IMAporter Mobile & Basic

Access Control Systems
with MobileAccess function

Installation and User Manual

Version: 2.0 Karel Kalivoda, Jan Orlický Date: 30.11.2020

DOCUMENT HISTORY

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1. Product Overview

1.1. Basic Properties

IMAporter Mobile and **IMAporter Basic** are variants of a smart **Access Control System** equipped with innovative identification and communication technologies.

Both systems support **Mobile Access** function enabling user identification via common standards of **RFID** cards or tokens, **Android** and **iOS** mobile devices using **NFC** technology or **Bluetooth Low Energy** and remote control **iBeacons**.

All IMAporter systems are designed for easy installation, configuration and maintenance according to specific customer needs.

1.2. Vocabulary

IMAporter Mobile
Standalone ACS fully managed via Android NFC-enabled device

IMAporter Basic
Smarter version of IMAporter Mobile with added communication and central management.

Mobile Access function
Identification function enabling users to ID themselves from a mobile device via NFC (Android) or BLE (Android and iOS) technologies

IMAporter IDcloud
Cloud-based platform designed for remote management of access rights and mobile credentials via a web dashboard IMAporter Cloud Admin. More info in a dedicated manual.

App - IMAporter ACS Config
Service app for initial configuration of IMAporter systems

App - IMAporter Mobile Admin
Admin app for common management of access rights and ACS control from an NFC-enabled Android device

App - IMAporter PC Admin
Admin app for common management of access rights and ACS control from a PC

App - IMAporter Mobile Key
User app available for Android and iOS devices enabling user to identify himself using the Mobile Access function.

Near Field Communication (NFC)
Close range radio frequency technology equipped in modern mobile devices with Android OS

Bluetooth Low Energy (BLE)
Also known as Bluetooth Smart or Bluetooth 4.x is a new generation of low power Bluetooth. Compared to previous versions of Bluetooth it adds new functions suitable for user identification.

ACS
Access Control System

1.3. Differences between IMAporter Mobile and IMAporter Basic

IMAporter Mobile
has a standalone function with management of user rights carried out solely from an Android NFC-enabled device with IMAporter Mobile Admin app.

IMAporter Basic
an advanced system fully compatible with and keeping all features of IMAporter Mobile. It has added communication protocols enabling it to be fully controlled centrally via a cloud web interface; or from a server PC over IP protocol / USB connection. It is equipped with a distributed DB and can optionally be configured to operate in online or offline mode. Alternatively, this system can also be managed from a mobile device.

1.4. System Features

- Wide ID media support
- Mobile Access function
- BLE remote control
- Android, iOS compatibility

- Many configuration options (mobile device, PC)
- Robust reader design
- Easy installation
- Weather resistance
- Reliable ID solution

1.5. Technical Specification

Memory - Access rights	up to 3000 users per door / reader
Memory - Events	up to 1500 events per door / reader
Identification media	**ISO14443A**: (Mifare Classic 1k & 4k, DESFire EV1, Mini, Plus S&X, LEGIC Prime, LEGIC Advant, SmartMX, Ultralight, Ultralight C NTAG20x, NTAG21x, PayPass, etc.) **ISO15693:** (LEGIC advant) **ISO18092 (NFC devices)**: Android 5+ **BLE devices**: Android 5+, iOS 7+
Identification distance	**ISO14443A**: up to 7 cm (2.8") **ISO18092 (NFC devices)**: up to 5 cm (2.0") **BLE devices**: 5 cm (2.0") to 10 m (32.8 ft)
Reader communication interface	OSDP protocol (RS485)
Administration	Central via PC (PC Admin) connected over **USB** (Basic) Central via PC (PC Admin) connected over **LAN** (Basic) Central (Cloud Admin) over **2G/3G/4G connection** (Basic)

	Local via mobile app over **NFC** (Mobile & Basic)
Indication	LED (green/red), beep
Frequency	13.56MHz & 2.4GHz
Power supply	12 VDC / max. 200 mA
Temperature range	-25°C to 60°C (-13° to 140°F)
Output / max. current	2 switching relay contacts / 1A/60V
Reader cover	Black plastic box (ABS) with front sticker
Reader IP rating	IP65
Reader dimensions (H*W*D)	12 cm (4.6") x 5.4 cm (2.1") x 2.6 cm (1.0")
Relay module IP rating	IP52
Relay module dimensions (H*W*D)	11,9 cm (4.7") x 8,0 cm (3.1") x 4,1 cm (1.6")
System components	Reader RSW.05-P (RFID/NFC) / RSW.05-PB (RFID/NFC/BLE) switching module SMR.04

1.6. Core components and accessories

The IMAporter systems can be modularly composed according to customer needs.
Available are 2 variants of ACS readers and 2 variants of switching modules. Other components are optional depending on the installation site, method of operation and connection.

RSW.05-P
Intelligent Reader with NFC and RFID capability

RSW.05-PB
Intelligent Reader with NFC, RFID and Bluetooth LE capability

SMR.04 (12V/24V)
Switching module with serial bus (RS485) communication interface (Basic)

SMR.04-E
Switching module for standalone operation (Mobile)

Xport
IP module for SMR.04 unit (Basic only)

LTE module
2G/3G/4G module for SMR.04 (Basic only)

USB converter
RS485/USB converter for centralized system connection to PC (Basic only)

NETmodule converter
RS485/IP converter for connection of multiple readers and their operation under one IP address (Basic only)

Android mobile device
A programming device for standalone variant of the system

PCE.05
Table RFID reader for loading ID media into the wired variant of the system.

Backup power supply
Battery backed 12VDC power supply. The power supply can power from 1 to 10 doors and is projected accordingly to the necessary power output.

Electric lock
Mechanical blocking component of the door. Is available in many variants depending on the intended security level.

Flush mounting frame
Stainless steel frame for flush mounting of the RSW.05 intelligent readers.

