



iLOQ 5 Series

**Online System**

Planning guide

05/2024

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**iLOQ Oy**


[support.iloq.com](https://support.iloq.com)

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# 1. Safety information

## 1.1 Safety signs

Sign	Description
	General notice sign. Indicates particularly important information.

# 2. Important

## 2.1 This document

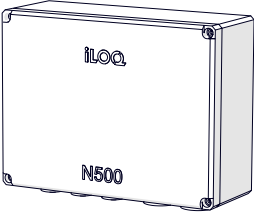
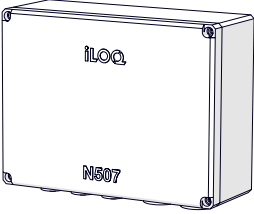
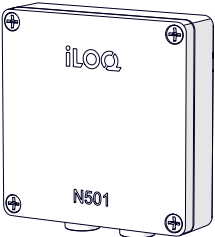
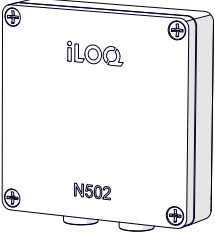

This document provides planning instructions, installation examples and connection diagrams for the iLOQ 5 Series Online System. It is intended to be used to help planning iLOQ 5 Series Online System layout and to calculate the maximum amount of bus devices. These examples are mainly for the installation of a system with a single iLOQ N500 Net Bridge. Systems with several net bridges are possible and the same principles apply for each net bridge in the system. This document does not cover the iLOQ HOME solution that can also be used to remotely control iLOQ 5 Series Online doors.

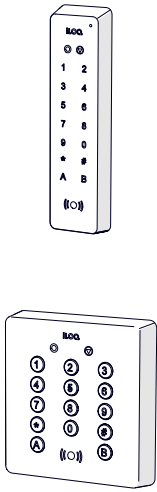
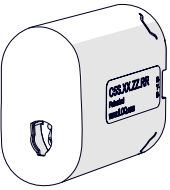
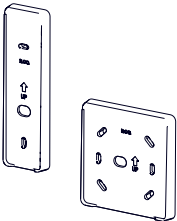
## 2.2 General information and safety

The iLOQ N500 Net Bridge acts as a link between the iLOQ server and the door modules and other bus devices. The iLOQ N500 Net Bridge should be installed in a secure interior space, such as a technical room, that is equipped with an Ethernet connection and an AC outlet. The net bridge acts as the host for the iLOQ N502 Online Door Modules, iLOQ NFC Readers and iLOQ N507 Online I/O Modules which do not work independently. The door module is a bus device installed in the vicinity of a door. The door module controls the devices installed in the door, such as lock cylinders, readers, electronic locks, electric strike plates, magnetic locks, etc.

For help and more information about the iLOQ 5 Series Online System, please visit [support.iloq.com](https://support.iloq.com). If needed, please contact your iLOQ representative for case-specific calculations and other cabling options.

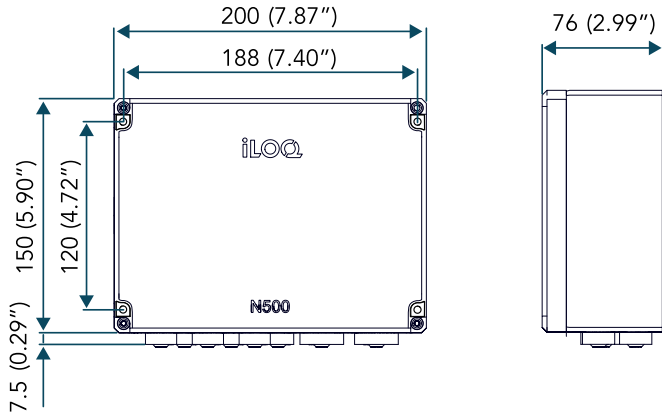
### 3. Main components of the iLOQ 5 Series Online System

Product	Description
	<p><b>N500 Net Bridge</b></p> <p>The iLOQ N500 Net Bridge acts as a central unit of the iLOQ Online system. The iLOQ N500 Net Bridge is connected to a network and, via bus wiring, to door modules. With one net bridge, it is possible to handle a theoretical maximum of 32 bus devices (cylinders, door modules and readers combined). Maximum power consumption per device <b>5 W</b>.</p>
	<p><b>N507 Online I/O Module</b></p> <p>The iLOQ N507 Online I/O Module contains 10 relays, 10 inputs and an iLOQ NFC Reader connection. The Online I/O Module can act as an individual relay card when it is programmed, or as an extension relay card to N507 when un-programmed. Maximum power consumption per device <b>3 W</b>.</p>
	<p><b>N501 Standalone Door Module</b></p> <p>The iLOQ Door Module is a standalone device and it is connected to the server via an LTE connection. The location of the door module should be in close proximity to the door. The maximum cable length from the door module to an iLOQ Cylinder or an iLOQ NFC Reader is 10 m. The door module contains two relays with individual functions that can be edited in the iLOQ Manager. At the connected door / magnet contact, the door status is obtained as open / closed. Maximum power consumption per device <b>3 W</b>.</p>
	<p><b>N502 Online Door Module</b></p> <p>The iLOQ N502 Online Door Module is connected to the iLOQ N500 Net Bridge via RS485 bus wiring. The location of the door module should be in close proximity to the door. The maximum cable length from the door module to an iLOQ Cylinder or an iLOQ NFC Reader is 10 m. The door module contains two relays with individual functions that can be edited in the iLOQ Manager. At the connected door / magnet contact, the door status is obtained as open / closed. Maximum power consumption per device <b>1 W</b>.</p>
	<p><b>N503 Offline Door Module</b></p> <p>The iLOQ N503 Offline Door Module is a lock with two relays, and is part of the iLOQ 5 Series Online product family. The features of the iLOQ N503 are limited when compared to other Online products. Time profiles, monitored doors, calendar controls, external tags, key PIN-codes and code access cannot be used. The iLOQ N503 is at its best in remote and hard to reach locations where only a simple key-relay control is needed. Maximum power consumption per device <b>1 W</b>.</p>

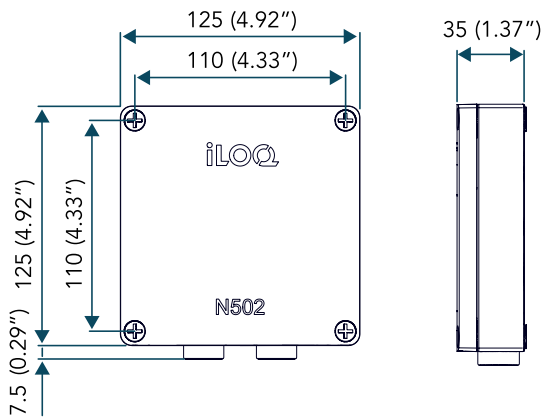
Product	Description
	<p><b>N504i/N505i NFC Reader</b></p> <p>The iLOQ NFC Reader can be connected either directly to the iLOQ N500 Net Bridge, iLOQ N502 Online Door Module or iLOQ N507 Online I/O Module.</p> <p>When connected to the iLOQ N502 Online Door Module or N507 Online I/O Module via a reader bus, it can, for example, open an electric lock, automated doors or elevator control panels. It is also possible to send tasks to it for updating the keys.</p> <p>When connected directly to the iLOQ N500 Net Bridge via the main bus, it works exclusively as a hotspot. Thus, it is possible to send update tasks to the hotspot, for example: key access rights and time restriction updates.</p> <p>Maximum power consumption per device:</p> <p>iLOQ N504i Door Reader: <b>1.5 W</b>  iLOQ N505i Wall Reader: <b>1.5 W</b></p>
	<p><b>C55.xx.xx Oval Cylinder*</b></p> <p>*Only available in Scandinavia.</p> <p>The iLOQ Oval Cylinder is a self-powered digital lock cylinder without batteries. The required energy is generated when the key is inserted into the lock cylinder. The key and the lock cylinder communicate with each other through contact and the communication has a strong electronic encryption. The lock can be connected to a door module for remote control of access rights, time limitations and blocklists.</p>
	<p><b>Accessories</b></p> <p>iLOQ power unit A5.111 USA &amp; A5.112 Europe  iLOQ NFC Reader mounting plates for surface wiring</p>

## 4. Device dimensions

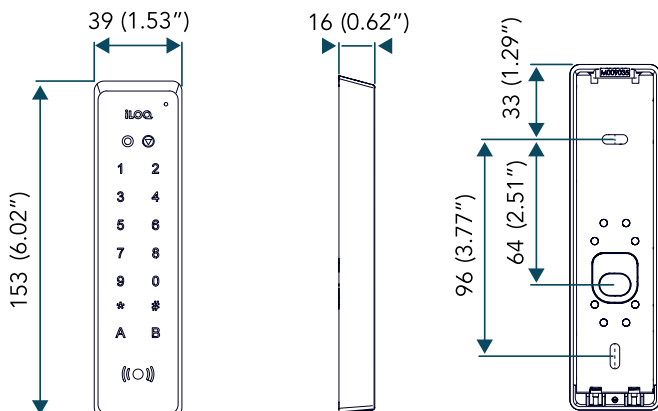
iLOQ N500 Net Bridge &  
iLOQ N507 Online I/O Module



