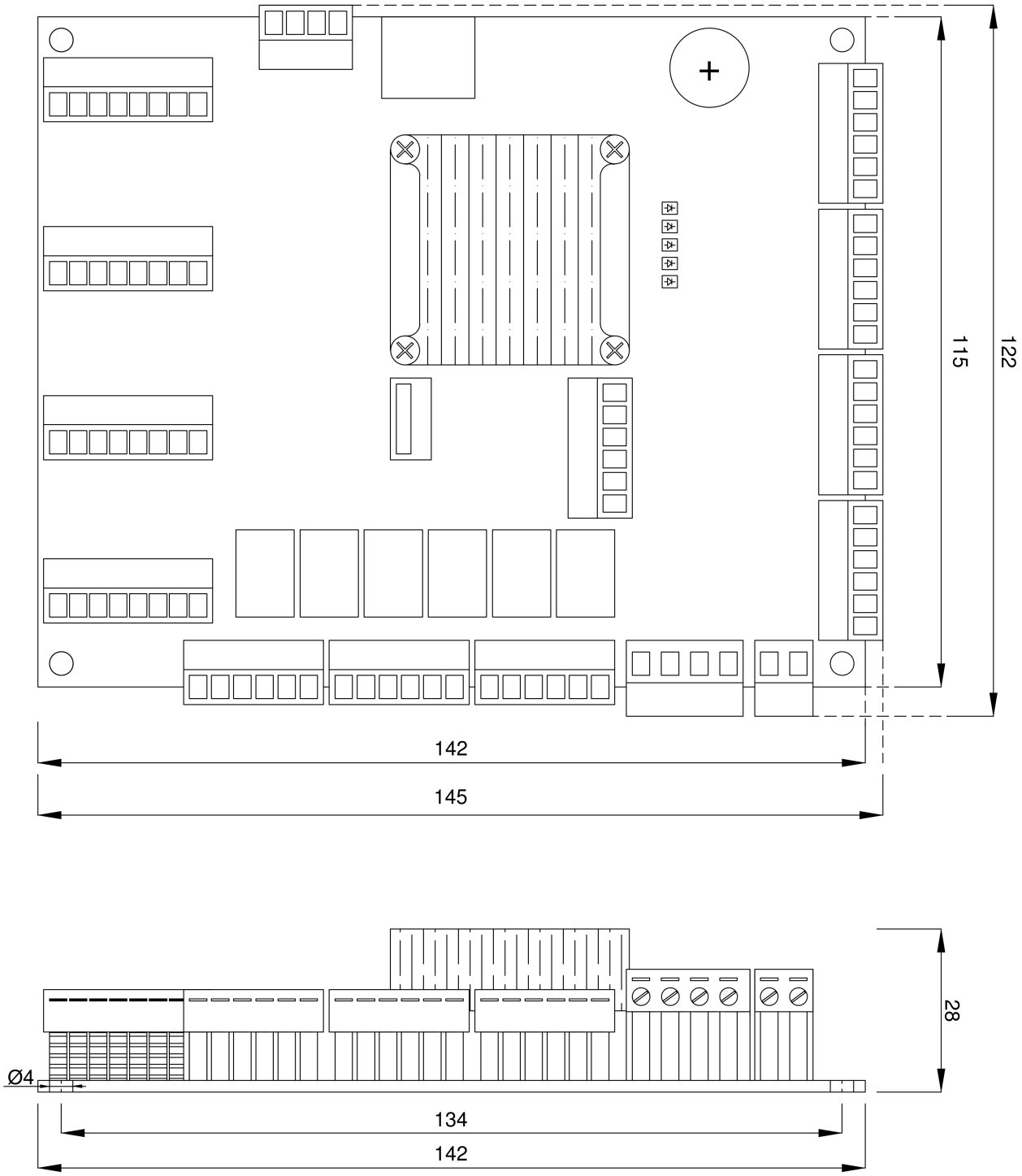
RS-485 bus for connecting readers (7) via RS-485 bus, can be used to connect Noder MD-R and MDK-R reader after native protocol or other readers, using OSDPv2 protocol. The current connection status can be checked using **RS-485 communication LEDs (8)** – when the readers are properly connected, the green and red LEDs should flash with a frequency of about 15Hz (to the human eye it looks like an almost continuous light).
RS-485 bus expansion port (7) is also used for communication with other integrated devices, such as the Noder IO16RS extension module (when properly connected, the **RS-485 communication LEDs (8)** should behave as in the case of ports for connecting readers), or the Suprema FaceStation 2 biometric face reader (for this device, communication with the controller takes place only when the face is read – the green **RS-485 communication LEDs (8)** flashes). **Ports 1, 2, 3 and 4 (6)** can support readers using Wiegand protocol.

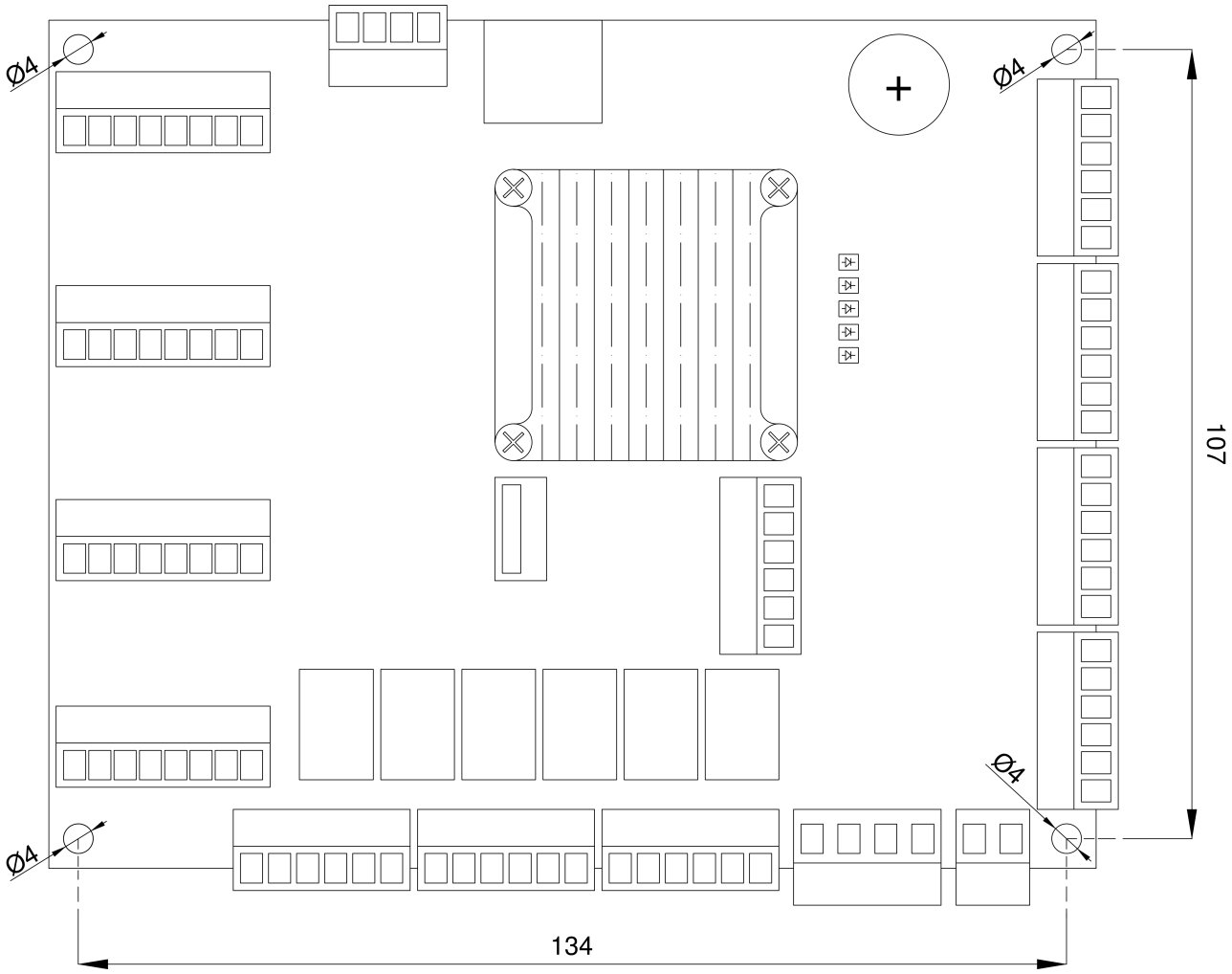
The **+12V power connector (9)**, are used to power the controller. The **DEC power connectors (10)** can be used to power and switch on/off other devices (note that the controller has built-in protection, which can switch on the fuse when the rated current is exceeded – see section 9.2).

The **CR battery (11)** is responsible for maintaining the date and time on the controller. The current status of the controller can be checked using the **information LEDs (12)**. The **USB port (13)** can be used for services work, such as resetting network settings to factory defaults. Use the **ETH port (14)** to connect to another device. The **microSD card slot (15)** is not used in the controller.