1.7. Identification media options

Depending on the configuration, the IMAporter systems support the following ID media:

ISO14443A

- MIFARE Classic 1k & 4k
- DESFire EV1
- MIFARE Mini, Plus S&X
- LEGIC Prime, LEGIC Advant
- SmartMX
- Ultralight, Ultralight C
- NTAG20x, NTAG21x
- PayPass

ISO15693

- LEGIC advant

NFC devices (ISO18092)

- Android 5+

BLE devices

- Android 5+
- iOS 7+

ISO14443A media differ in properties and some of them support advanced encryption features. The most commonly used ID media are the MIFARE Classic 1k and DESFire EV1 cards.
The IMAporter ACS fully support all advanced features of these ID cards. In the management apps (PC app as well as mobile app) it is possible to set the following:

MIFARE Classic 1k

- UID reading
- Sector reading (sector ID, key ID, key)

DESFire EV1, DESFire EV2

- UID reading
- File reading (AID, Key ID, File ID, Key in HEX)

The RSW.05 reader supports in other configurations also various other ID media (eg LEGIC Advant). Upon request it is possible to add support for such ID media into the IMAporter Basic system.

Mobile identification options using NFC and BLE devices is described in chapter **4.4. Mobile User Identification**.

1.8. HW and LAN requirements for IMAporter Basic

HW requirements

- OS Windows 7 or newer
- Quadcore 2GHz processor
- At least 4GB RAM
- 500MB HDD

LAN requirements for NETmodule / Xport connection

- One LAN IP range e.g.: 192.168.1.1 - 192.168.1.255
- Server PC located in the same network
- NETmodule / Xport with static IP address

When connected through different ISPs, a Virtual Private Network (VPN) must be established allowing bidirectional communication between server PC and remote NETmodule / Xport. Use of Multi-Protocol Label Switching (MPLS) VPN is a proved option to connect parts of the IMAporter system over internet.

1.9. Certification

IMA s.r.o. hereby declares that IMAporter ACS meets all the essential requirements and other relevant provisions of Act No. 90/2016 Coll., the Act on Conformity Assessment of Specified Products in Their Supply to the Market, as amended, and pursuant to Government Decree No. 117/2016 Coll., on Conformity Assessment of Products in terms of their electromagnetic compatibility in their supply to market, and according to Government Decree No. 118/2016 Coll., on conformity assessment of electrical equipment intended for use within certain voltage limits during their supply to the market.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMA s.r.o. is a holder of the ISO 9001:2016 certificate issued by TÜV Rheinland. All development, production and distribution processes of the company are managed by this standard and guarantee a high quality, technical level and professional aspect of all our products.

2. Installation

This section describes the mechanical and electrical installation of the IMAporter ACS and all their components and modules.

The IMAporter Systems can be operated in 2 types of connection:

- Standalone (wire free) connection (Mobile & Basic)
- Wired centralized system (Basic only)
- IMAporter Basic connected as an 'Registration reader' (see diagram in section 2.2.4)

Principal system function and description

Each electric lock is controlled and switched from the SMR.04 (-E) switching module. User identification media are read by the RSW.05 Intelligent reader. The RSW.05 reader is equipped with internal database of access rights and decides on granting or restricting user access. Upon authorized user identification, the RSW.05 reader sends data command to the SMR.04 (-E) switching module to open the door for a specified amount of time.

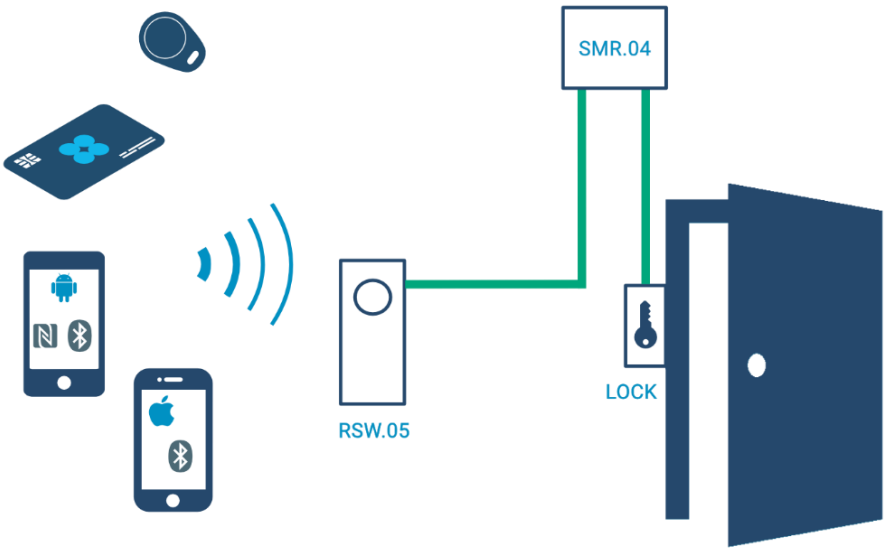
Switching module is a central component at each entry point. It is powered by 12VDC (optionally 24VDC) and powers up also the RSW.05 reader and controls the electric lock. In a wired variant of the system (IMAporter Basic) it communicates using a serial bus RS485, using IP protocol (with Xport module installed) or via LTE module; with a Windows server PC.

2.1. Mechanical installation

Common for IMAporter **Mobile** & IMAporter **Basic**
- The door opener must be equipped with a protection diode 1N4007 anti-parallel to the opener
- Use shielded cable (eg SYKFY) for RS485 communication line
- Use a separate cable to power the locks

2.1.1. Crucial components positioning

The IMAporter ACS comprises of 3 necessary components installed at each entrance.



Simple components positioning diagram

RSW.05 Intelligent reader
A component for user interaction and identification.
Needs to be installed from outside the entry door at a height around 100 cm from the ground.
Possible installations are:
- Flush mounting
- Wall surface mounting
- Integration into Entry Phone system

SMR.04 (-E) Switching module
Central switching component at the door
Installation is from the inner side of the entry at a distance:
- **up to 15m** from the **RSW.05 Intelligent reader** for standalone system (**IMAporter Mobile**)
- **up to 15m** from the **RSW.05 Intelligent reader** for wired centralized system (**IMAporter Basic**)

Recommended installation of both variants is above the door by the ceiling within the reach of standard 3m RSW.05 cable and electric lock cable.

Electromagnetic lock
A component for mechanical blocking and release of the door.
The system is able to operate with many different electrical locks from various vendors.