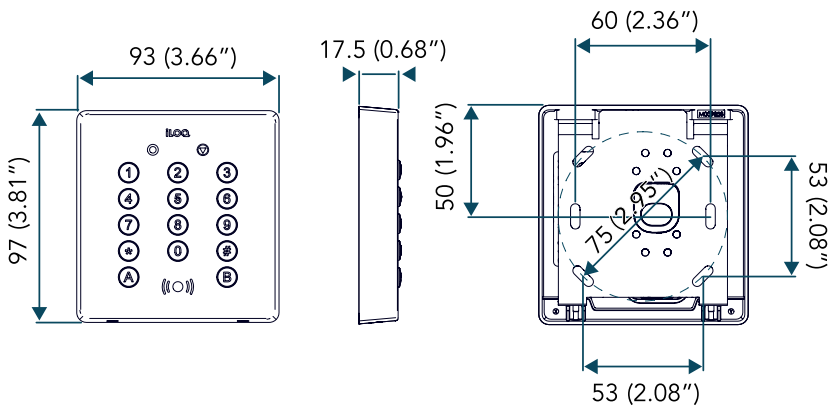
iLOQ N502 Online Door Module  
iLOQ N501 Standalone Door Module  
iLOQ N503 Offline Door Module



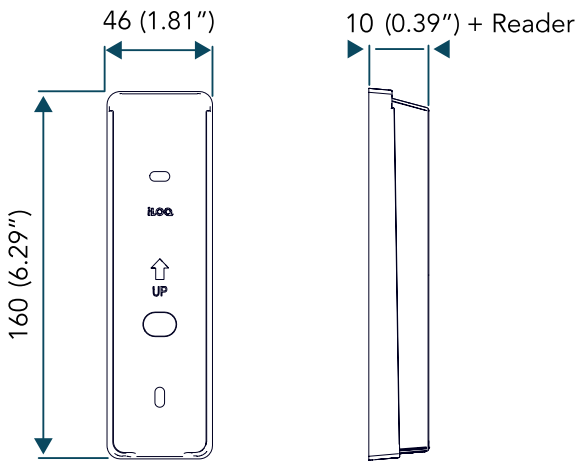
iLOQ N504i NFC/PIN Door Reader



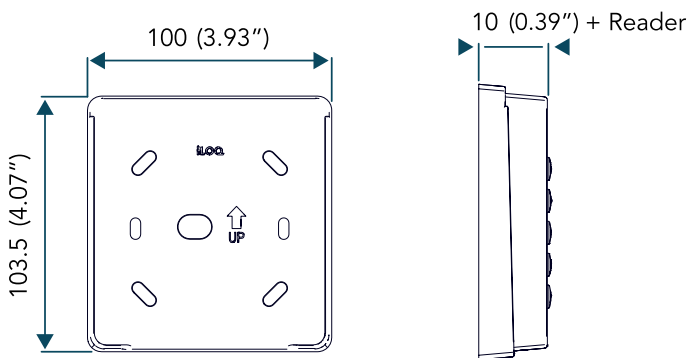
iLOQ N505i NFC/PIN Wall Reader



iLOQ A5.016 Mounting Plate



iLOQ A5.017 Mounting Plate



## 5. Terminology

Term	Description
iLOQ Manager	<p>All administration of the system is done via the iLOQ Manager software.</p> <p>The iLOQ Manager controls users, programming keys, access rights, locks and keys. The system also generates an event log that stores all administrative events. The database is securely stored and backups are performed by following ISO/IEC 27001:2013 standard procedures. It is possible to download floor plans and place lock cylinders on the floor plans. This gives a very good overview for designing the locking system, but it is also very useful in daily programming tasks.</p>
Main bus	<p>The RS-485 bus wiring is the main bus that enables the transfer of data and power to the connected bus devices. Bus communication is encrypted with AES-256 encryption in the device-to-device network.</p>
Branch	<p>The iLOQ N500 Net Bridge has a main bus connector for six branches. This means that the main bus can be divided into six branches to provide more flexibility for wiring options.</p>
Bus device	<p>Each device connected to the bus is considered a bus device.</p>
Reader bus	<p>The reader bus is dedicated for communication between an iLOQ N502 Online Door Module and an iLOQ NFC Reader.</p>

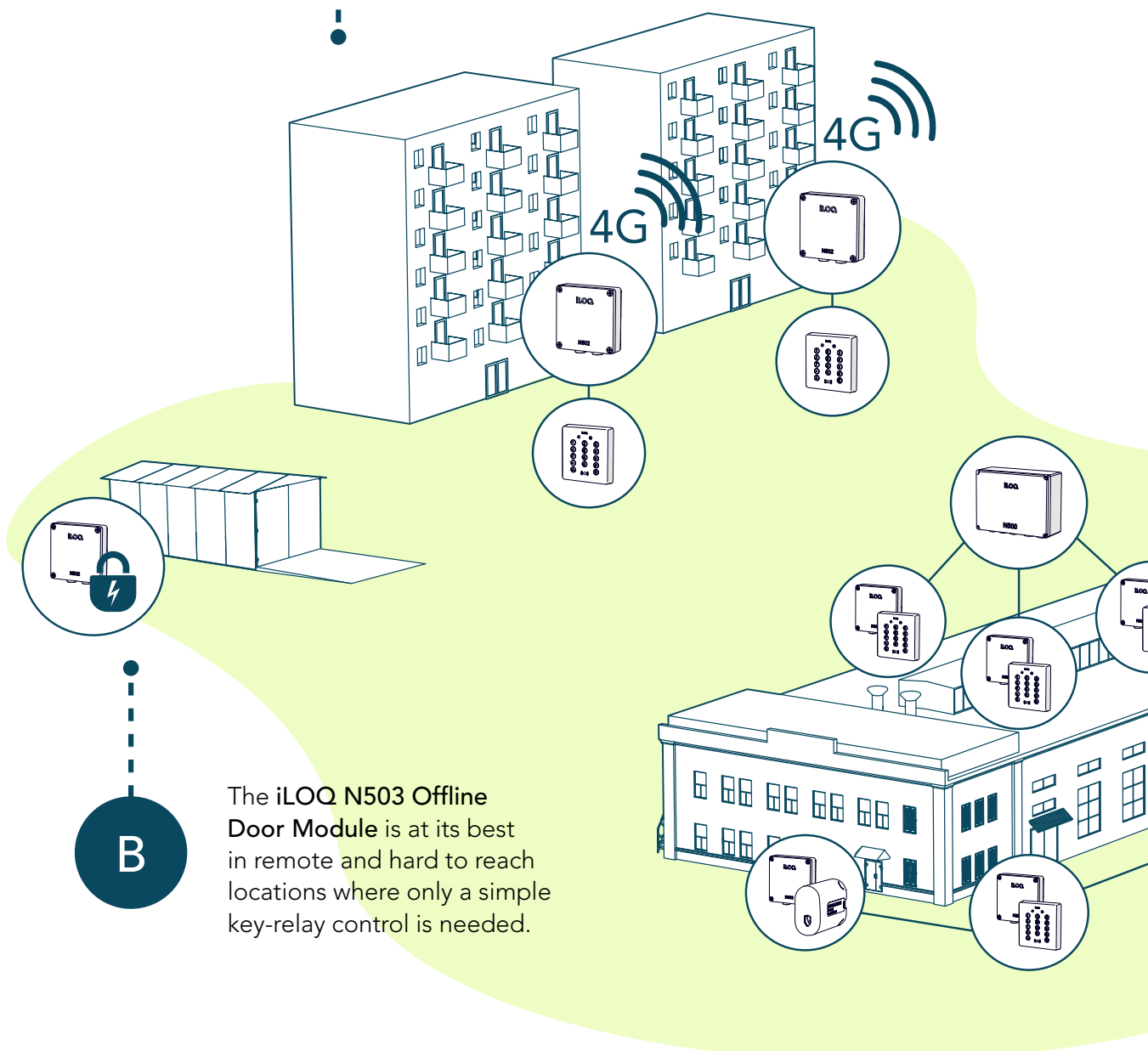


Internal bus (chain)	The internal chain bus of the N507 Online I/O Module is used to connect additional N507 slave cards into each other, but also to connect iLOQ NFC Reader into the main N507.
L1 & L2 bus	Dedicated bus/connector for iLOQ C5S.xx.xx lock cylinders.
Potential free relay output	K1 and K2 relays in the iLOQ N502 Online Door Module.
Lock device	Device connected to the K1 or K2 relay.
RFID	iLOQ NFC Readers can read RFID tags that can be programmed into iLOQ Manager as external tags (Keys).
NFC	Near Field Communication - Technology that iLOQ NFC Readers use to communicate with iLOQ Keys.

