

S5 Online system Planning guide

This document provides instructions, installation examples and connection diagrams for the iLOQ S5 Online system. The system consists of the iLOQ N500 Net Bridge and connected iLOQ bus devices.

These instructions are for a single Net Bridge installation. The system can have several Net Bridges and the principles apply for every Net Bridge in the system.

MAIN PARTS OF THE ILOQ S5 ONLINE SYSTEM

N500 Net Bridge



The N500 Net Bridge acts as a central unit of an iLOQ Online system. The 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.

Maximum power consumption per device **3W**.

N501 4G Door Module



The 4G Door Module is a stand-alone 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 a lock cylinder or RFID reader is 10m. 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 **3W**.

N502 Door Module



The Door Module is connected to a 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 a lock cylinder or RFID reader is 10m. 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 **1W**.

N504i/N505i/N506i RFID Reader & Hotspot



The iLOQ Reader & Hotspot is an online reader connected either directly to the N500 Net Bridge or via the N502 Door Module. The Reader & Hotspot can be used in two ways:

- When connected directly to the Net Bridge via the main bus, it works exclusively as a hotspot. Thus, it is possible to send updated tasks to the hotspot, for example: key access rights and time restriction updates.
- If the Reader & Hotspot is connected to an N502 Door Module via a reader bus, it can function as a key reader. 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.

Maximum power consumption per device **1.45W**.

N507 Relay Card



The iLOQ N507 Relay Card contains 10 relays and 10 inputs. The Relay Card can act as an individual relay card when it is programmed, or as an extension relay card to N502 when un-programmed.

Maximum power consumption per device **1W**.

C5S.xx.xx Oval Cylinder*



*Only available in Scandinavia.

The iLOQ lock 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.

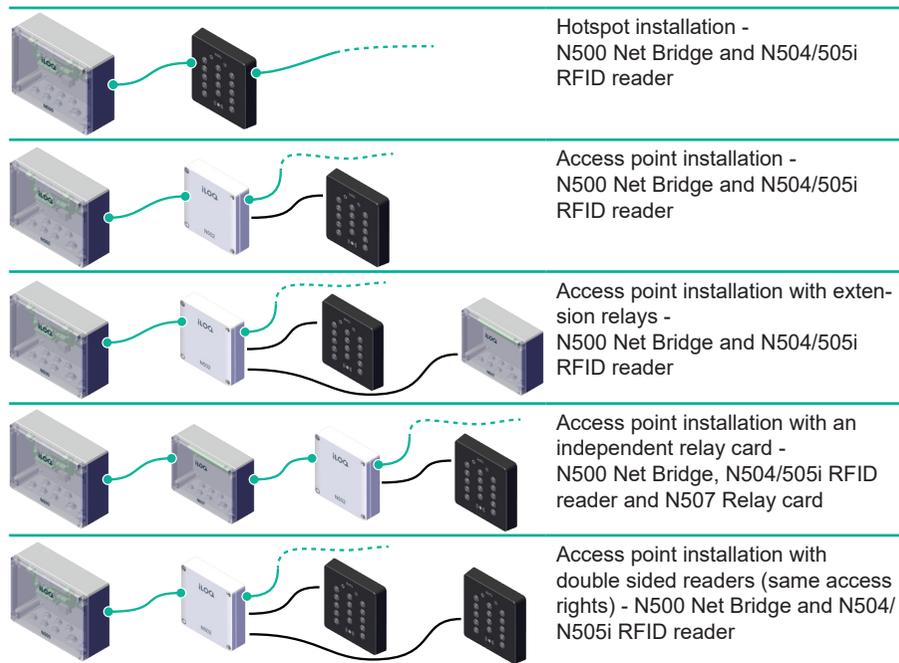
TERMS USED IN THE MANUAL

iLOQ Manager	<p>All administration of the system is done via the iLOQ Manager software. The software is a cloud service that is available 24/7 over the Internet.</p> <p>The iLOQ Manager controls users, system 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.</p> <p>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>	L1 and L2 BUS	Dedicated bus/connector for iLOQ C5S.xx.xx lock cylinders.
Potential free relay output	K1 and K2 relays on N502 door module	Lock device	Device connected to K1 or K2 relay
MAIN BUS	The RS485 bus wiring is the main bus that enables to transfer data and power to the connected bus devices. Bus communication is encrypted with AES-256 encryption in the device-to-device network.		
BRANCH	The N500 Net Bridge has a main bus connector for six branches. Thus, the main bus can be divided into six branches to have more flexibility for wiring options.		
BUS DEVICE	Each device connected to the main bus is considered a bus device.		
READER BUS	<p>The reader bus is dedicated for communication between an N502 and an N50x Reader.</p> <p>The reader bus is also used when an N507 Relay Card is connected as an extension relay for an N502 Door Module.</p>		
INTERNAL BUS (CHAIN)	The internal chain bus is dedicated for stacking 2-5 pieces of N507 Relay Cards to one combined relay extension.		