2.1.2. Reader mounting options

Common for IMAporter **Mobile** & IMAporter **Basic**

The **RSW.05 Intelligent reader** can be mounted in the following ways depending on the installation options at the site:

Flush mounting

Together with IMAporter stainless steel flush mounting frame, the RSW.05 reader can be installed inside the plaster.
The niche for mounting should have minimum dimensions of 13 cm (h) x 6 cm (w) x 3 cm (d).

Mounting template is a part of the flush mounting frame delivery.

Wall surface mounting

The RSW.05 reader housing is very hard and robust to be installed on surface.

Mounting template is a part of the RSW.05 delivery.
The RSW.05 reader, unlike the readers of older generations, offers the possibility of using replaceable covers made of decorative materials (wood, concrete, white plastic).

Integration into Entry Phone system or 3rd party housing

The RSW.05 reader can be integrated into Entry Phone systems of various vendors. Integration into empty Phone system module is to be prepared by IMA. We are still widening our support for 3rd party systems and housings. Please contact us for more info.

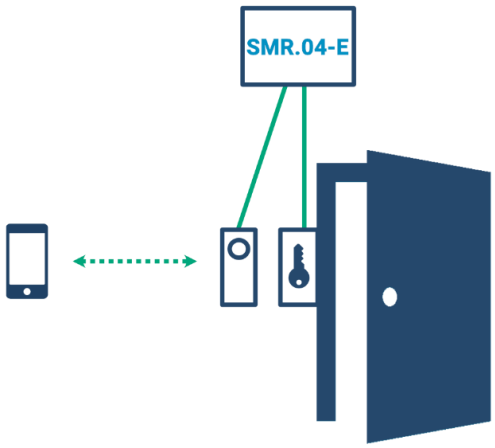
The dimensions of RSW.05 module for integration are 108 mm (h) x 44 mm (w) x 12 mm (d). The RSW.05 integration module can also use external antenna of dimensions 30 x 30 mm. The antenna can be installed up to 20 cm from the RSW.05 module.

2.2. Electrical installation

2.2.1. Operation and connection methods (IMAporter Mobile & Basic)

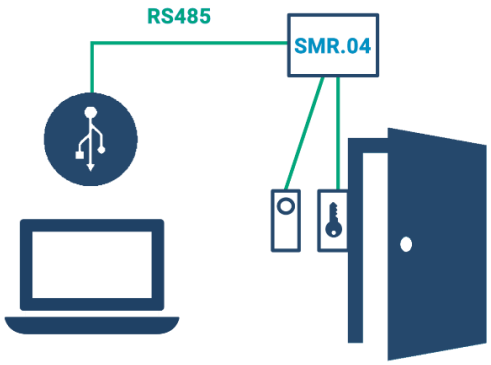
Standalone operated system (IMAporter Mobile & Basic)

Smart Relay Module SMR.04-E without communication interface.
All communication and management of the standalone operated system is carried out using NFC interface of the RSW.05 reading terminal from an Android NFC-enabled mobile device.
Standalone operation via Mobile Admin app is being used usually in smaller installations (IMAporter Mobile) and can be used also or as an alternative system management option to the IMAporter Basic.



Managed from a laptop (IMAporter Basic)

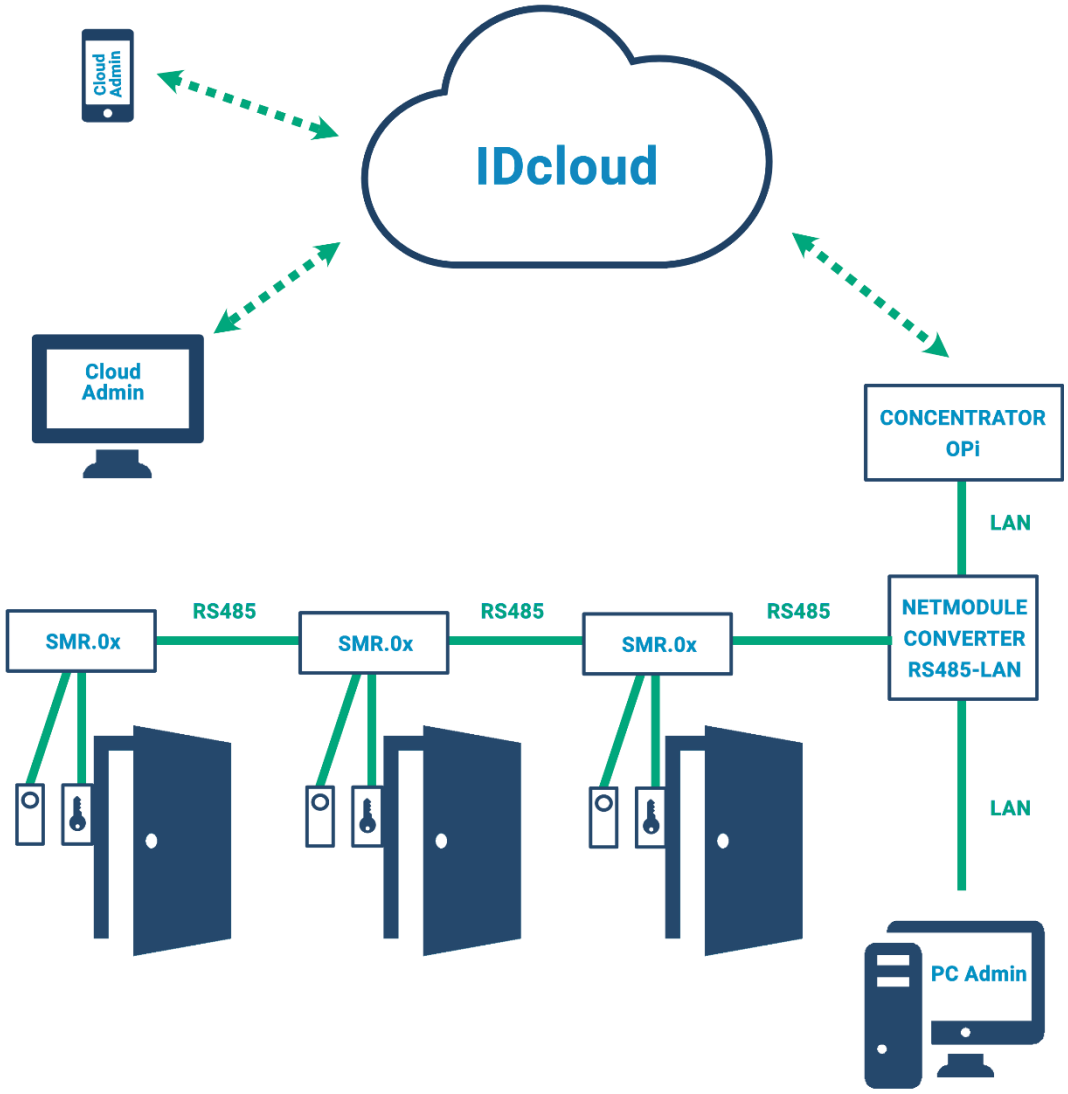
Smart Relay Module SMR.04 with RS485 serial bus.
Configuration and management of the ACS is carried out from a Windows Laptop PC connected only for programming purposes directly to the SMR.04 via a USB cable.
This procedure can be used for programming one or multiple readers that are connected together on a serial bus. Such serial bus can hold up to 5 devices at a maximum line length of 250 m.