## 6. iLOQ 5 Series Online System concept

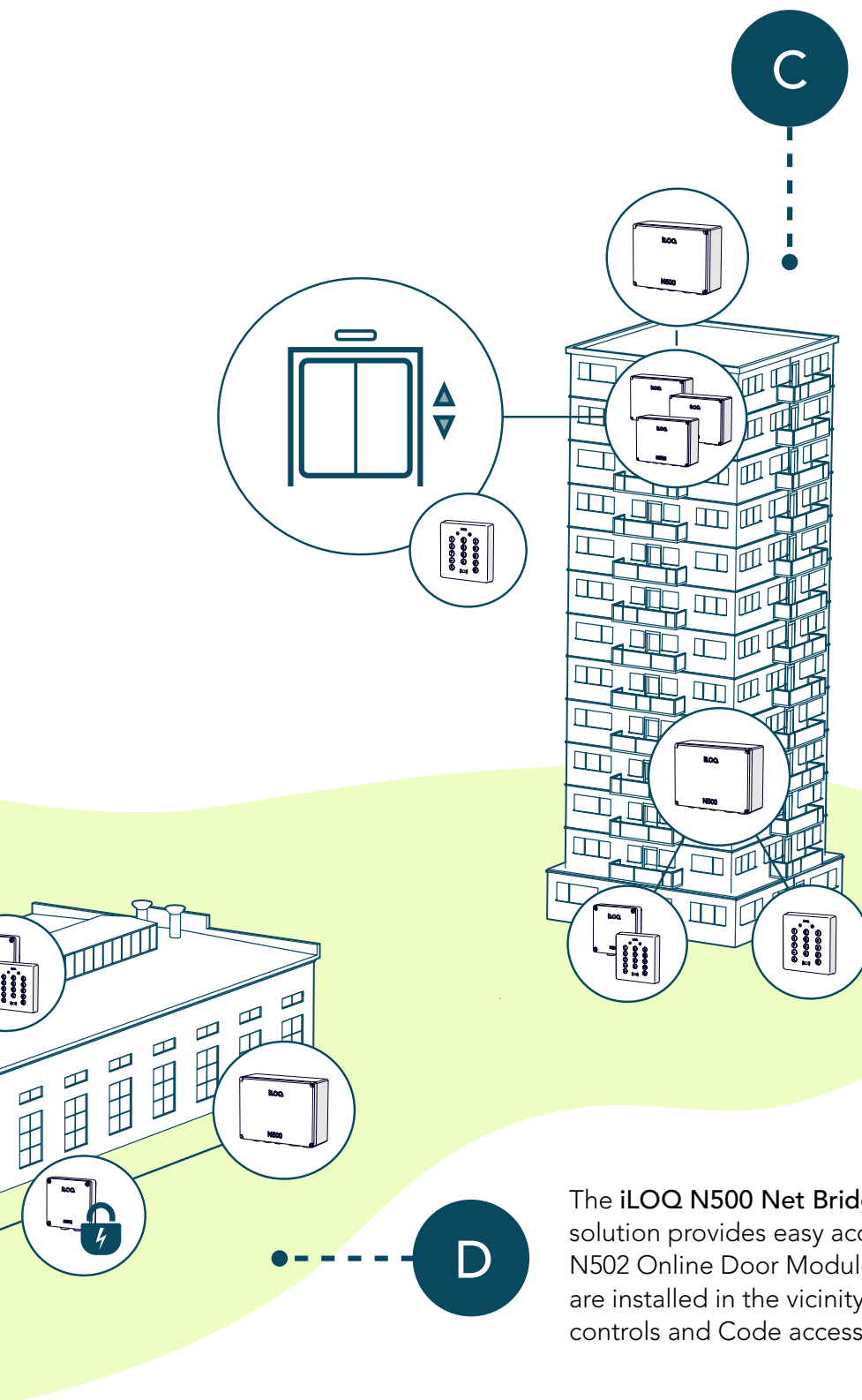
**A**

The **iLOQ N501 Standalone Door Module** is an easy single-door solution that is ideal, for example, for a residential building where cabling might be difficult. It is the perfect ad-on for S5 Cylinders and Keys making access easy, key updates possible and iLOQ HOME remote opening available.



**B**

The **iLOQ N503 Offline Door Module** is at its best in remote and hard to reach locations where only a simple key-relay control is needed.



The **iLOQ N507 Online I/O Module** is connected to N500 the Net Bridge allowing for example multifloor elevator controls. Up to 50 relays can be controlled via a single NFC reader.

The **iLOQ N500 Net Bridge**, cabled multiple door solution provides easy access and key updating. N502 Online Door Modules and NFC readers are installed in the vicinity of the door. Calendar controls and Code access can also be used.

## 7. Planning principles and bus specifications

The iLOQ N500 Net Bridge works as a central unit and it has one main bus. The bus can be divided into a maximum of six branches (**see Table 1.**). The branching must always start from the net bridge, where the bus devices can be connected to a series or into several branches. The maximum number of connected iLOQ bus devices depends on the chosen power supply, branch cable length and overall power consumption generated by the iLOQ bus devices and cable losses.

Calculating bus power:

1. See **Table 2.** to check the iLOQ bus device power consumption of each device.
2. Add up the power consumption of all the devices in a single branch to get the cumulative power consumption value.
3. Use the [calculation tool](#) to check the overall power consumption of a single branch, including cable losses.

If needed, please contact your iLOQ representative for case-specific calculations and other cabling options.



NOTE! It is recommended to use double wiring to power the bus. This decreases cable losses, and, in turn, increases the number of iLOQ bus devices you can connect to the system.



NOTE! The chosen power supply determines the available bus power (see table 3). Make sure that the available bus power is not exceeded.

Place the iLOQ N500 Net Bridge as close to the iLOQ bus devices as possible to minimize cable power losses. However, place the net bridge in a secure location such as a technical room.

Use the bus power only for powering iLOQ bus devices.



NOTE! iLOQ bus cabling is not allowed to be used to transfer the bus traffic of another system or any external devices (e.g. electrical locks). If power is needed for an external device, you can branch the power from the supply connector of the DC power unit. Do not use the iLOQ N500 Net Bridge or N502 Online Door Module connectors. Make sure that the rated capacity of the power supply is sufficient to handle the additional load from the external devices.

**Table 1. Bus layout (for a single iLOQ N500 Net Bridge)**

Maximum number of branches	6
Maximum number of bus devices*	Depends on power consumption
Maximum single branch length	300 m
Maximum door cable length	10 m

\* Verify with the [calculation tool](#).

**Table 2. iLOQ bus device power consumption**

	<b>Value</b>
iLOQ N500 Net Bridge	5 W
iLOQ N502 Online Door Module	1 W
iLOQ N507 Online I/O Module	3 W
iLOQ N504i NFC/PIN Door Reader	1.5 W
iLOQ N505i NFC/PIN Wall Reader	1.5 W

**Table 3. Max. available bus power (depending on power supply)**

	<b>Value</b>
PoE	10 W
PoE+	20 W
DC	30 W

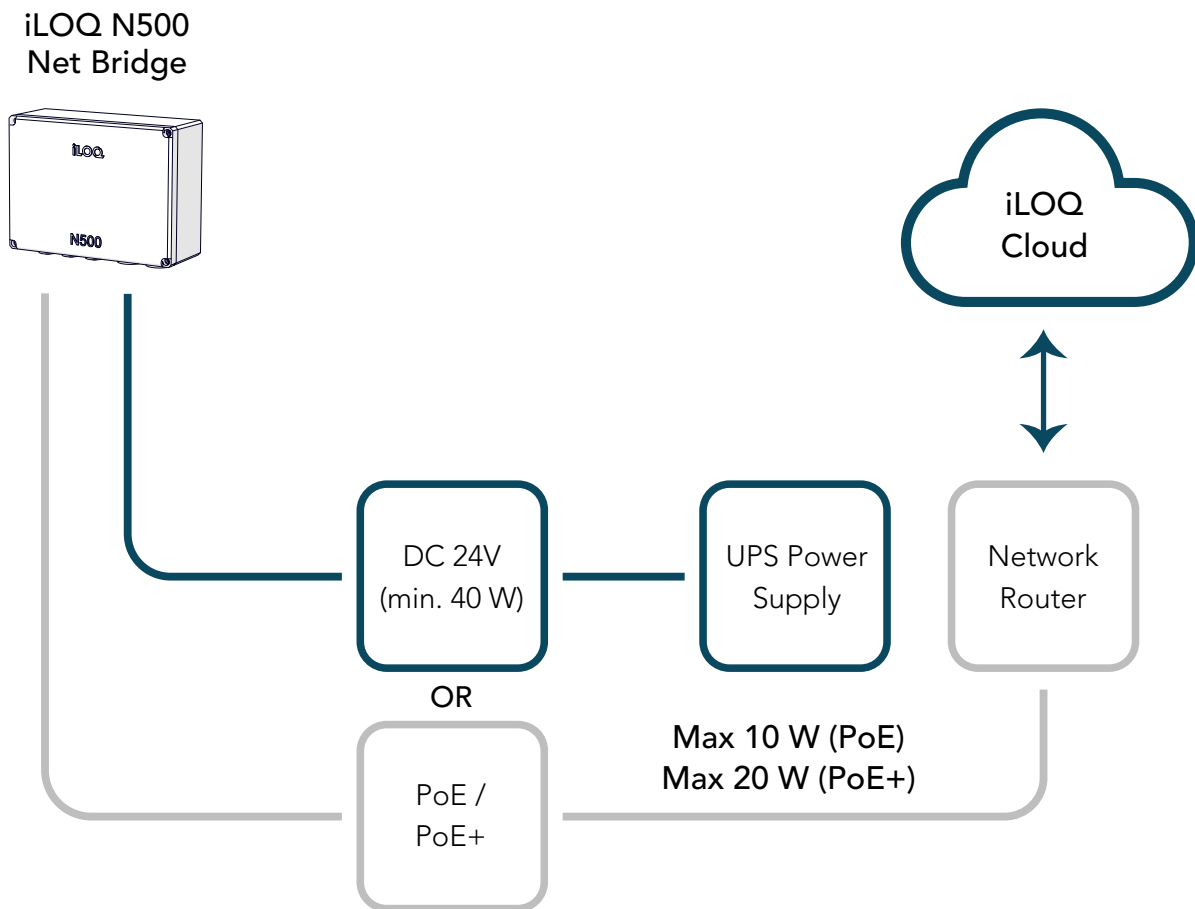
**Table 4. Cabling requirements**

Cable type*	MHS / JAMAK / KJAAM
Min. for single wiring*	2 x 2 wires
Min. for double wiring**	3 x 2 wires

\* The iLOQ Bus requires a minimum of 4 wires for the iLOQ devices. Please note that external devices may require more wires.

\*\* Do not duplicate the data pair.