RS-485 port for connecting readers or expansion devices (7)
ETH port (14)
information LEDs (12)
CR battery (11)
PORT1
V B- A+ GND
LAN
RS-485 communication LEDs (8)
PORT2
nanoPC (1)
SD card slot (15)
PORT3
USB port(13)
relay output LEDs (5)
PORT4
ERR
APK
CPU
ETH
STA
DR
G
TMP
AC
G
BAT
special signals connectors (3)
INPUTS 1-16
I1 G I2 I3 G I4 I5 G I6 I7 G I8 I9 G I10 I11 G I12 I13 G I14 I15 G I16
wiegand ports to connect readers (6)
input device terminals (2)
OUTPUTS 1-6
+12V
DEC
NO GND NC NO GND NC NO GND NC NO GND NC NO GND NC NO GND NC
relay outputs connectors (4)
power terminals 12V DC (9)
relay output terminals DEC (10)

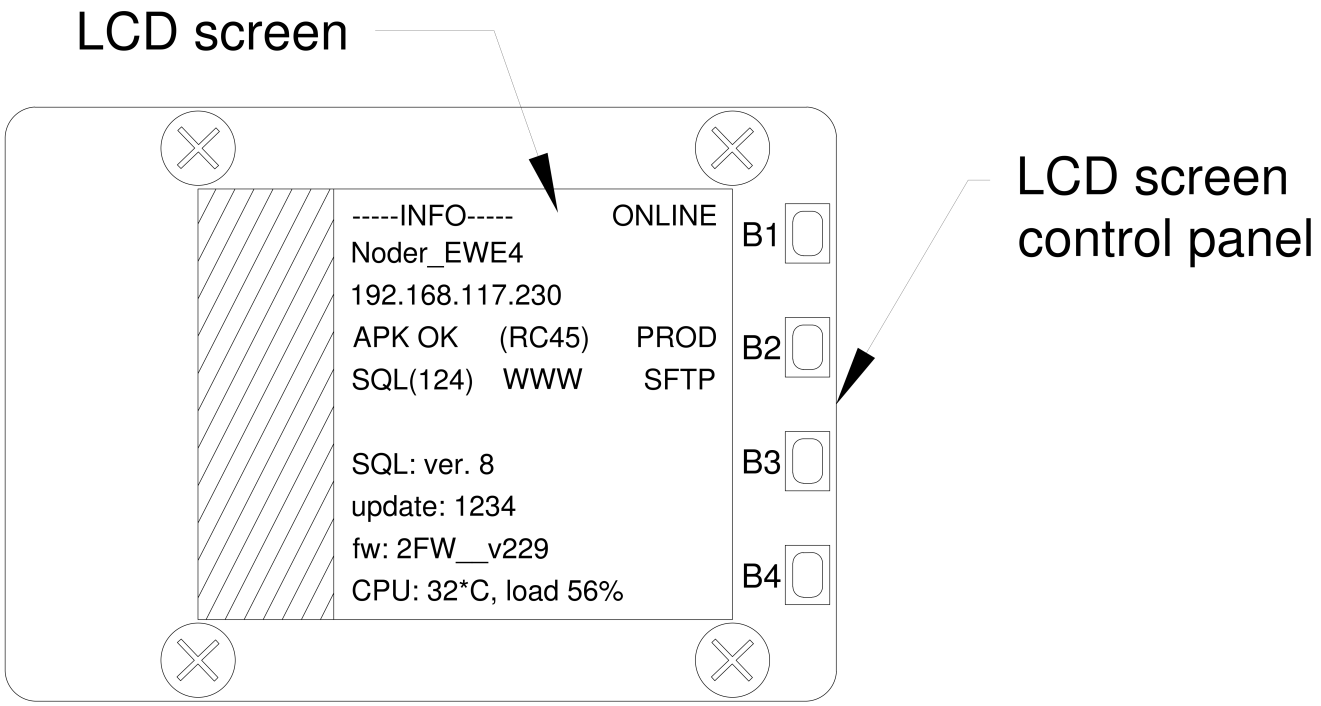
6. EWE4 controller dimensions




Ø4
Ø4
Ø4
Ø4
107
134

7. EWE4 LCD screen

The EWE4 controller has the option of installing an optional LCD screen for monitoring device status. **(LCD screen available to order)**



The LCD screen allows the operator to view the basic parameters of the unit without having to connect to it via the management platform. Four function keys allow the user to:

- **B1** - allows you to view basic device parameters such as device address, firmware version or processor temperature;
- **B2** - allows you to view the services running on the device;
- **B3** - allows viewing the inputs and outputs of the device that are currently in use;
- **B4** - allows viewing on which port of the RS-485 bus the reader is running.

8. Characteristic

Characteristic	
CONTROLLER TYPE	EWE4 / EWE4-LCD
SUPPPORTED PASSING TYPES	4 passes with one-sided access control / 2 passes with two-sided access control (Any combination possible)
NUBER OF CARDS	1 024 000
NUMBER OF STORY EVENTS	2 048 000
FUNCTION PREVENTING RETRIEVE AND ZONE CONROL	If connected to the server – global AntiPassBack. If autonomic operating mode – local AntiPassBack.
UPDATE OF DRIVER SOFTWAE	Remote

Technical Specification	
NUMBER OF SUPPORTED READERS	Up to 4 (Wiegand or RS-485)
SUPPORTED READER INTERFACE	Wiegand: up to 64 bits, RS native AES with encapsulation, OSDP
COMPATIBLE READER TYPES	Proximity, biometric, bar, magnetic, OCR, ICR, OMR, RFID UHF
COMMUNICATION WITH READERS	4 x Wiegand or 1 x RS-485
COMMUNICATION WITH SERVER	LAN/WAN
PROGRAMMABLE INPUTS	16 parameterized inputs (Detectors, buttons, reed switches, alarm, etc.)
PREDEFINED INPUTS	4 parameterized inputs (AC, BAT, TMP, DR) (No AC [230 V power supply], low battery voltage/ lack of battery, failure of the power supply 12V DC, housing opening)
PROGRAMMABLE OUTPUTS	6 relay outputs NO/NC, 3A 24V DC, 3A 120V AC (Electric strike, tripod, signaler, etc.)
CLOCKWORS POWER SUPPLING	CR battery
LCD SCREEN	Optional (available to order)
SUPPLY VOLTAGE	12V DC
ENERGY CONSUMPTION (WITHOUT READERS)	approximately ~ 120 mA (max ~ 240mA)
DIMENSIONS	145 x 122 x 28mm (5.71 x 4.80 x 1.10in)
WEIGHT	235g (0.52lb) – with LCD screen 222g (0.49lb) – without LCD screen
WORKING TEMPERATURE	-10 °C - +55 °C
STORAGE TEMPERATURE	-20 °C - +70 °C
AMBIENT HUMIDITY	<80%
NORMS	CE

9. Power supply, built-in protection and special inputs of the controller

Chapter eight contains information on how to connect the controller power supply and special inputs. Recommended wiring and the controller's internal overvoltage protection are described.

9.1 Connecting power and special inputs

The controller should be powered from a 12V DC buffer power supply. Do not connected inductive devices to the controller's power connector, as they may cause power interference. These devices should be connected directly to the power supply connectors. To connect the power supply to the controller, select the appropriate cable cross-section according to the requirements of the system.

The default power supplies used in Noder control systems have built-in relay-type technical outputs. After connecting them according to the **"Standard Wiring Diagram for Power Supply and Special Inputs in Noder Housing"**, the operator can check the current status of the devices. Batteries should be connected to dedicated inputs in the power supply. If 230V AC is lost, there will be an automatic switchover to battery power and switching of the EPS relay. Be default, the controller will send an event to the system about the absence of 230V. When the voltage on the power supply drops to 11.5V, the second APS relay will switch over and a low battery/no battery event will displayed. The same event will be sent when the battery is not connected. The battery charging current is configurable via a jumper located on the power supply. The EWE4 controller has a built-in voltmeter to send the voltage level applied to the controller. When the voltage drops to <10.5V, and an under-supply voltage event is generated automatically. For power supplies, a battery test is performed every 5 minutes. If the batteries are not connected during the test, the voltage value at the output of the PSU drops momentarily below 10.5V, and an under-supply voltage event is automatically generated (value of the supply voltage given in the event may already indicate the correct value of the voltage, because its drop was instantaneous, i.e., the event is generated with a delay relative to the voltage drop).