Centrally managed system (IMAporter Basic)

The IMAporter Basic ACS supports four main connection variants. Each variant uses different HW modules and connection. Here is a simple overview:

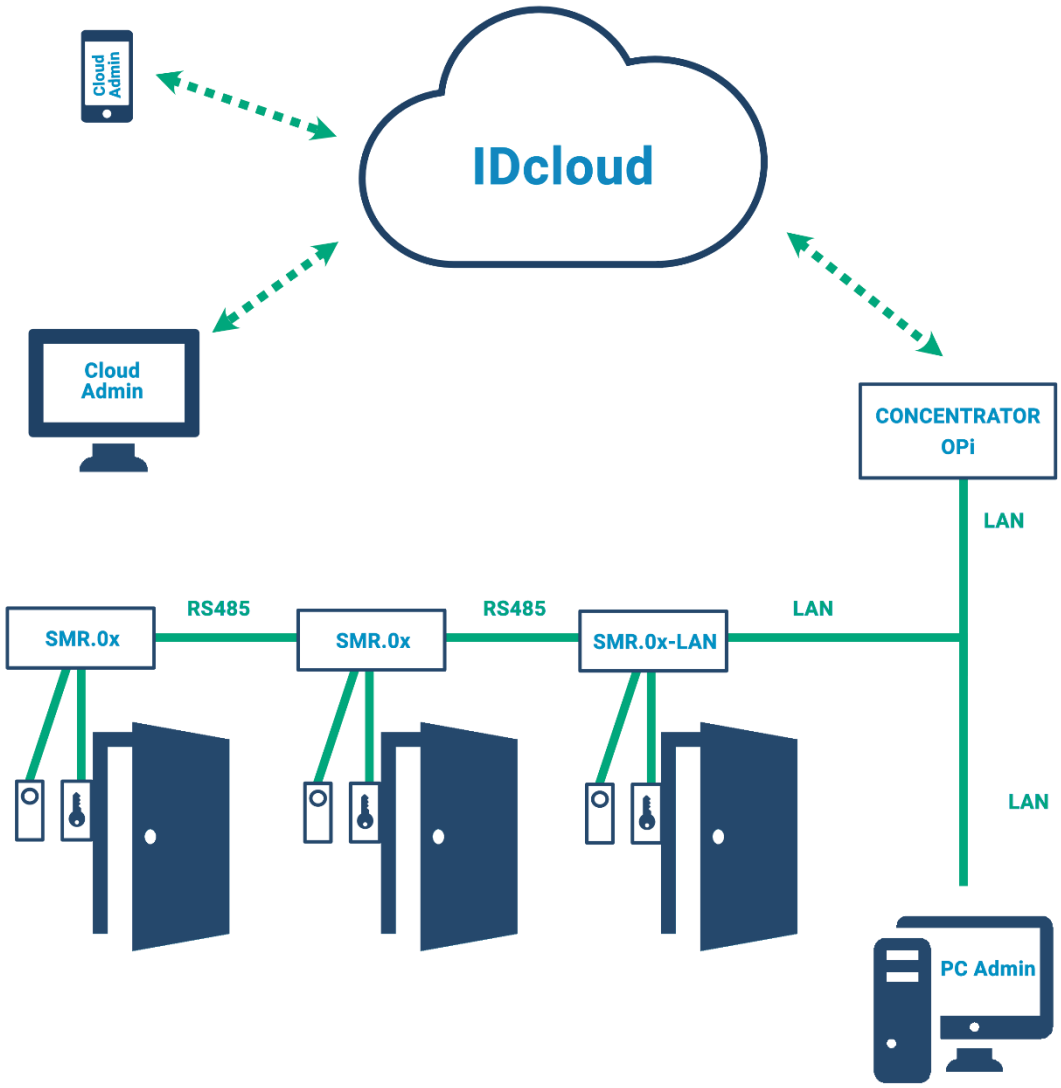
Variant 1 – serial connection over IP



Variant 1 – connection over LAN converter (management via PC Admin or Cloud Admin)

Switching Module SMR.04 with RS485 serial bus. All SMR.04 modules on the communication line are connected in series.
At the end of the line is a NETmodule IP converter that connects the serial line to a Local Area Network.
Each RS485 serial line can hold up to 5 devices at a maximum line length of 250 m. Should more than one reader be connected on the same line, each reader must have a unique ID.
The system is able to support up to 250 IP devices.