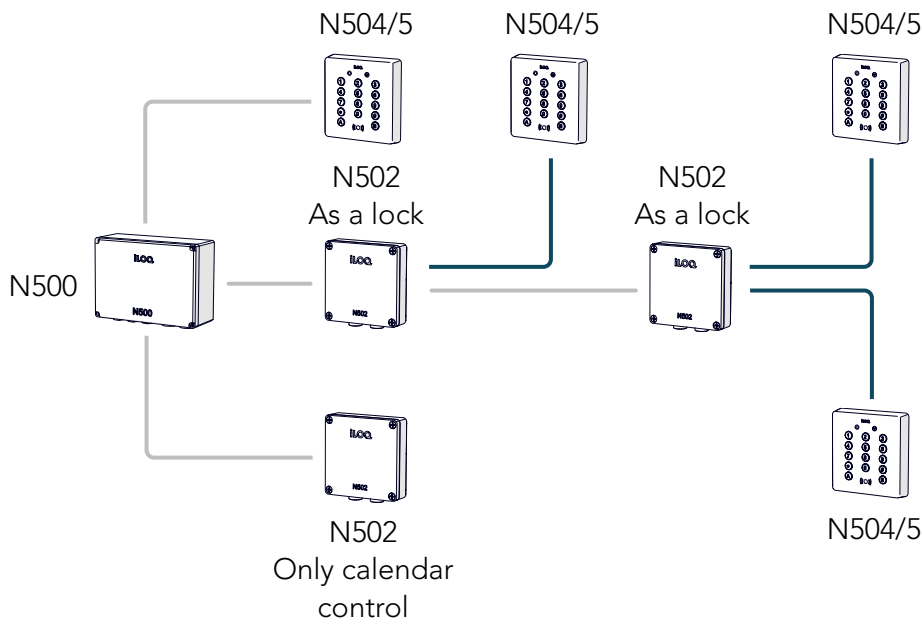
Bus power supply options and max. available bus power:



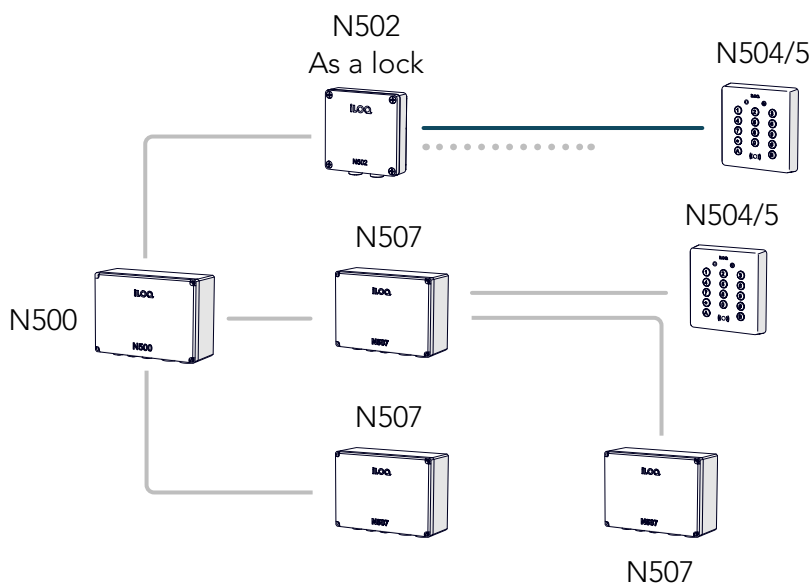
# 8. Installation options

Main bus  Reader bus  Optional 

iLOQ N502 Online Door Module  
N500 Net Bridge with N502 Online Door Module



iLOQ N507 Online I/O Module  
N500 Net bridge with N507 Online I/O Module



## 9. System configuration examples

The following examples have been tested and proven for different wiring and device configurations. Use the [calculation tool](#) to make sure that the designed configuration meets the bus requirements.

### One branch configuration:

This example shows one branch configuration (1x100 m). The branch has 6 bus devices: 6 readers and 6 door modules.

- Each pair of devices (NFC reader and door module) has a total power consumption of **2.5 W**
- The total combined power consumption is approx. **15 W** when all bus devices are counted together

#### Main bus

MHS 10 x 2 x 0.5 mm

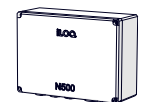
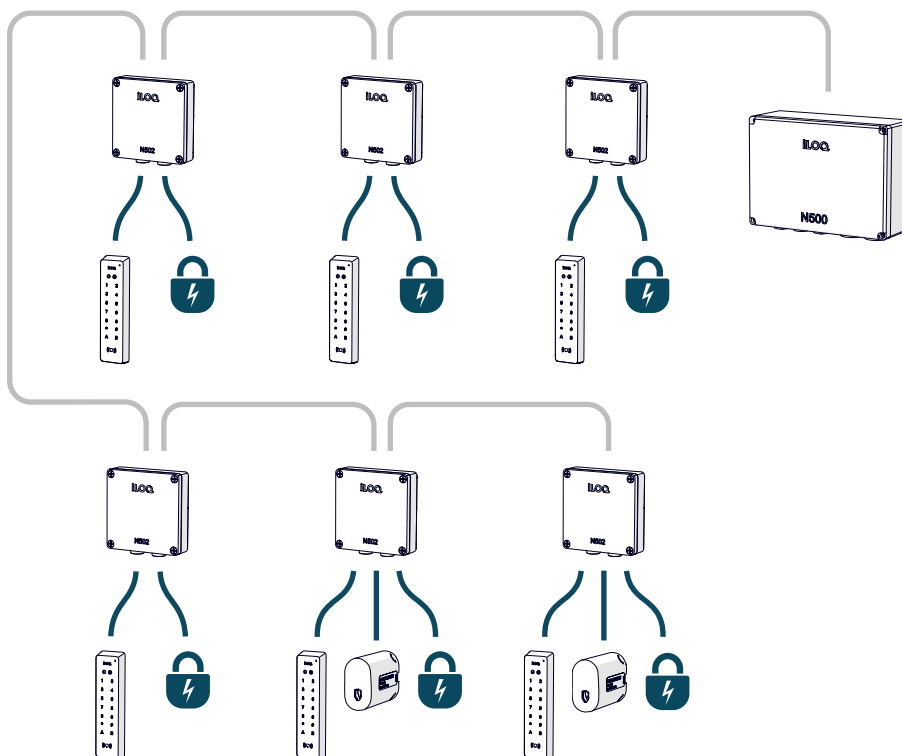
- Double wiring, 6 wires to door module
- ( 2 wires data and 4 wires voltage )
- Leftover wires for customer-specific use

#### Door cable / Reader bus

Use a twisted and shielded pair cable for the reader whenever possible

- 4 wires to iLOQ NFC Reader
- 2 wires to iLOQ Cylinder
- Min. 2 wires to lock device

Max. bus length from Net Bridge to last device is 300m (984 ft)



N500 (5 W)



N502 (1 W)



N504i (1.5 W)



iLOQ C55.X  
Cylinder



Lock  
device



### Three-branch configuration:

This example shows three-branch configuration (3x100 m). Each branch has six bus devices: three readers and three door modules.

- Each pair of devices (NFC reader and door module) has a total power consumption of **2.5 W**
- The total combined power consumption is approx. **22.5 W** when all bus devices are counted together

#### Main bus

MHS 10 x 2 x 0.5 mm

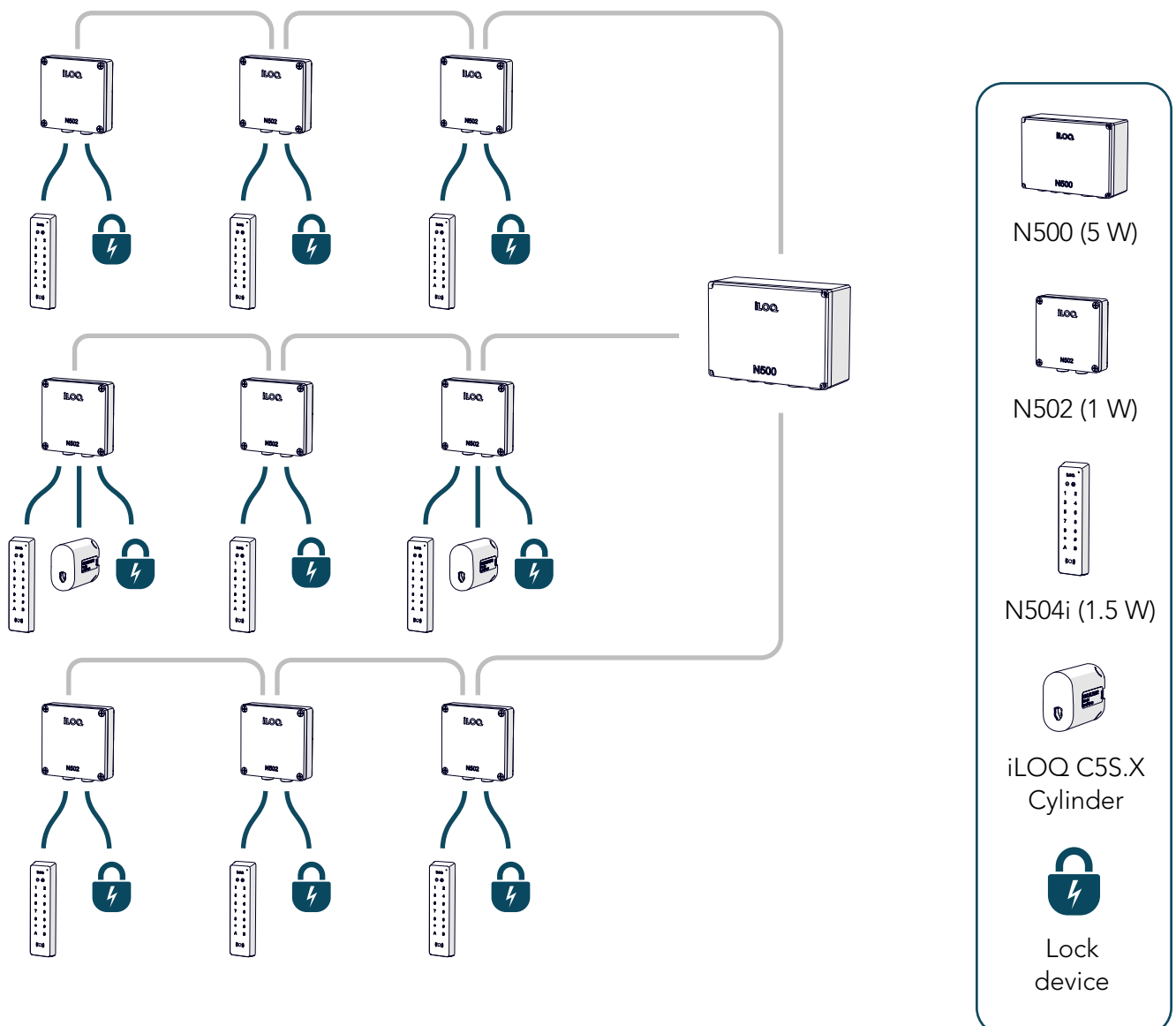
- Double wiring, 6 wires to door module
- ( 2 wires data and 4 wires voltage )