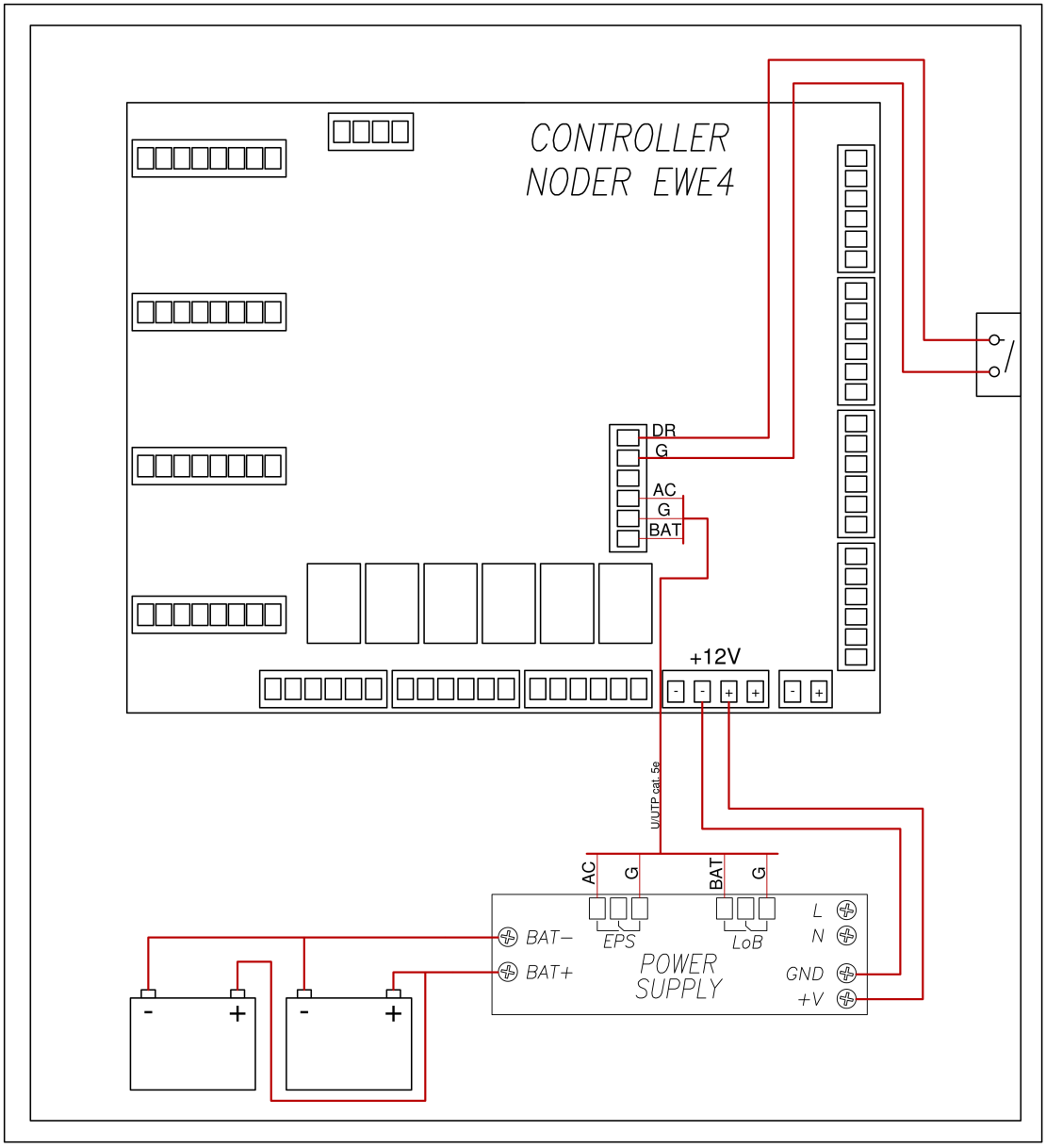
The controller has the possibility to monitor the opening of the housing door. The **"Standard Wiring Diagram for Power Supply and Special Inputs in Noder Housing"** shows an example of connecting the door tamper to the controller's special input. When they are opened, a corresponding event is generated in the system. When monitoring more than one door (e.g., the door of an enclosure that houses batteries), the tampers should be connected in series.

The controller's special signal connectors are configured as follow:

- **BAT –** low voltage on the battery/lack of battery;
- **AC –** 230V power supply is not available;
- **TMP –** damage to the 12V DC power supply;
- **DR –** serial connection of all tamper cabinet doors and wall mounting.

For default power supplies, the TMP input is not used, but can be used when connecting another power supply. Special inputs can also be used as standard controller inputs (representing, for example, a reed switch).

Standard wiring diagram for power supply and special inputs in Noder housings:

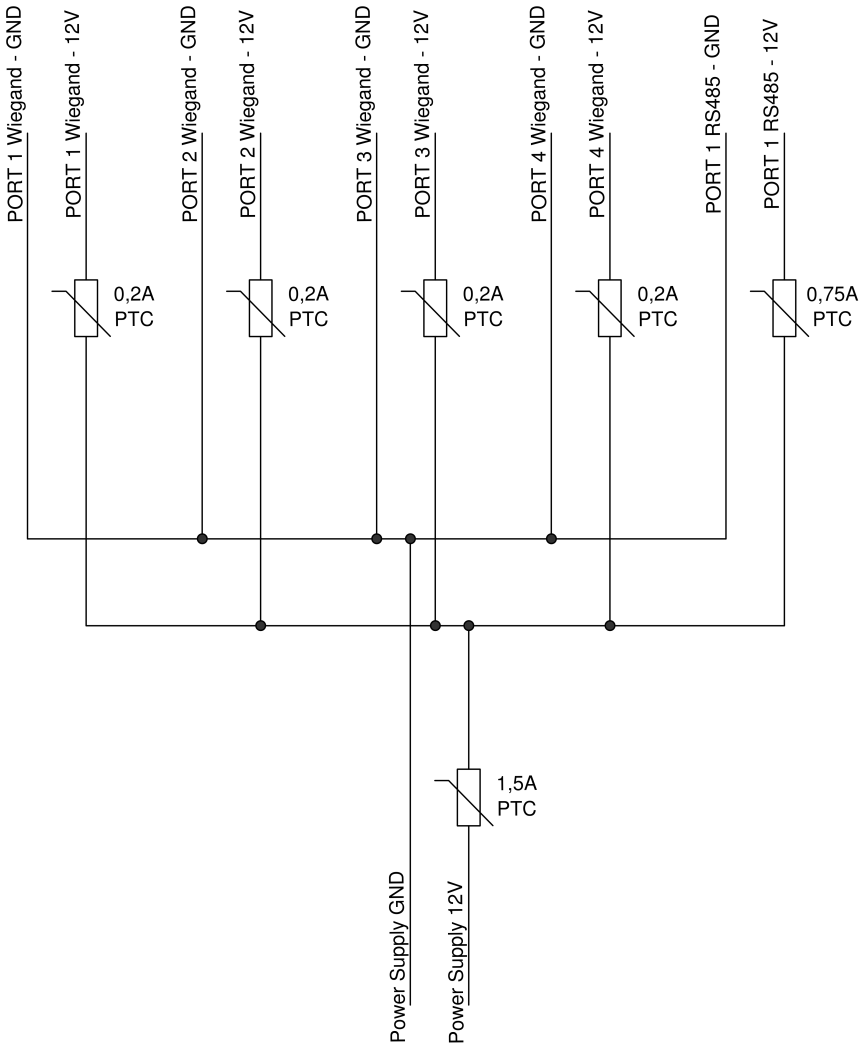


9.2 Built-in electrical protection of the controller

The controller is equipped with overcurrent protection by means of PTC polymer fuses with the following loads:

- Power input: 1,5A;
- Wiegand reader power outputs (PORT1, PORT2, PORT3, PORT4): 0,2A;
- Power outputs of the RS-485 bus (PORT1): 0,75A.

The controller is also equipped with overvoltage protections using Zener diodes on RS-485 buses and digital / analogue inputs. The diagram below shows a detailed drawing of the built-in protections:



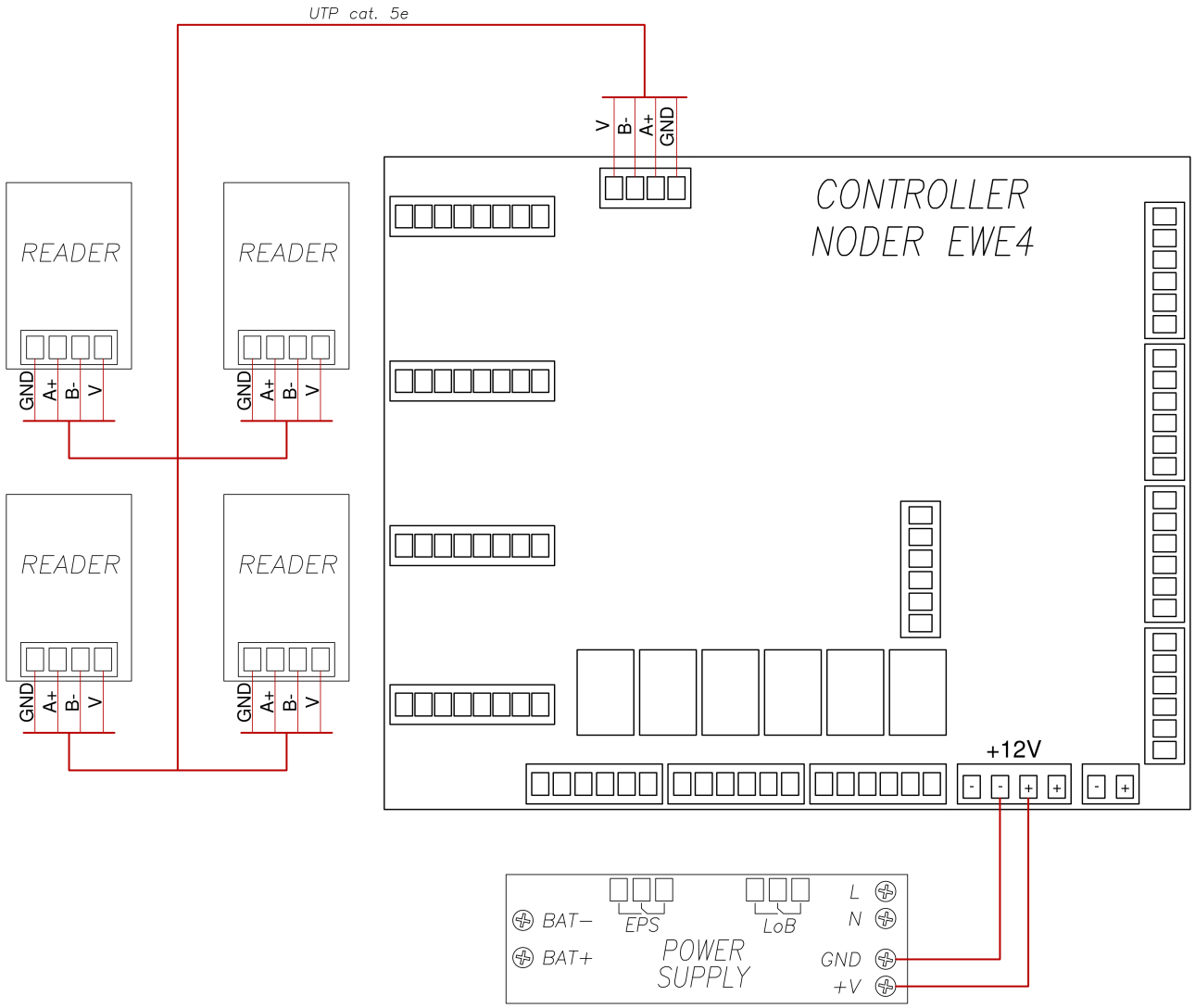
Note that the DEC relay output is located behind the 1.5A PTC fuse and it is necessary to calculate the total current consumption of the devices before connecting additional external devices to it. Exceeding the rating may lead to tripping of the fuse.