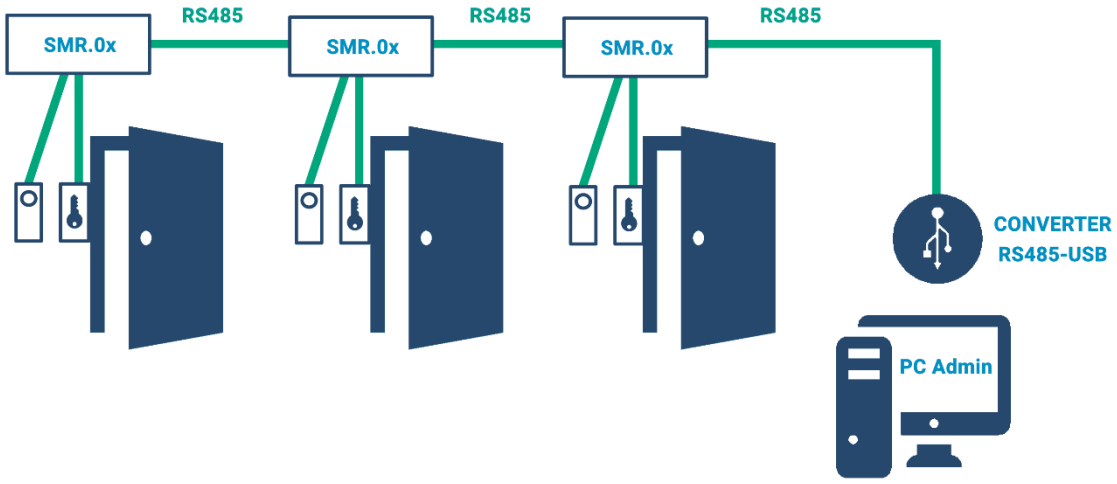
Variant 2 – direct IP connection



Variant 2 – direct LAN connection (management via PC Admin or Cloud Admin)

Switching Module SMR.04 with a built-in Xport IP module. The SMR.04 module is connected to the Local Area Network and accessed directly. Each SMR.04 with Xport IP module can support up to 5 SMR.04 switching modules connected to it using serial bus. In such installation, the last SMR.04 module acts as a converter for the whole serial line.
The system is able to support up to 250 IP devices.

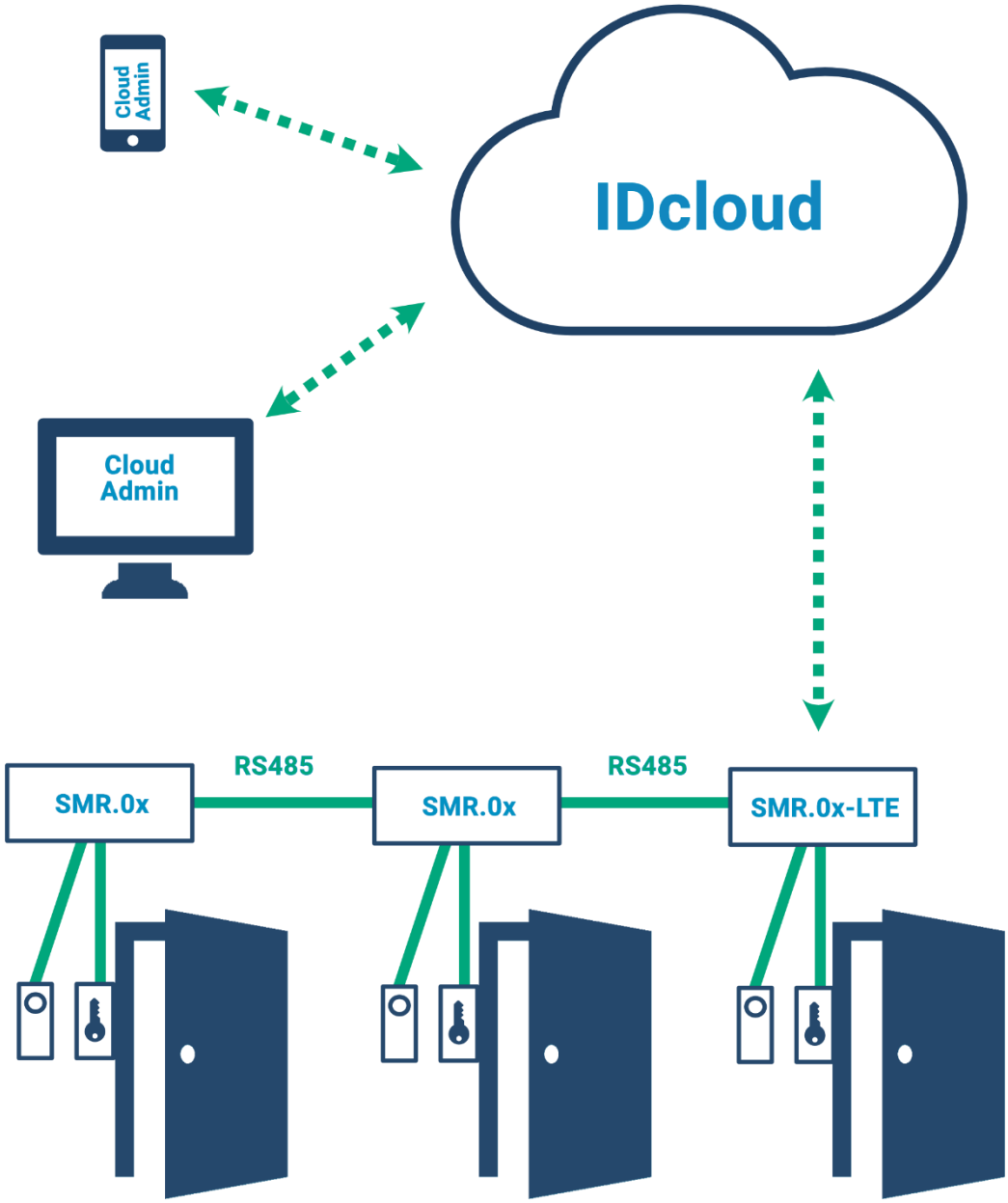
Variant 3 - serial connection connected using USB



Variant 3 - serial connection connected using USB (management only via PC Admin)

Switching Module SMR.04 with RS485 serial bus. All SMR.04 modules on the communication line are connected in series.
At the end of the line is a RS485/USB converter that connects the serial line directly to the server PC (virtual COM).
The serial line can hold up to 5 devices at a maximum line length of 250 m.