#### Door cable / Reader bus

Use a twisted and shielded pair cable for the reader whenever possible

- 4 wires to iLOQ NFC Reader
- 2 wires to iLOQ Cylinder
- Min. 2 wires to lock device

Max. bus length from Net Bridge to last device is 300m (984 ft)



## 10. Hotspot installation

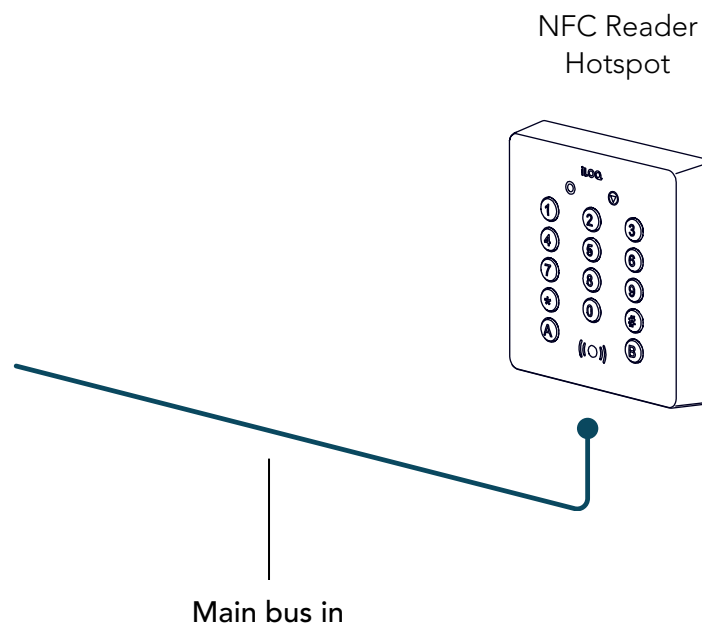
An iLOQ NFC Reader connected directly to the main bus acts as a hotspot for updating keys.



NOTE! The iLOQ NFC Reader cannot be the only device in the main bus. There has to be at least one programmed iLOQ N502 Online Door Module or iLOQ N507 Online I/O Module.



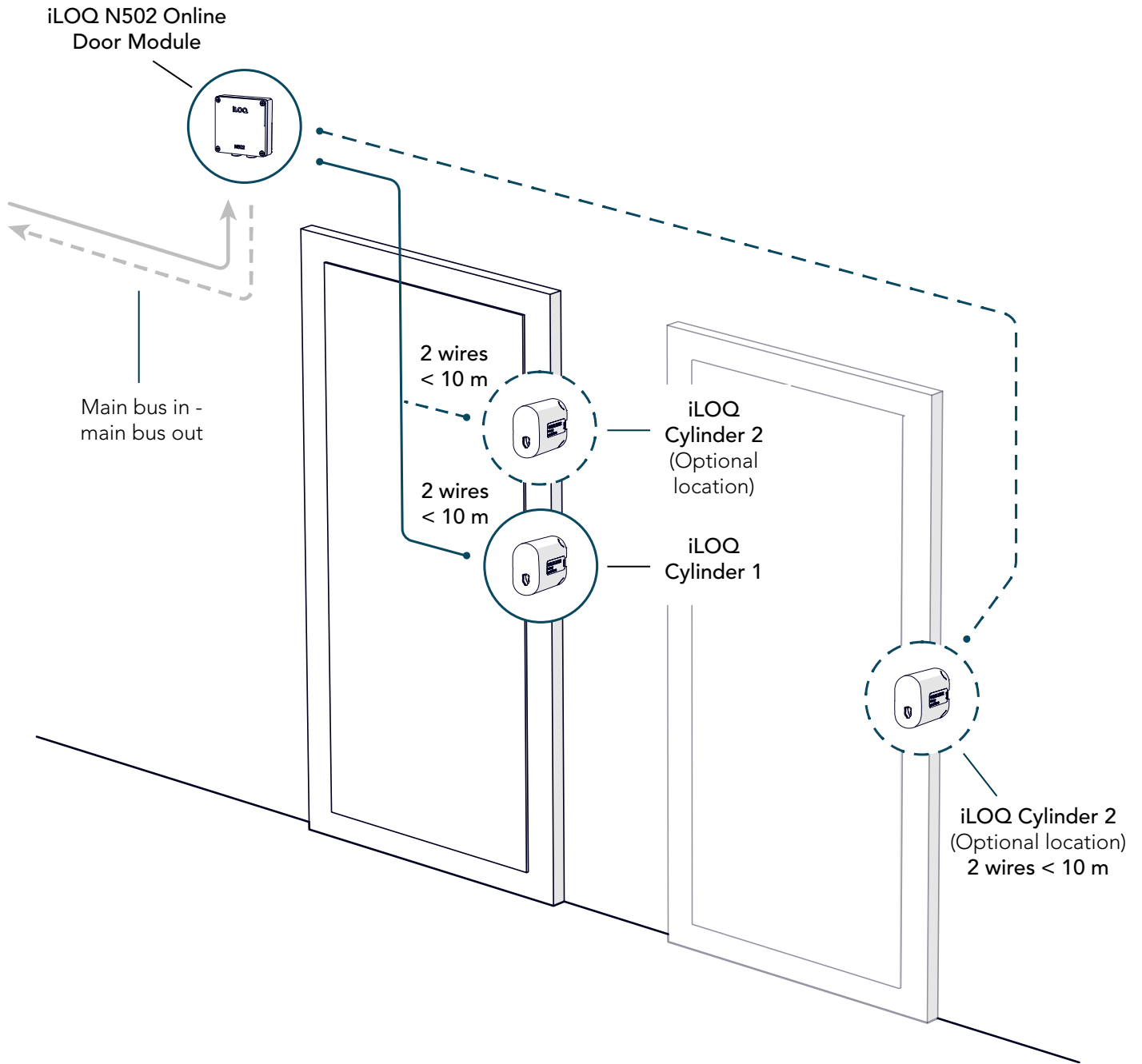
NOTE! An iLOQ NFC reader connected to the main bus is always the last device of that branch (reader is terminated).



# 11. Door environment installation examples

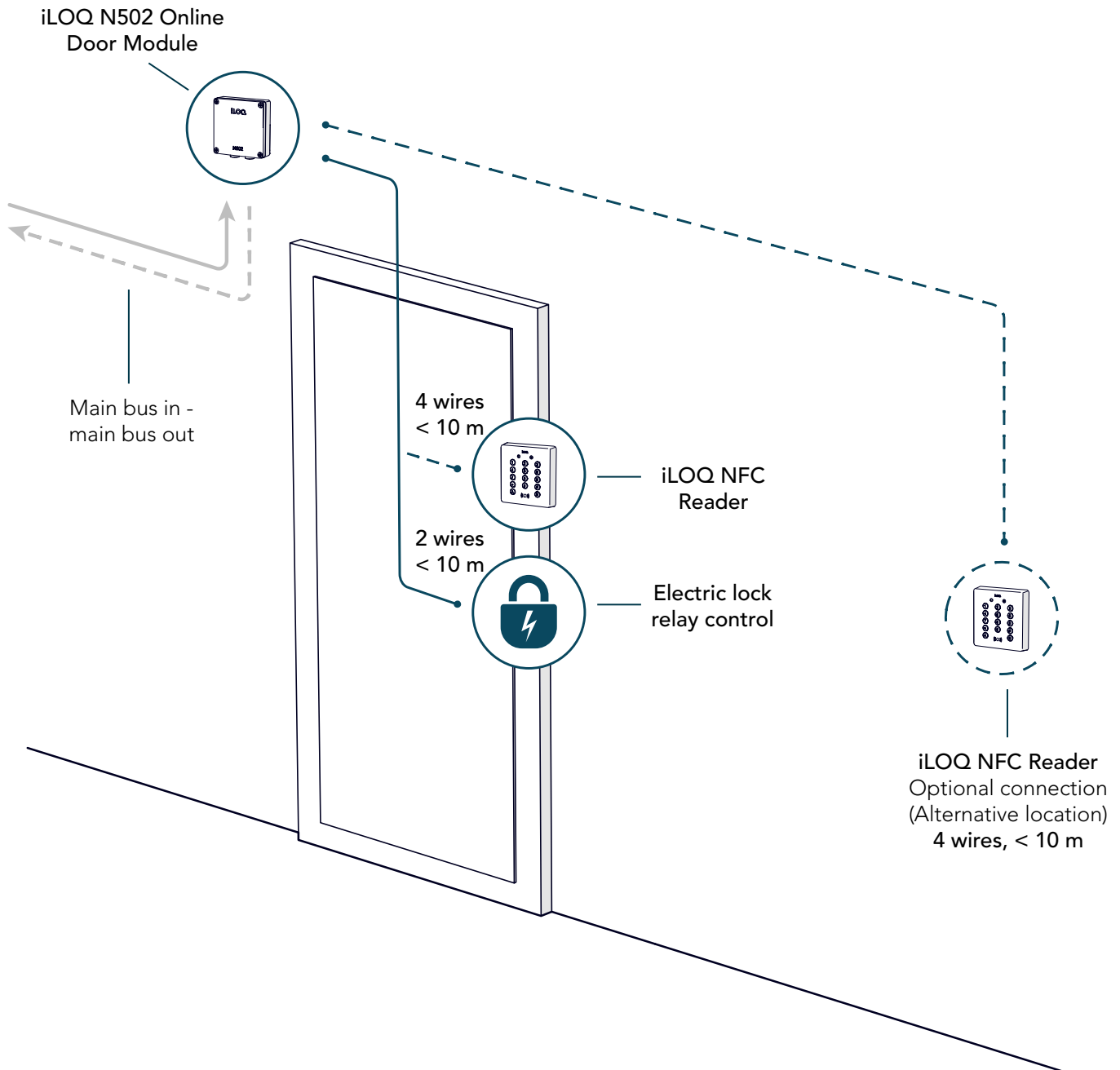
## 11.1 Example A

An iLOQ N502 Online Door Module without an NFC reader, cylinders connected.