10. Connection diagrams of devices to the controller

This chapter contains information on connecting devices to the controller.

10.1 Connecting RS485 readers

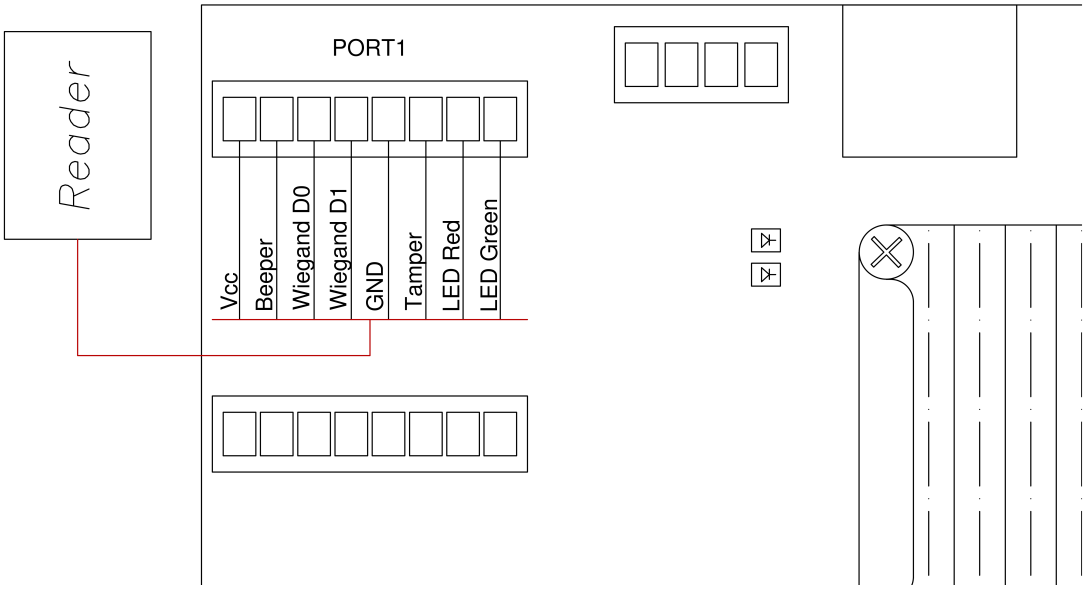
RS-485 bus port is used to connect readers. It allows the connection of up to 4 readers to the controller. Readers should be connected in parallel. It is recommended to connect readers in so called **"Star"** – each reader plugged directly into a port controller. The maximum length of the bus must not exceed 1200m. In the case of a several hundred-meter bus, appropriate measurements and line adjustment should be performed with terminating resistors. For connecting the readers, UTP cat. 5e cables can be used, for longer distances it is recommended to use screened cables. The cross-section of the wires should be adjusted to the distance so as not to exceed the permissible voltage drops for the readers used.



10.2 Connecting Wiegand readers

The EWE4 controller gives the possibility to connect 4 Wiegand readers or 4 RS485 readers in any configuration, e.g. (1 Wiegand + 3 RS485).

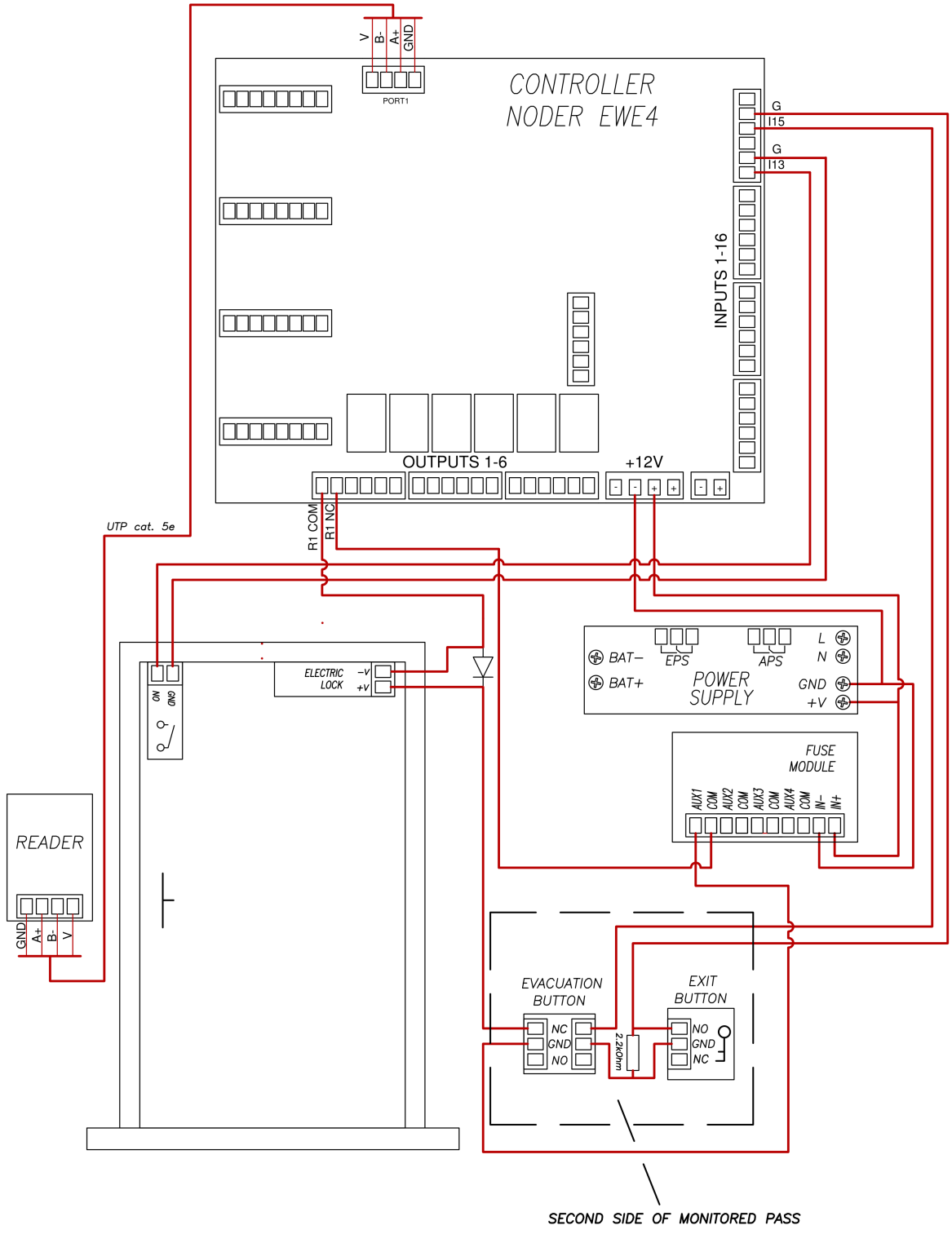
For proper operation of the device, it is recommended to use cable with external insulation diameter 1,2 mm – 1,5 mm and with a rated conductor cross-section of 0,12 mm^2 – 0,2 mm^2 (acceptable dimensions on the Wiegand port cube). It is recommended to use screened cables. The cross-section of the wires should be adapted to the distance, so as not to exceed the permissible voltage drops for the readers used. Before starting the installation, it is recommended to carry out a test of the existing wiring at a given length. At greater distances there may be malfunctions in the operation of the device (e.g., incorrect reading of the number from the card, or the reader does not respond at all to the application of the card). Do not install close to inductive devices, as they can cause interference with the power supply, and the information sent between the reader and the controller.