Variant 4 – connection over mobile networks (2G/3G/4G)



Variant 4 – connection over LTE module (management only via Cloud Admin)

Direct connection of remotely installed doors or door groups (connected via RS485 bus). Similar to variant 2, the SMR.04 module is equipped with a built-in LTE module and connected directly to the IDcloud server.

IDcloud - cloud system management for variants 1, 2 and 4

For variants 1, 2 and 4, it is possible to use the IMAporter IDcloud platform, which ensures convenient and fast management of access rights from anywhere via the web interface. The administrator can also send the user a mobile key directly to their mobile device, allowing the user to enter the building immediately. All this while maintaining maximum comfort and a high level of security.

2.2.2. Communication distances

Depending on the type of the system:

- **IMAporter Mobile** – standalone, managed only using a mobile device
- **IMAporter Basic** – wired with central management from a server PC

The following wiring schemes are universal for both system variants with marked features that apply only to the advanced IMAporter Basic system.

IMAporter Mobile uses a Switching Module **SMR.04-E** that is not equipped with wired communication interfaces. The communication distance between the SMR.03-E Switching module and RSW.05 intelligent reader is **15m**.

IMAporter Basic uses a Switching Module **SMR.04** that is equipped with RS485 or IP (with Xport module) communication line. The communication distance between the SMR.04 Switching Module and RSW.05 intelligent reader is **15m**.

2.2.3. RSW.05 cable and wire description

Cable: TRONIC-CY(LiY-CY) 12X0,14 QMM/ 20008 350V 01960019393
Cable connection at RSW.05: fixed pigtail connection, reader coming from the center back of the reader.
Standard length of the connection cable is 3m. It can be extended using a shielded cable with corresponding wire thickness for +12V and GND (for 150m minimum of 0,5mm ^{2}).

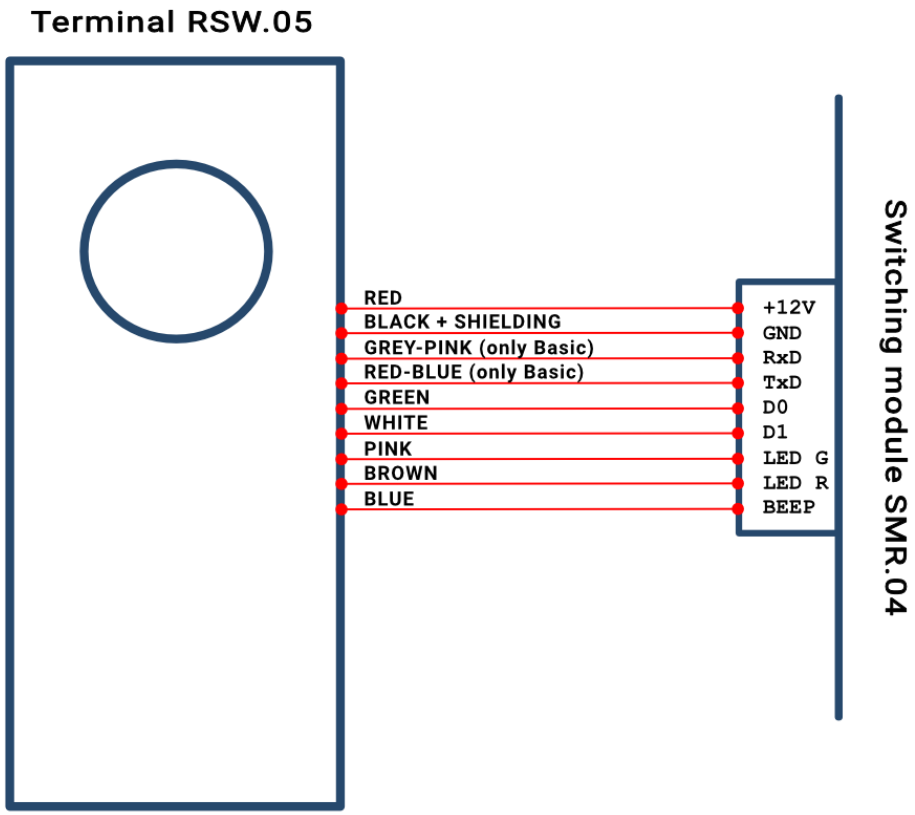
Wire signals and colors used

Signal:	**Color:**
+12V	red
GND	black
RxD	grey-purple
TxD	red-blue
D0	green
D1	white
LEDG	pink
LEDR	brown
BEEPER	blue

Cable shielding should be connected to GND terminal of the SMR.04 module.

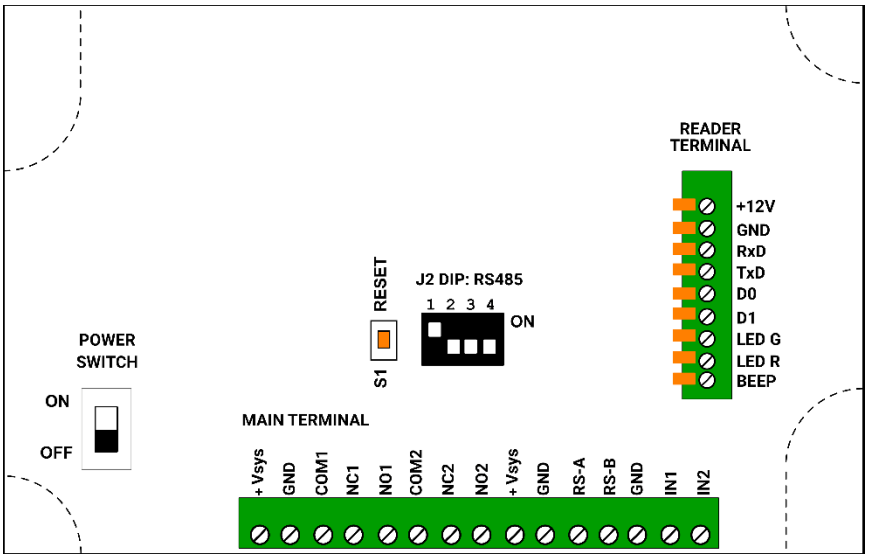
2.2.4. RSW.05 connection to SMR.04 module

Individual wires are connected according to the symbols marked on the SMR.04 circuit board.