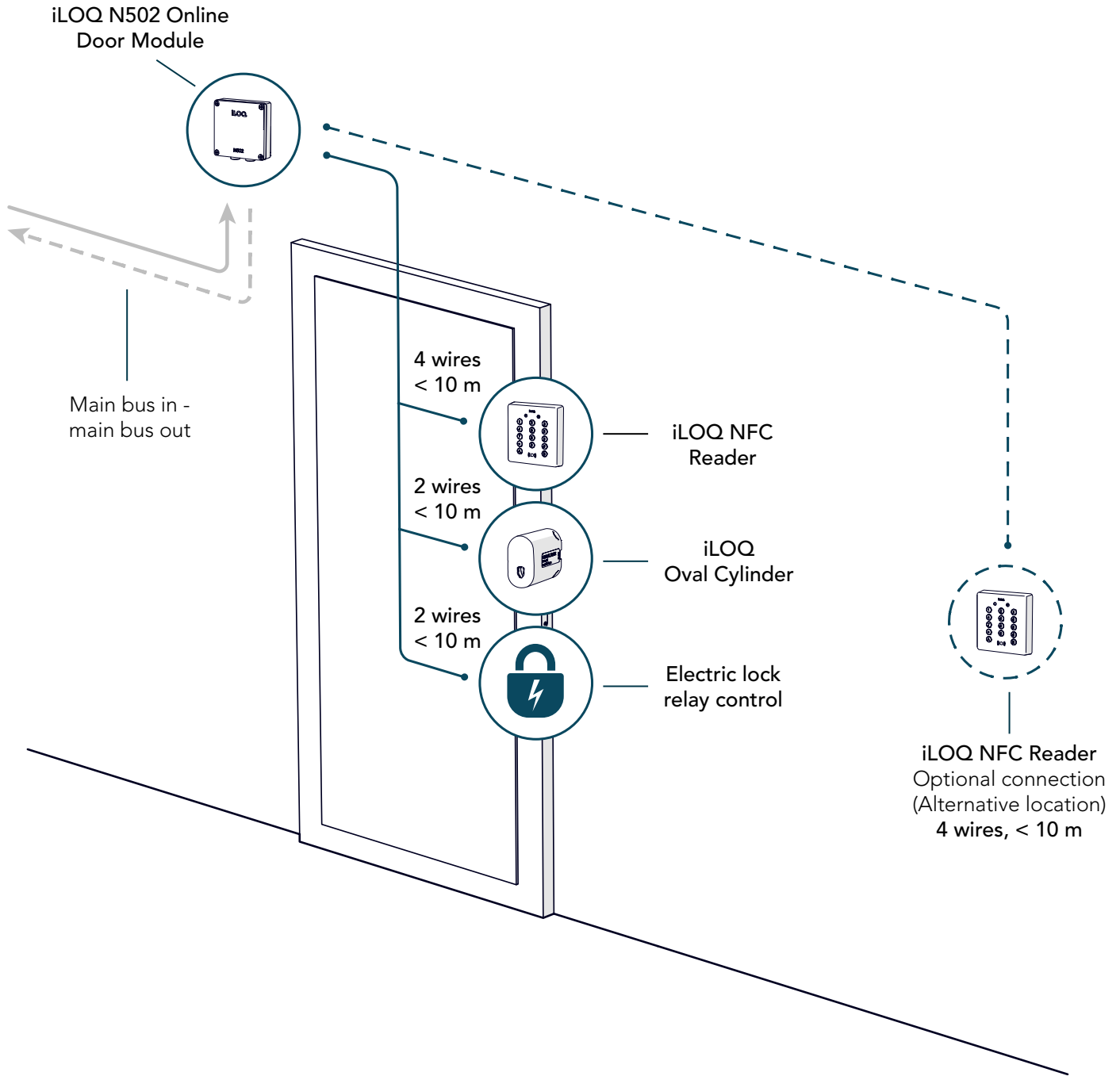
## 11.2 Example B

An iLOQ N502 Online Door Module with an NFC reader and an electric lock.



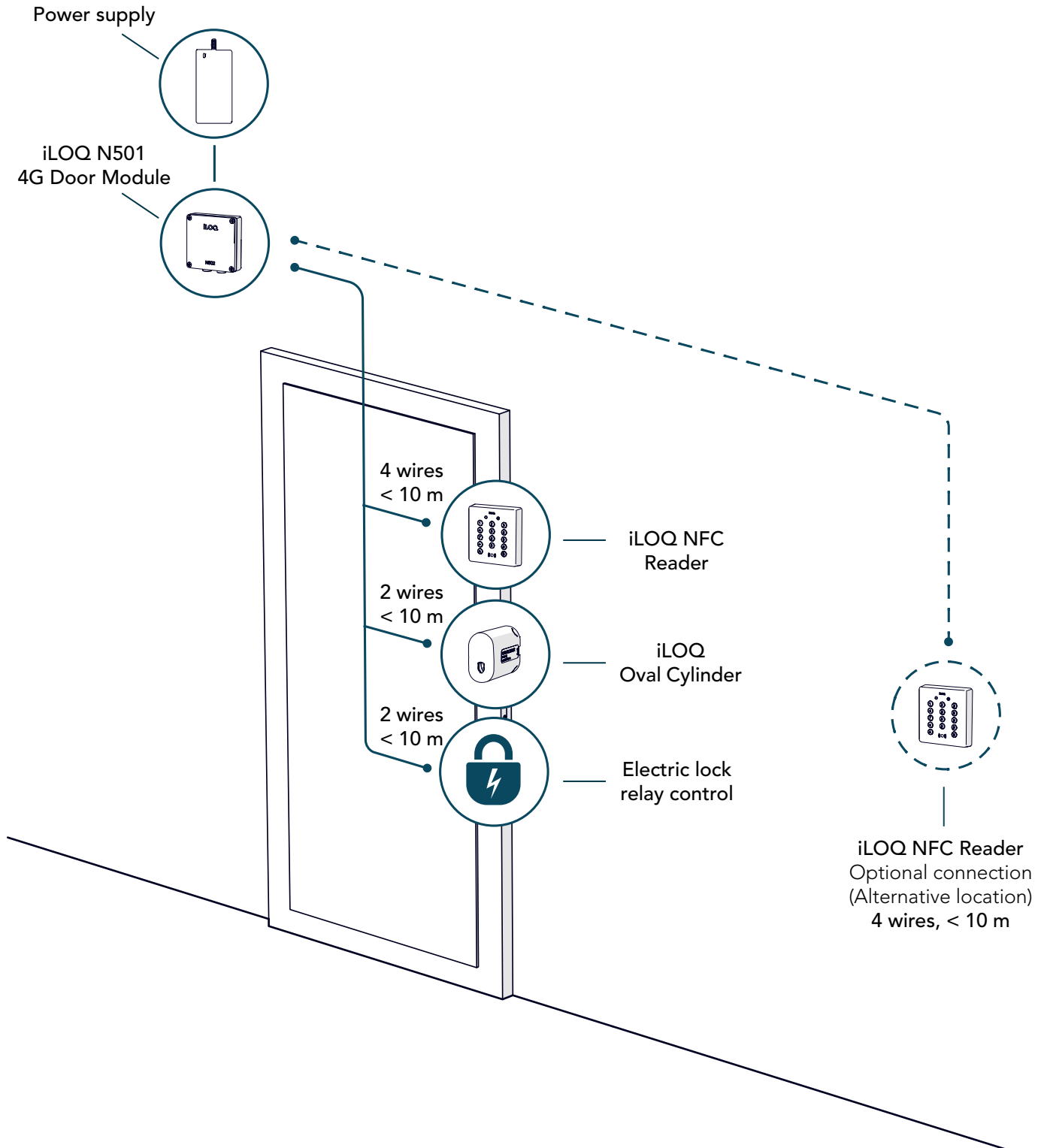
### 11.3 Example C

An iLOQ N502 Online Door Module with an NFC reader and a cylinder connected.