10.3 Single-left doors, one-sidedly monitored with EoL

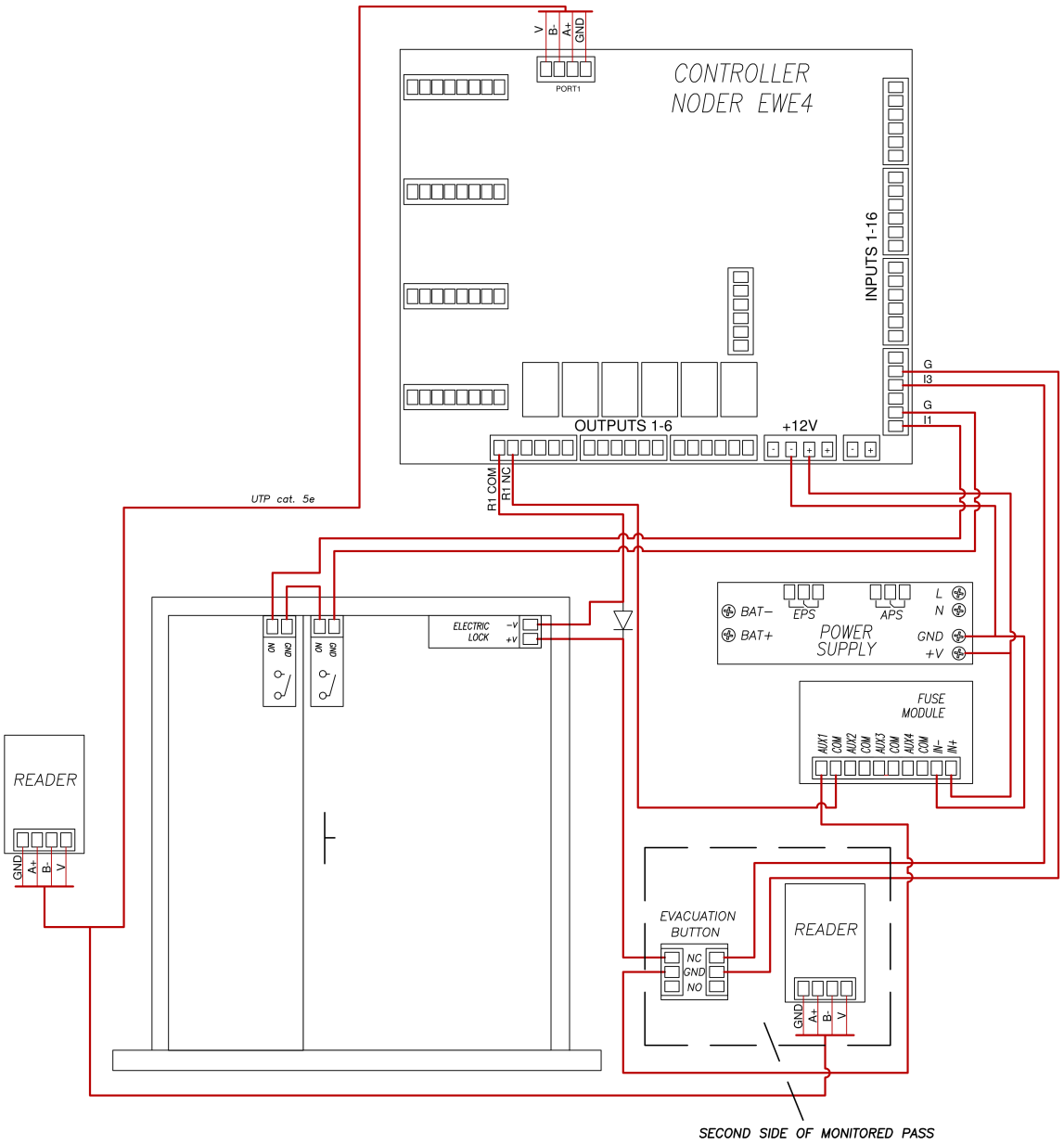
Example of a single-sided passage with a Noder MD-R/MDK-R reader (or any other using the OSDPv2 protocol) connected to RS-485 bus port and an exit button on the other side. The executive component is a reversing lock controlled by the controller's relay no. 1 (NC connector). It is powered from a fuse module equipped with appropriately selected fuses. In the example uses an evacuation button that, when pressed, drops voltage from electric lock. The second of the NC contacts of the evacuation button was connected to the exit button and connected to input no. 15 (parametrized with a 2.2kOhm resistor – this solution saves one input. Other value than 2.2kOhm may cause malfunction of the input). Another way of connection is to separately connect the exit button and escape button to different inputs of the controller and configure according to their logic.

Within a single system, it is recommended to make the connection of inputs in one way, i.e., parameterized or non-parameterized. The status of opening/closing the door is checked by means of a contractron connected to the input no. 13. **A rectifying diode** should be used at the electric lock (recommended model – 1N4007). Its absence may cause damage to the controller relay.



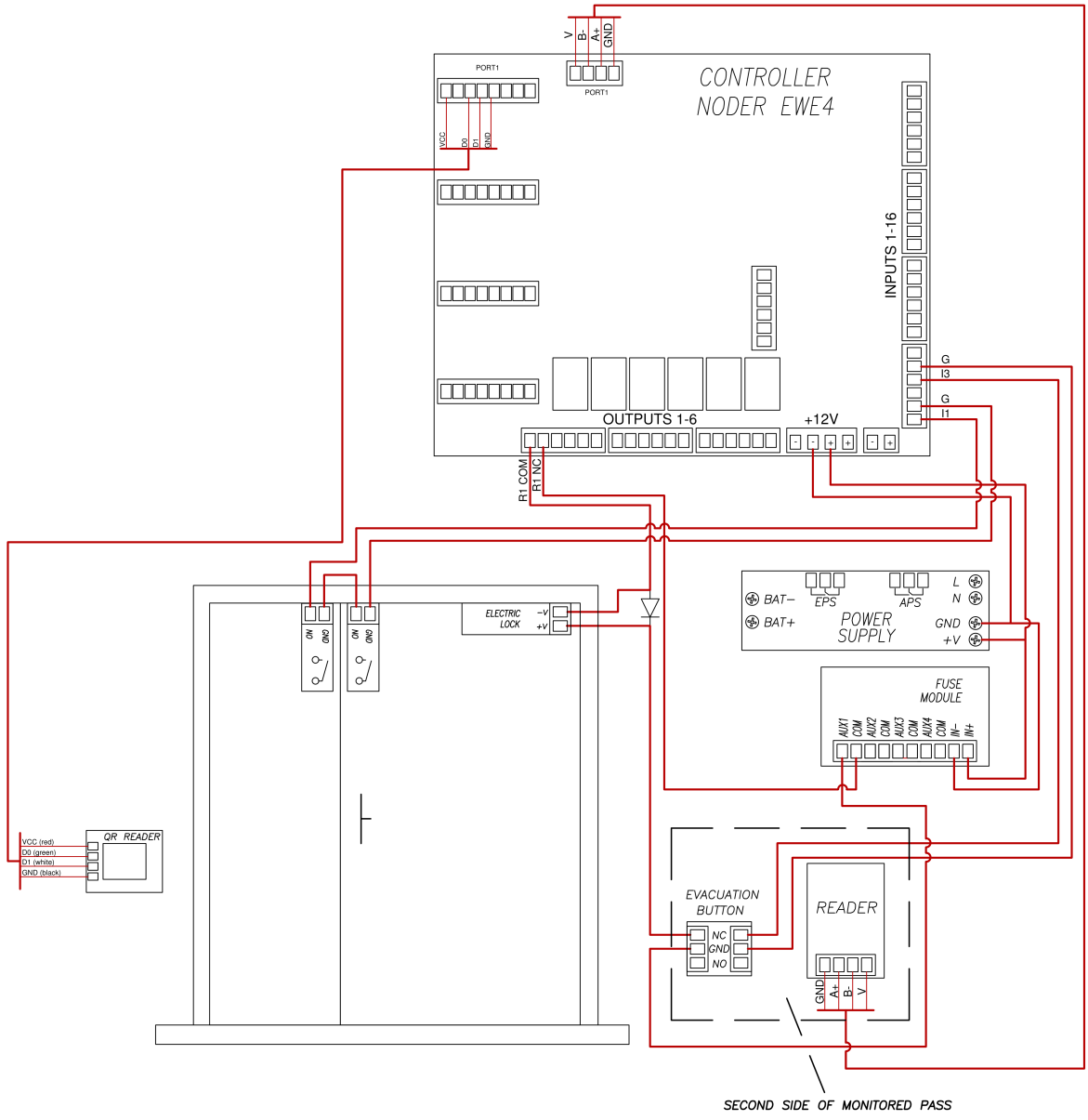
10.4 Double doors, both-sidedly monitored

Example of two-way passage with Noder MD-R/MDK-R readers (or other using the OSDPv2 potocol) connected to RS-485 bus port. The electric lock is a reversing lock controlled by relay no. 1 of the controller (NC connector). It is powered by a fuse module equipped with appropriately selected fuses. The example uses an evacuation button which, when pressed, drops voltage from the electric lock. The second of the evacuation button's NC contacts has been connected to the controller's input no. 3 and the controller's ground. The open/closed status of the door is checked by serially connected reed switches. When one of the leaves is opened, a signal is sent to the controller by opening the ground to input no. 1. **A rectifying diode** should be used on the electric lock (recommended model – 1N4007). Its absence may cause damage to the controller relay.