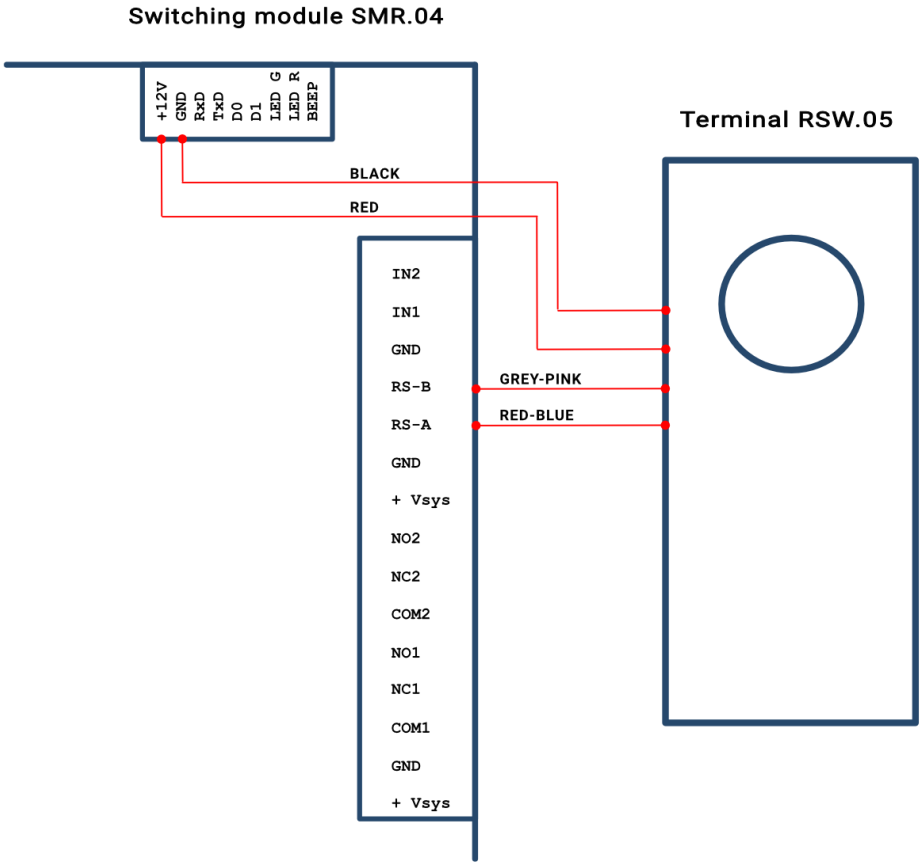


RSW.05 <–> SMR.04 connection

RSW.05 reader is connected to the ORANGE/GREEN (reader) terminal of the SMR.04 switching module as shown on the diagram below.



SMR.04 module – terminal scheme



RSW.05 in variant ‘Registration reader’ <–> SMR.04 connection

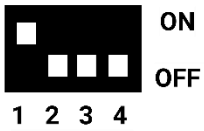
2.2.5. SMR.04 DIP switch settings

DIP switch J2 (IMAporter Basic)

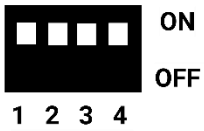
Used only to configure the serial communication line on the IMAporter Basic system.
The individual pins inside the SMR.04 switching modules on the communication line must be set as described below in order to ensure optimal line functionality.

switch 1 -> not connected
switch 2 -> termination resistor – connects 120 Ohm resistance between RS485-A and RS485-B
switch 3 -> boost resistor – connects 470 Ohm resistance between RS485-B a GND
switch 4 -> boost resistor – connects 470 Ohm resistance between RS485-A and +5V

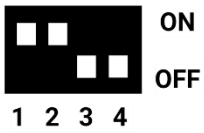
Settings of the pins inside switching modules according to the position on the communication line:



- factory reset
- any SMR.04 switching module in the middle of the line

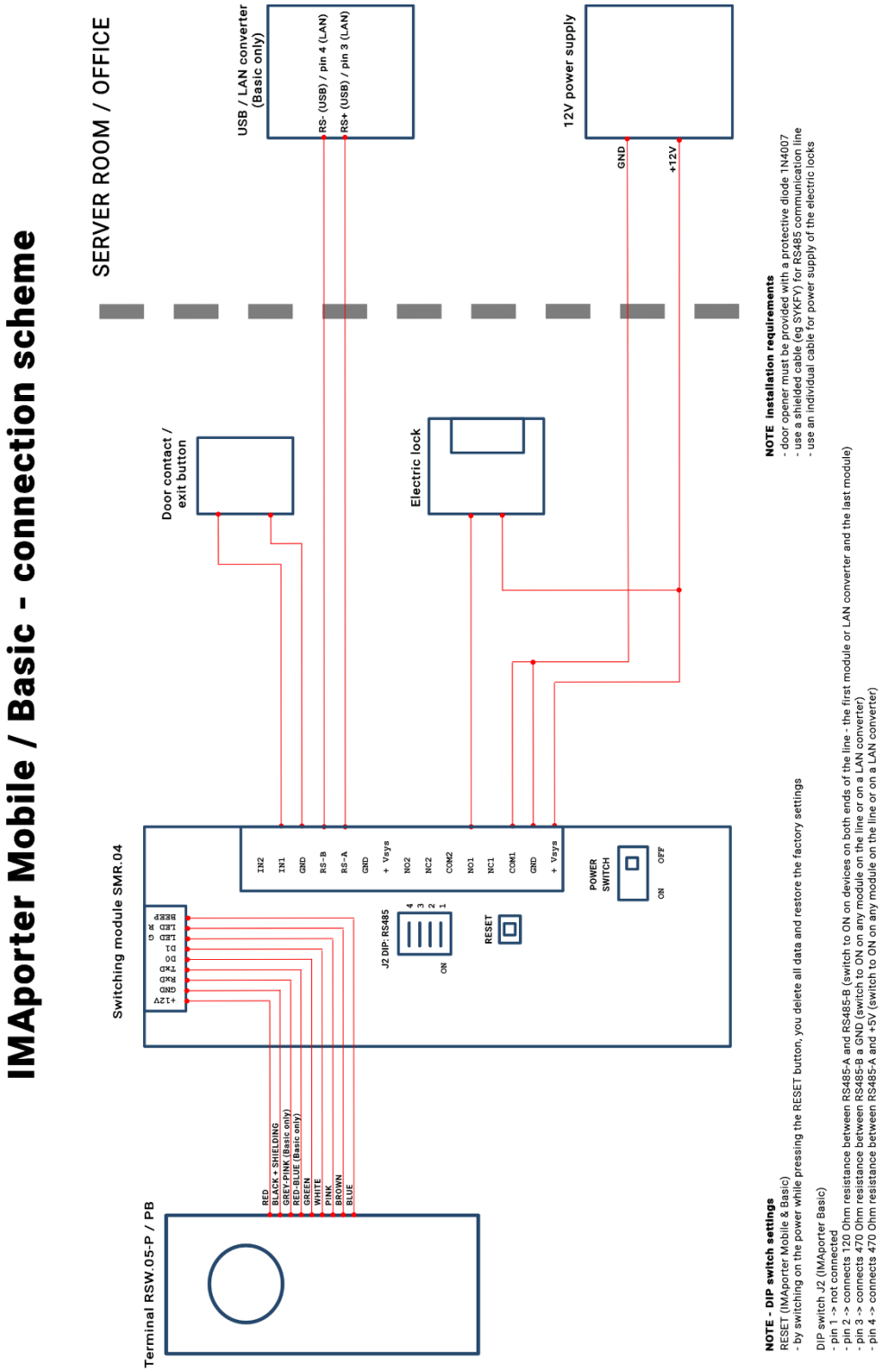


- standalone SMR.04 switching module
- SMR.04 switching module at the beginning of the line
  - SMR.04 with a built-in Xport LAN module (connected to a PC)
  - SMR.04 with a built-in LTE module
  - SMR.04 connection over a USB converter
  - SMR.04 connection over NETmodule LAN converter



- SMR.04 switching module at the end of the line

2.2.6. IMAporter ACS wiring diagram



2.2.7. Configuration

Once the system is prepared and installed, it is time for initial configuration.
Depending on the type of installation and delivery the system may already be configured by the distributor and no further configuration is needed.

2.3. Factory settings restoration

A new HW is most commonly supplied with factory settings and needs to be configured after its first launch. Exception can be an on-key delivery, when the system is already configured by the supplier. The configuration process is described in a separate manual dedicated to IMAporter ACS Config app. In case of a wrong configuration, or in case of a lost configuration device (mobile device etc.), it is handy to proceed with factory settings restoration and reconfigure the system with new admin passwords and settings.

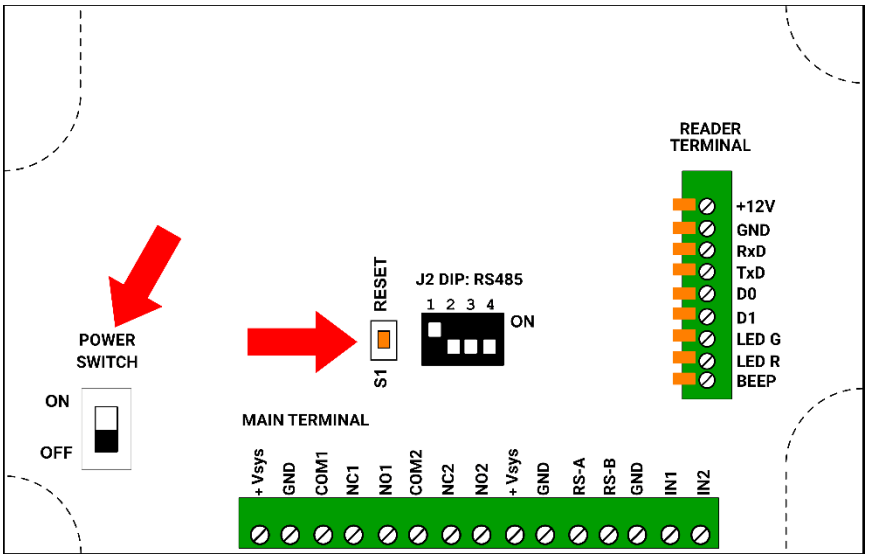
Hard-reset deletes all configuration (access rights DB, stored events, pairing password, System ID).

NOTE that the new configuration after a full factory reset can only be performed using the ACS Config / Reader Config application. This application is only available to integration partners.

RESET process

1) Open the SMR.04 switching module
2) Switch off the POWER button
3) Press the S1 RESET button and while pressing it, switch on the POWER button
4) Loosen the S1 RESET button
5) The S1 RESET button is disengaged during normal operation of the module

A deleted system indicates its state by blinking a red LED diode. The reader does not react to any ID media.



3. Troubleshooting and support

3.1. Reader states and signalization

Normal operation – flashing green LED (can be switched OFF by site admin)

Reader in factory settings – flashing red LED

Unrecognized ID card – when a card cannot be read, the reader does not react in any way

Unauthorized ID – when an ID does not have valid access rights to the reader or is missing from the database, access is not allowed, reader beeps shortly and lights up a red LED

Authorized ID - when an ID has valid access rights to the reader, access is allowed and the reader shortly beeps and lights up a green LED

Authorized ID outside of an allowed time interval – when an ID has valid access rights, but is currently forbidden by the calendar options, access is not allowed, reader shortly beeps and the red LED starts blinking for 2 seconds

Permanent unlock – lighting green LED, electric lock is unlocked the whole time (relay is switched) and allowing entry without identification

FW reader error - red LED flashing quickly

3.2. Electric Waste and Used Battery Pack Handling

Do not place used electric devices and battery packs into municipal waste containers. An undue disposal thereof might impair the environment!

Deliver your expired electric appliances and battery packs removed from them to dedicated dumpsites or containers or give them back to the dealer or manufacturer for environmental-friendly disposal. The dealer or manufacturer shall take the product back free of charge and without requiring another purchase. Make sure that the devices to be disposed of are complete.

Do not throw battery packs into fire. Battery packs may not be taken into parts or short-circuited either.