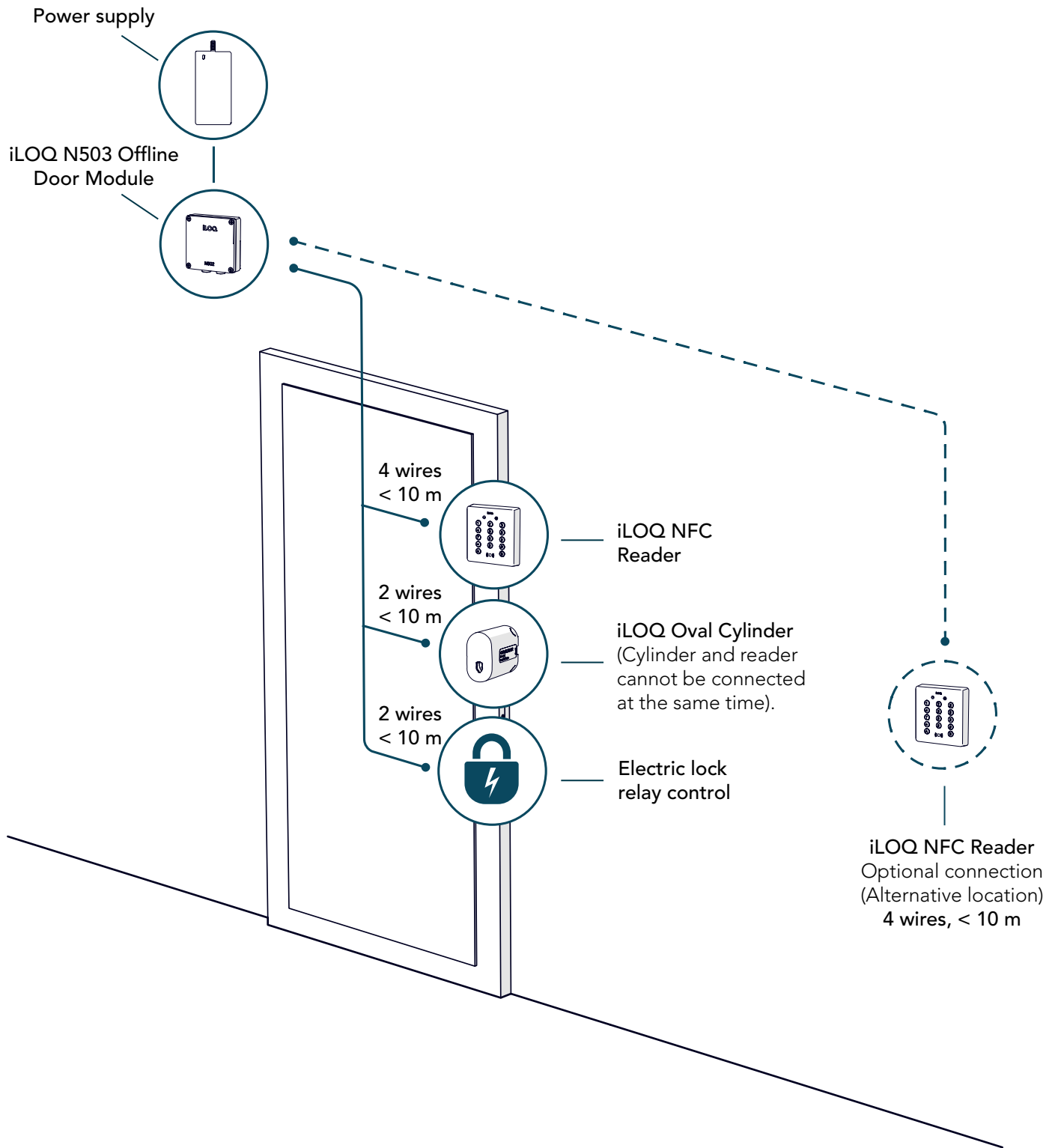
## 11.4 Example D

An iLOQ N501 Standalone Door Module with an NFC reader, oval cylinder and an electric lock.



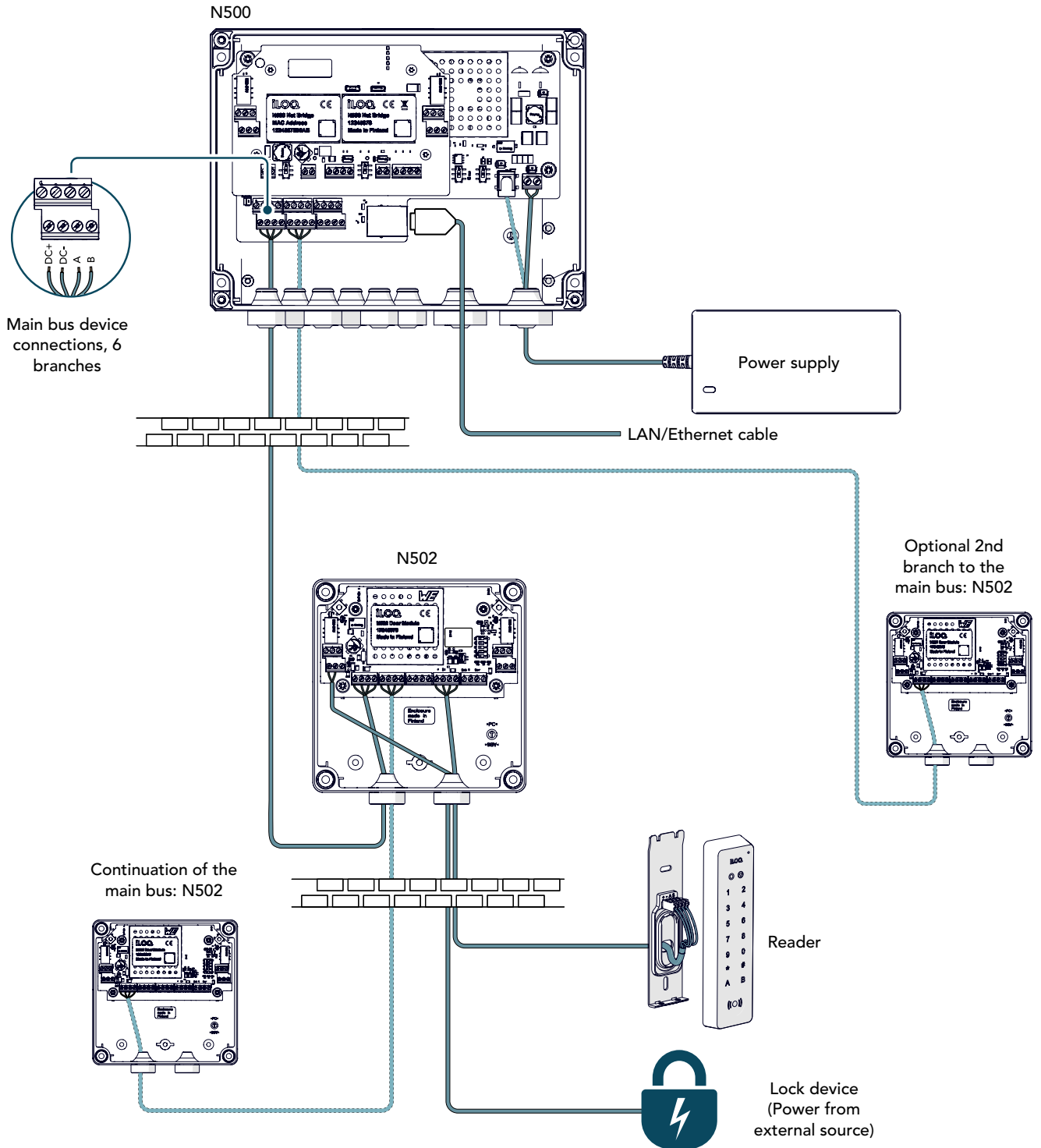
## 11.5 Example E

An iLOQ N503 Offline Door Module with an NFC reader, oval cylinder and an electric lock.