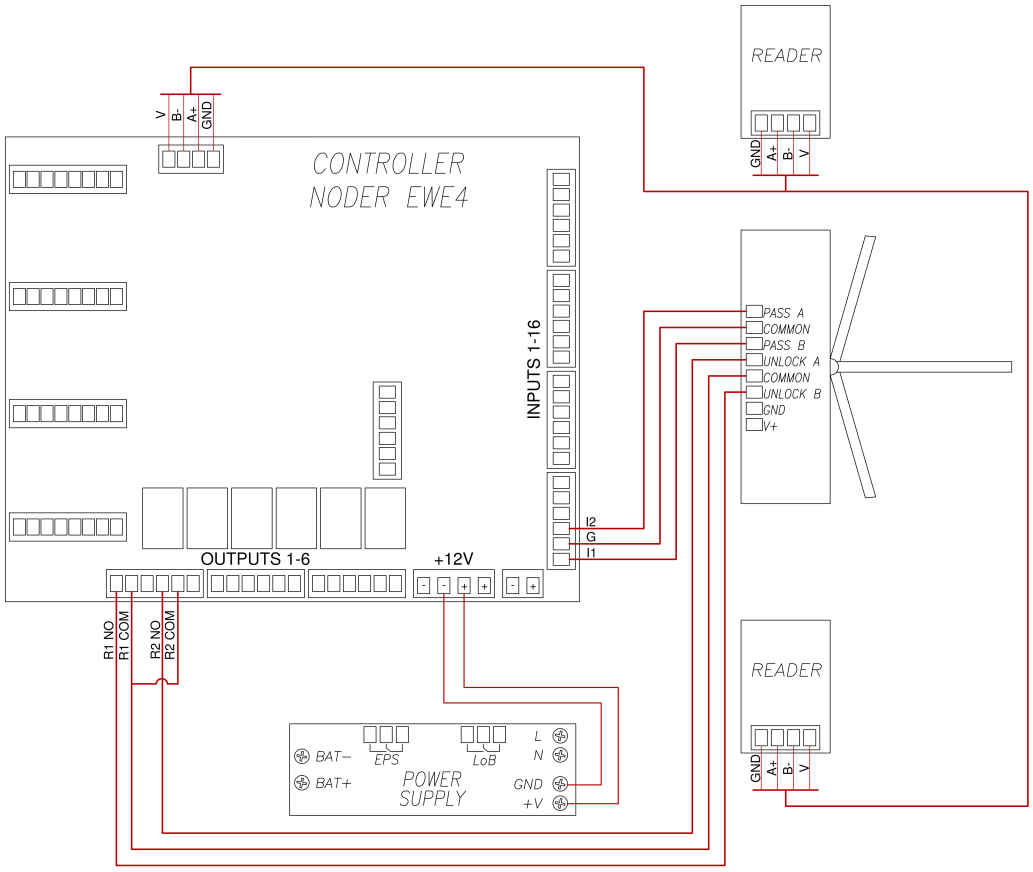
10.5 Passage with QR reader

Example of two-way passage with Noder MD-R/MDK-R reader (or other according OSDPv2 protocol) and QR reader using Wiegand interface. The electric lock is a reversing lock controlled by relay no. 1 of the controller (NC connector). It is powered from a fuse module equipped with appropriately selected fuses. The example uses an evacuation button that, when pressed, drops voltage from the lock. The second of the evacuation button's NC contacts has been connected to the controller's input no. 3 and the controller's ground. The open/closed status of the door is checked by serially connected reed switches. When one of the leaves is opened, a signal is sent to the controller by opening the ground to input no. 1. **A rectifying diode** should be used at the electric lock (recommended model – 1N4007). Its absence may cause damage to the controller relay.



10.6 Two-sided turnstile connection

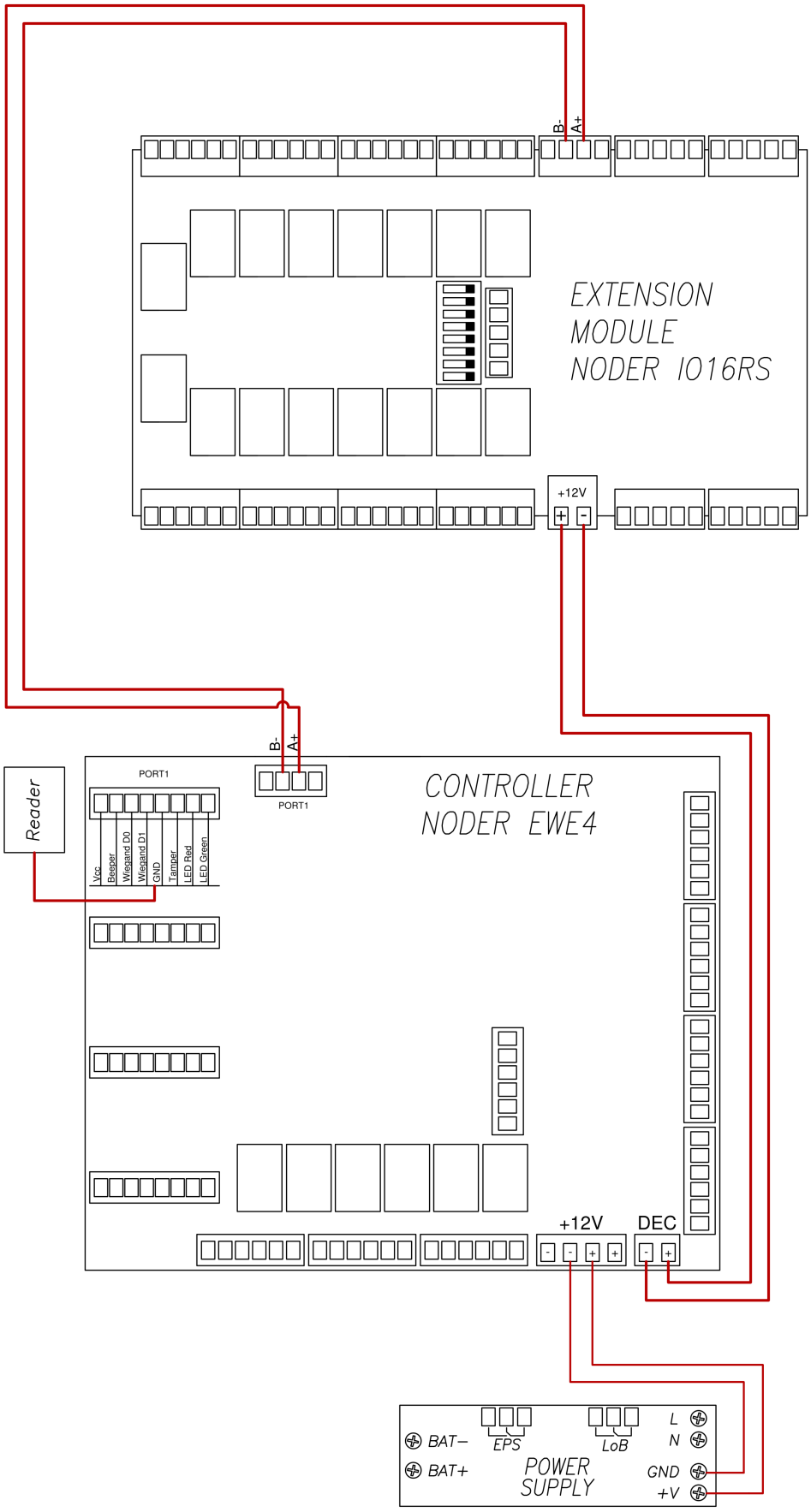
Example of a two-way gateway/tripod passage with Noder MD-R/MDK-R readers (or others using the OSDPv2 protocol) connected to RS-485 bus port. When an authorised card is applied, the corresponding controller relay is activated (in example 1 or 2), which unlocks the passage in the specified direction. It then locks after a specified time or user transition. Feedback signals are connected to controller inputs 1 and 2 to determine whether the system user has physically crossed to the other side.



10.7 Connecting the extension module Noder IO16RS

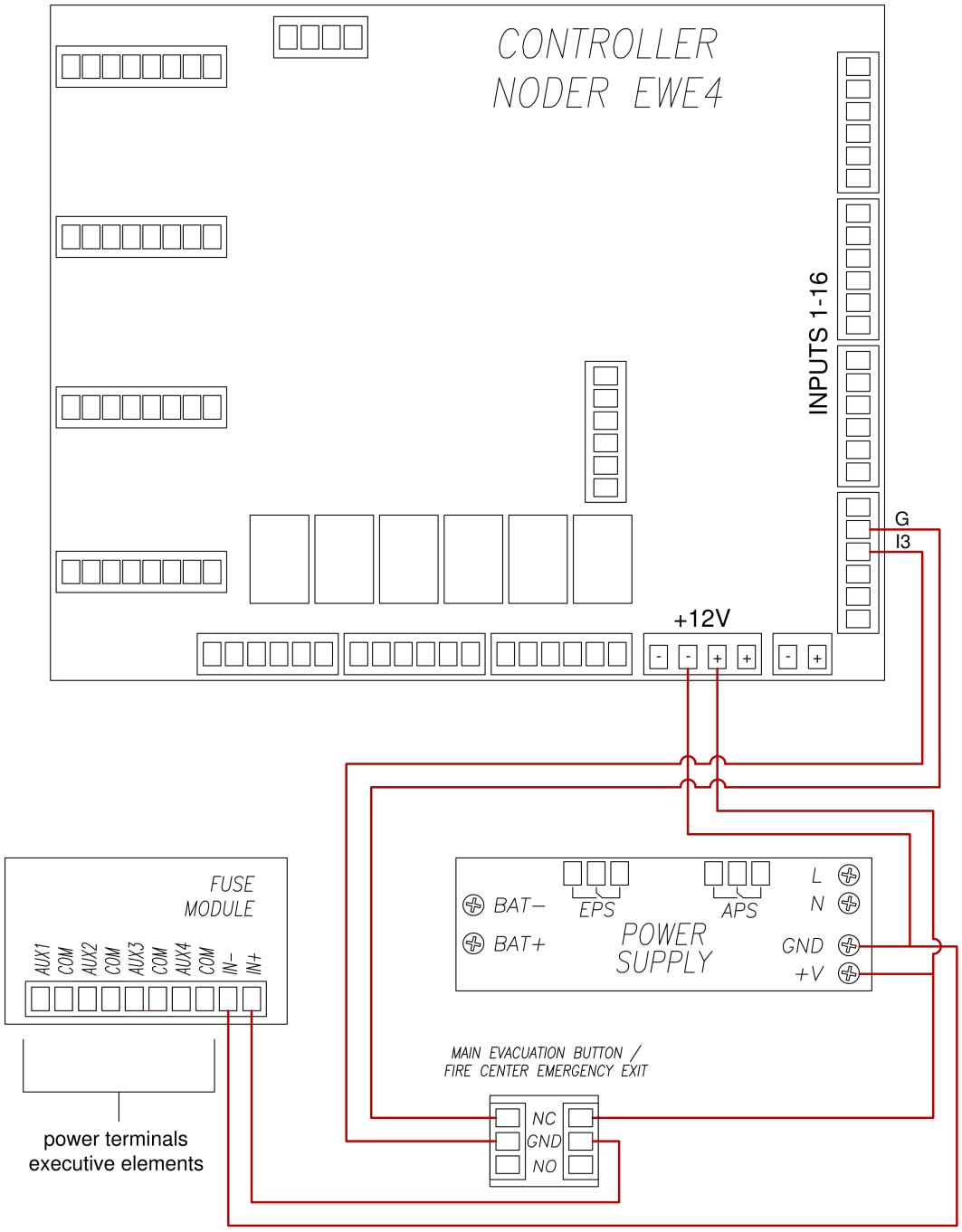
The RS-485 port of the controller is used to connect communication with the extension module. It is recommended that the IO16RS power supply be connected to the DEC relay output. This allows remote restart of the device. Information on addressing the extension module is included in its technical documentation.

The possibility of taking the elevator to given floors is indicated on the basis of the authorization of the user's card, which the user applied to the reader located inside the elevator and assigned to the extension module. Once the card has been authenticated, relays are activated representing the building floors. A single controller can serve a maximum of 64 floors (4 extension modules).


B-
A+
EXTENSION
MODULE
NODER IO16RS
+12V
Reader
PORT1
PORT1
Vcc
Beeper
Wiegand D0
Wiegand D1
GND
Tamper
LED Red
LED Green
CONTROLLER
NODER EWE4
+12V
DEC
BAT–
BAT+
EPS
LoB
POWER
SUPPLY
L
N
GND
+V

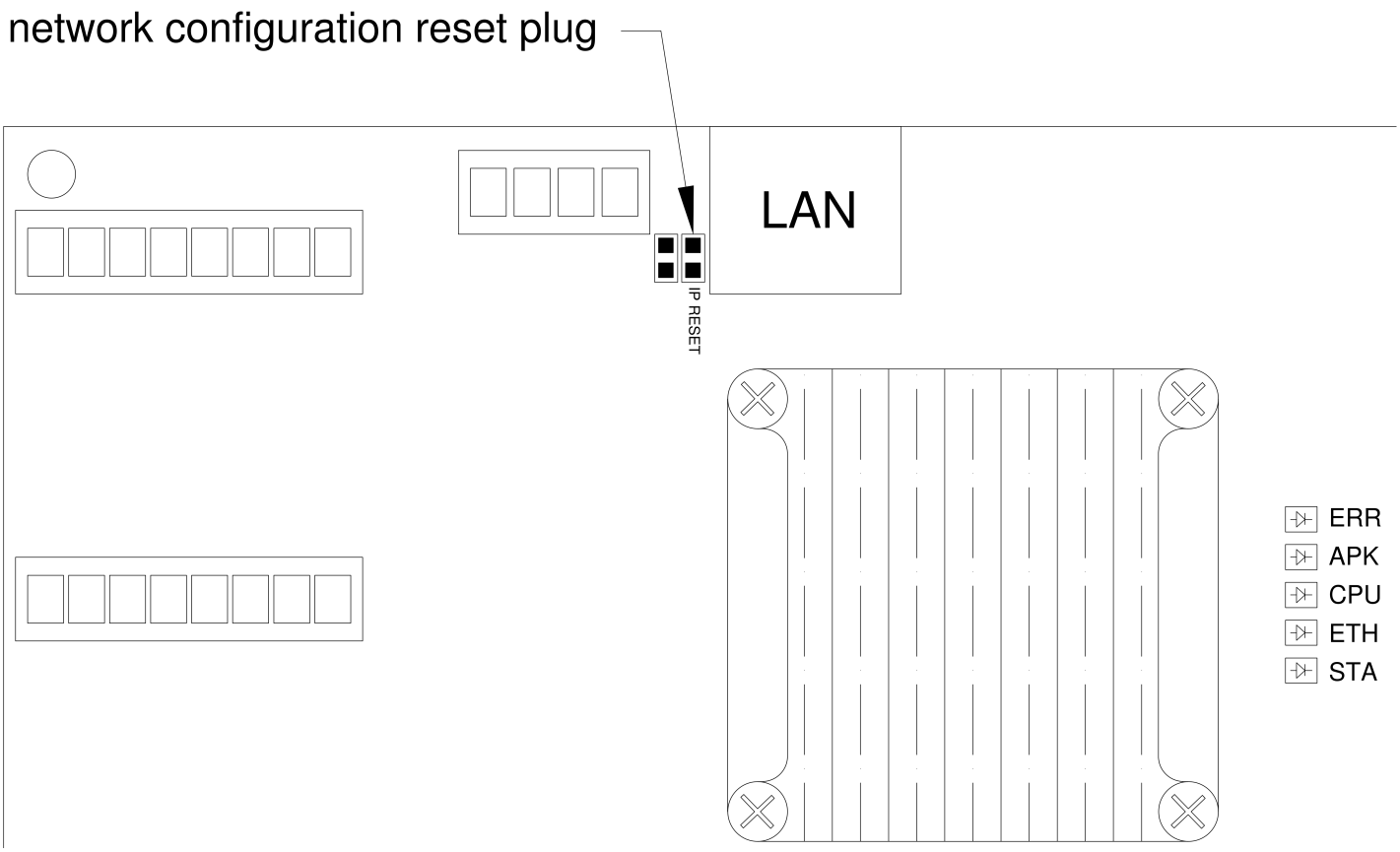
10.8 Emergency door opener connection

The main evacuation button / alarm relay from the fire panel should be connected between the power supply and the fuse module power supply. The second of the GPE contacts in the example is connected to input no. 20 of the controller to monitoring its status. In the case of the fire panel, a separate relay should be used for his purpose, since the inputs on the controller are potential-free and applying voltage to them could damage the controller.



11. Reset of EWE4 controller network to default settings

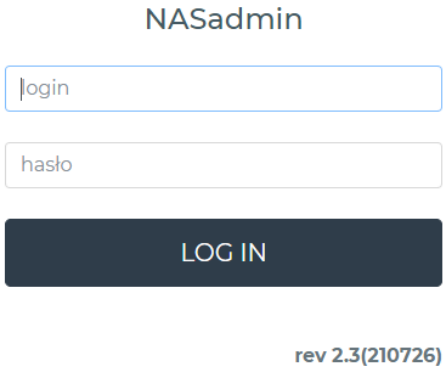
The EWE4 controller allows you to restore the default settings of the device if necessary. To do this, short-circuit the **"IP RESET"** electronic circuit located next to the Ethernet port. Then restart the controller from the power supply without opening the electronic circuit. After reboot, the STA LED will flash for a few seconds and then the APK LED will also flash. When the diode stops flashing after approx. 30 seconds, the electronic circuit can be disconnected. After a few seconds, the controller will return to the default settings.