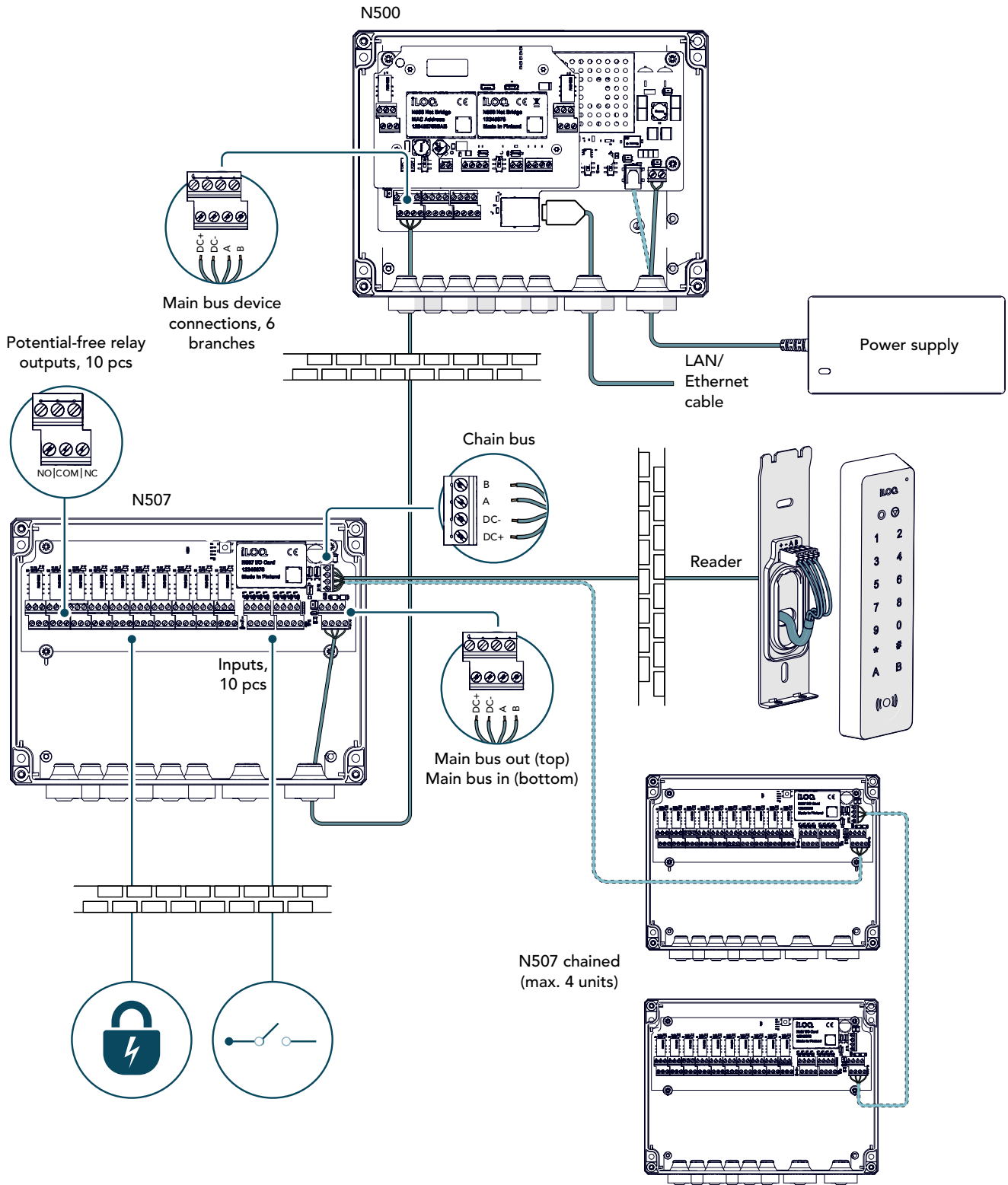
# 12. Wiring

## 12.1 Example of wiring for the iLOQ N500-N502 modules

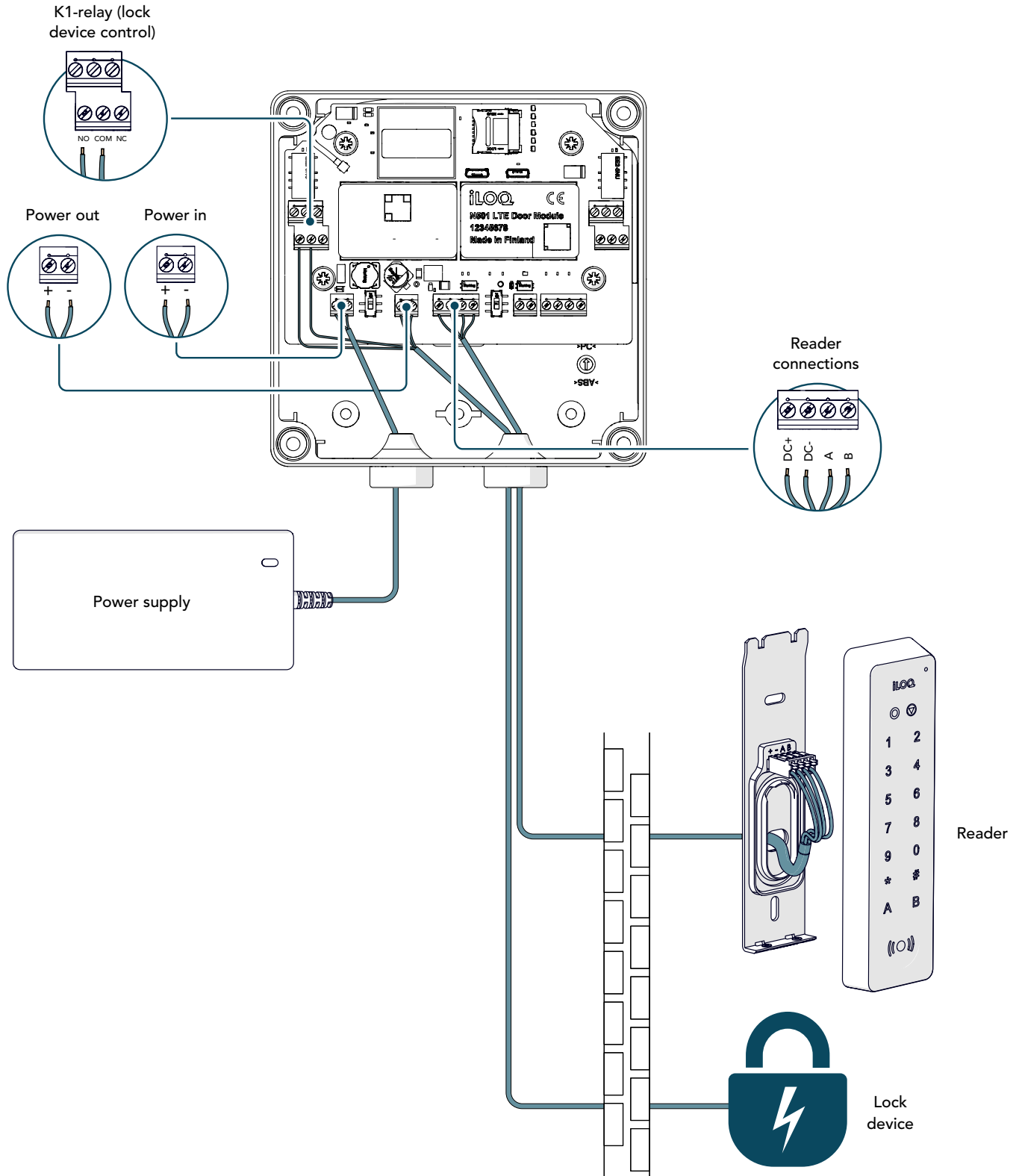




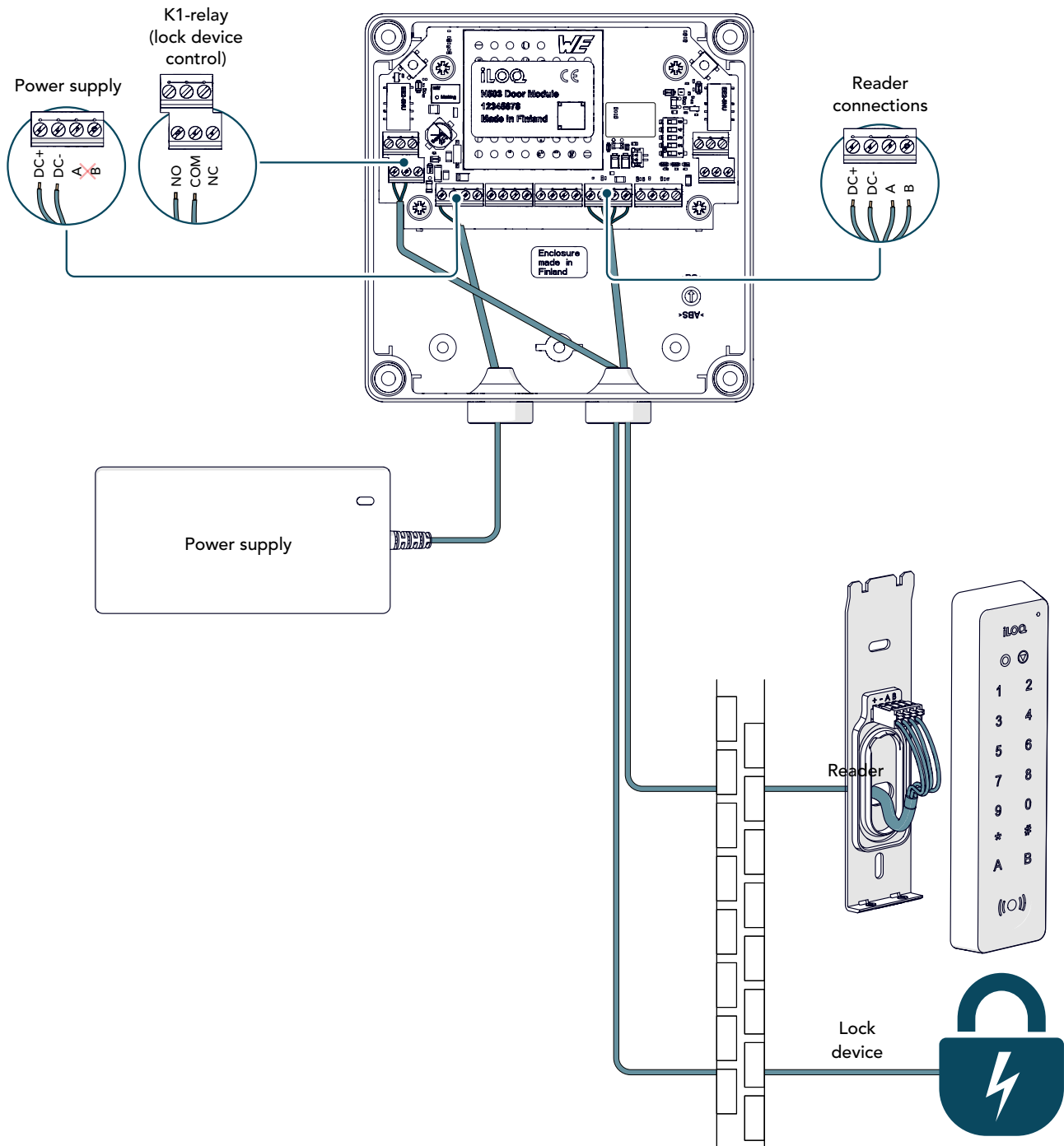
## 12.2 Example of wiring for the iLOQ N500-N507 modules



## 12.3 Example of wiring for the iLOQ N501 Standalone Door Module



## 12.4 Example of wiring for the iLOQ N503 Offline Door Module





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**Online System**

Planning guide

**iLOQ**

[support.iloq.com](https://support.iloq.com)

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