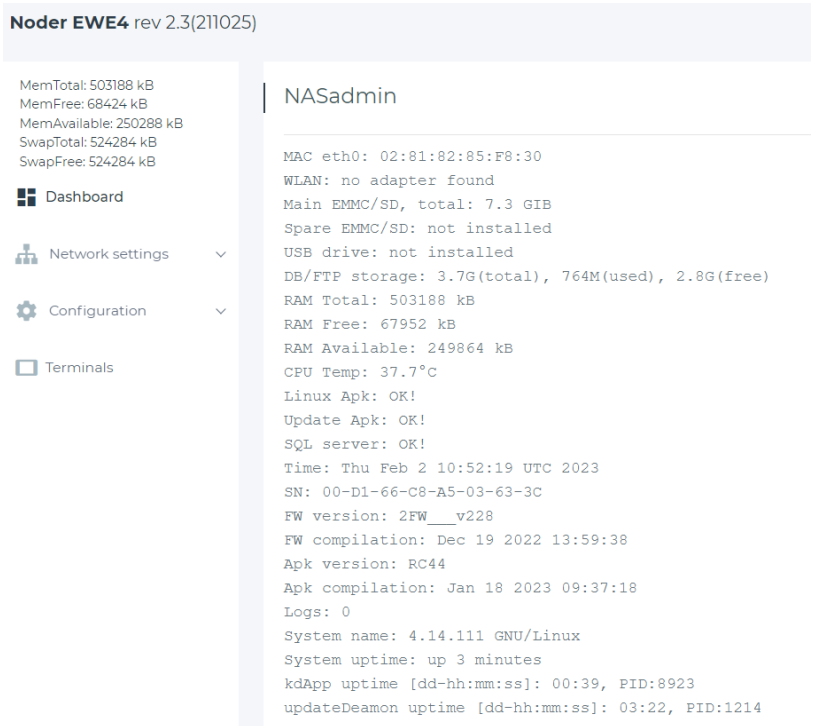
12. First start

The first time you start the controller, you must give it a unique IP address for your network. By default, the controllers are assigned the address **192.168.117.230** in the network with the mask **255.255.255.0** and the gate **192.168.117.1**. You need to set up your computer in this network and then log in using the web browser:

- default login: **admin**
- default password: **123456**



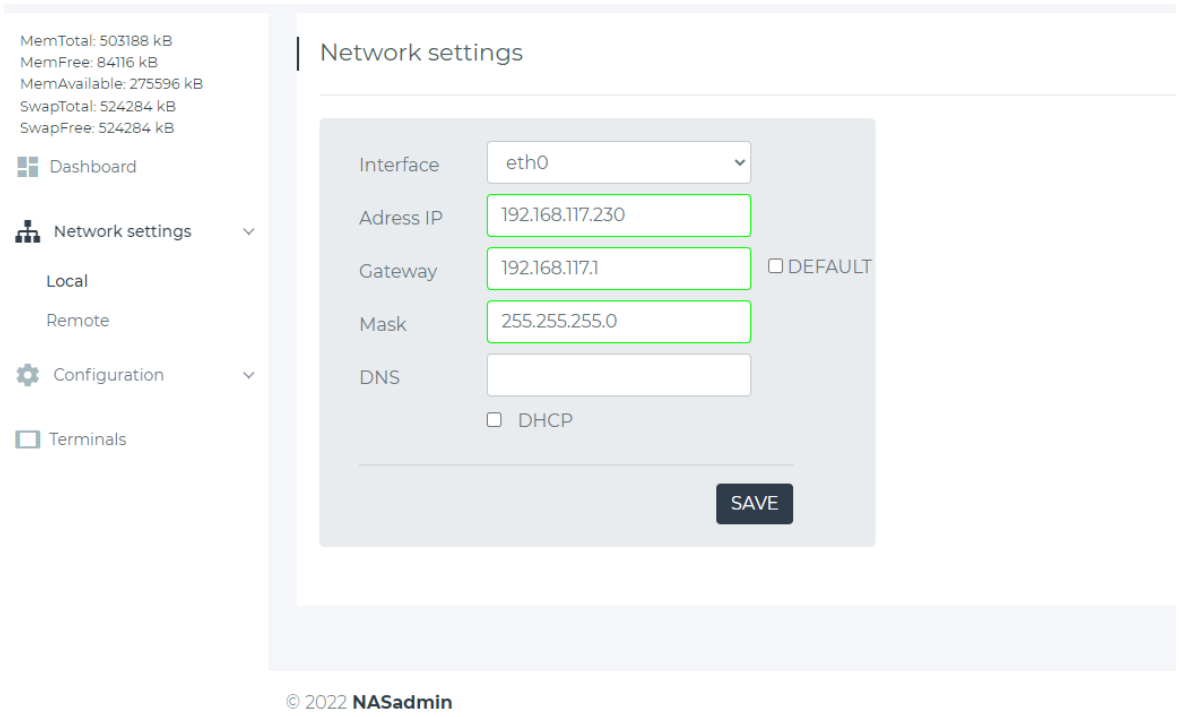
After logging in, an information page about current state of the controller will be displayed:



On the left side there are tabs for network settings options and configuration options. In addition, other devices such as RCP readers can be configured in the **Terminals** tab.

12.1 Network settings

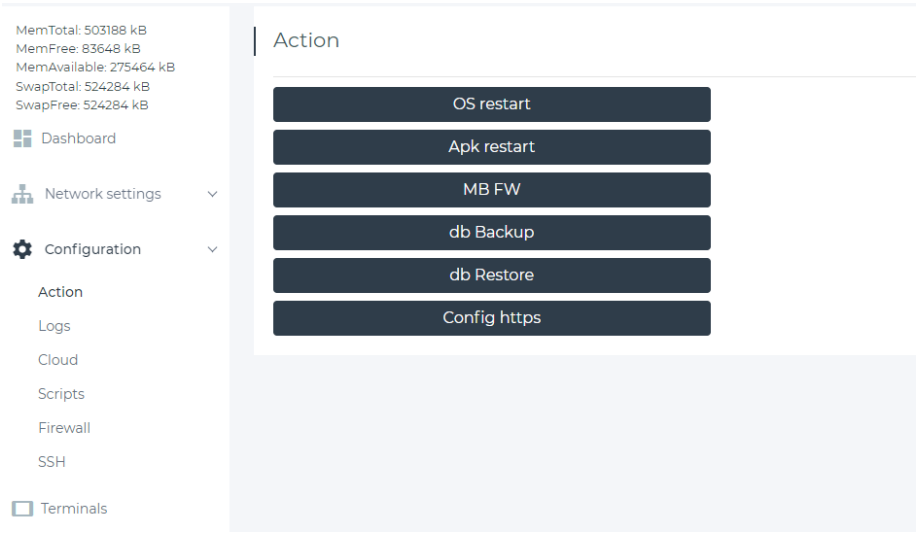
To change the IP address, select **Network settings -> Local**. In the window that opens, enter the new network settings and then click **Save**.



The controller should have a static IP address. If there is no configuration on the network side to securely assign the device always the same address, then the DHCP option should be unchecked. If it is checked, the address setting options will be greyed out, and the address assignment option will be taken over by the DHCP controller. To check, after setting the destination address, change the computer's network settings and connect to the controller's newly assigned IP address.

12.2 Configuration options

In the basic configuration of the controller, only the Action tab is used.



The **Action** tab gives you the possibility to restart device elements such as:

- **OS restart** – Restart the operating system (the entire controller). Use this option when **SQL server** has a state other than OK or **Apk restart** did not solve the problem;
- **Apk restart** – restart the controller application. Use this option if the **Linux Apk** has a state other than OK;
- **MB FW** – PIC microprocessor software update from the internal memory of the controller;
- **db Backup** – creating a copy of the internal security of the controller's database;
- **db Restore** – restoring the database from a backup copy saved to the internal memory;
- **Config https** - allows you to generate a new https certificate.

13. LED information's on controller

The controller is equipped with diodes informing about the operating status of the device:

- **ERR** - red, lighting or blinking means that the hardware error of the device has been detected;
- **APK** - green, blinking means correct operation of the controller application;
- **CPU** - in the bootloader mode blinking alternately with the STA diode, indicates bootloader mode;
- **ETH** - in the bootloader mode, receive the FW frame;
- **STA** - works together with the CPU as described above, and blinks when the microcontroller is working properly.

14. Addressing readers

Readers connected to RS485 bus must be addressed. Addressing of readers is done with programming cards available from the manufacturer. Cards with addresses from 1 to 4 are included. A maximum of 4 readers can be addressed on the bus port. If an RS reader is connected to the controller with address 1, the Wiegand port number 1 will be inactive, similarly for the other ports.

The reader is in addressable mode for 10 seconds after it is connected to the power supply. When the programming card is applied, the reader reprograms itself (reads the card and starts flashing the green LED at a frequency of 1Hz), then reboots and signals with a green LED blink and a beep. The number of flashes and beeps corresponds to the assigned address of the reader. A reader with an already assigned address will always signal its address with a sound and a green diode flash after being connected to the power supply.

15. Further configuration

After connecting all devices: readers, buttons, reed switches, power supplies and others, and addressing the readers with special address cards, you should collect information about the devices and ports to which they are connected and go to Device Configuration in management platform. Device configuration is described in the **"Start-up and Configuration Guide"**, available at https://noder.systems/en/downloads/.