BASIC PLANNING GUIDELINES

- The iLOQ N500 Net Bridge works as a central unit. It has one main bus. The bus can be divided into six branches. The branching must always start from the Net Bridge (see *Table 2* in chapter *Bus specifications*).
- The maximum number of connected iLOQ bus devices depends on the chosen power supply, branch cable length and overall power consumption generated by iLOQ bus devices and cable losses.
- Calculate the overall bus power consumption by adding up the overall power consumption from all branches:
 1. See Figure 1 to check the iLOQ bus device power consumption of a single installation.

Table 1. Installation options



2. Add up power consumption of all the installations in a single branch to get the cumulative power consumption of iLOQ bus devices.
3. Use the **calculation tool** to check the overall power consumption of a single branch, including cable losses.

Note! It is possible to use double wiring to power the bus. This decreases cable losses, thus increasing the number of connected iLOQ bus devices.

4. Add up the overall power consumption of all branches. Make sure that the overall power consumption does not exceed the available bus power that depends on the chosen power supply (see *Table 3* in chapter *Bus specifications*).
- Place the 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 for powering only iLOQ bus devices.

Note! DO NOT use bus power for powering any other devices, such as electric locks.

However, the same DC power supply can be used for powering other external devices, such as electric locks, in addition to the Net Bridge. If this is the case, consider the number of wire pairs needed for other devices. Make sure to branch the power starting from the DC power supply connectors, not from the Net Bridge connectors. Make sure that the rated capacity of the power supply is sufficient to handle the additional load from external devices.

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

BUS SPECIFICATIONS

Table 2. Bus layout (for a single iLOQ N500 Net Bridge)

Maximum number of branches	6
Maximum number of bus devices	32
Maximum single branch length	300m
Maximum door cable length	10m

* Theoretical maximum

** See calculation tool.

Table 3. Cabling requirements

Cable type*	Cat 5 / Cat 6
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 iLOQ devices.
Please note that external devices may require more wires.

Table 4. Max. available bus power (depending on power supply)

PoE	10W
PoE+	20W
DC	30W

Table 5. iLOQ Bus device power consumption

iLOQ N502 Door Module	1W
iLOQ N504 RFID Reader	1.45W
iLOQ N505 RFID Reader	1.45W

* The iLOQ Bus voltage is 41V DC.

Compatible bus devices N502, N504i, N505i, N506 and N507.

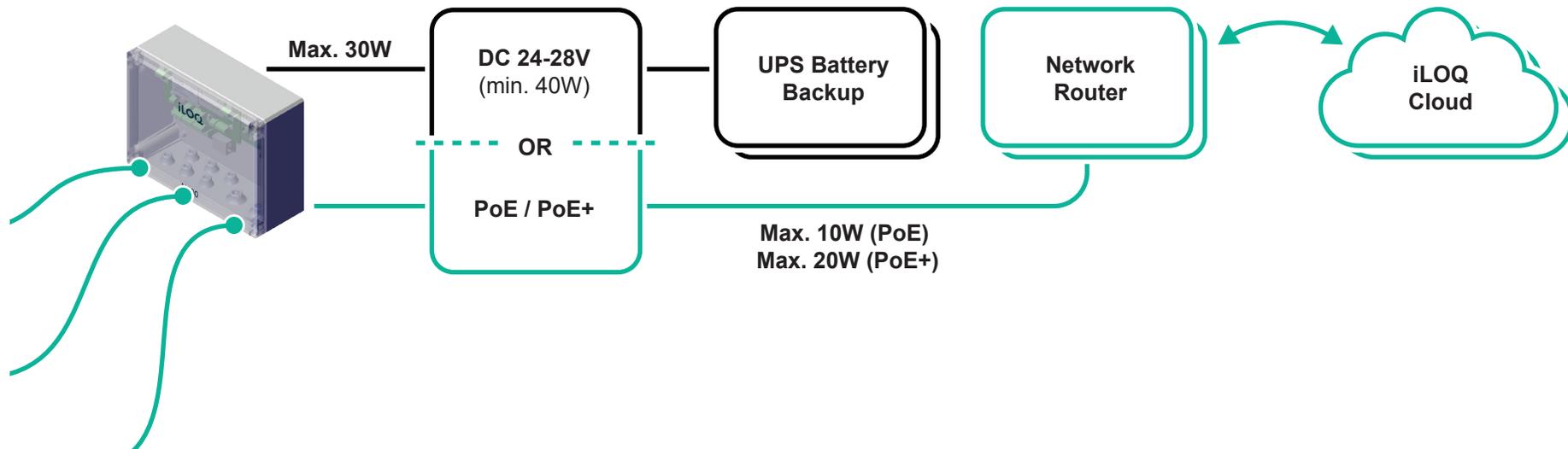


Figure 2. Bus power supply options and max. available bus power

CONFIGURATION EXAMPLES

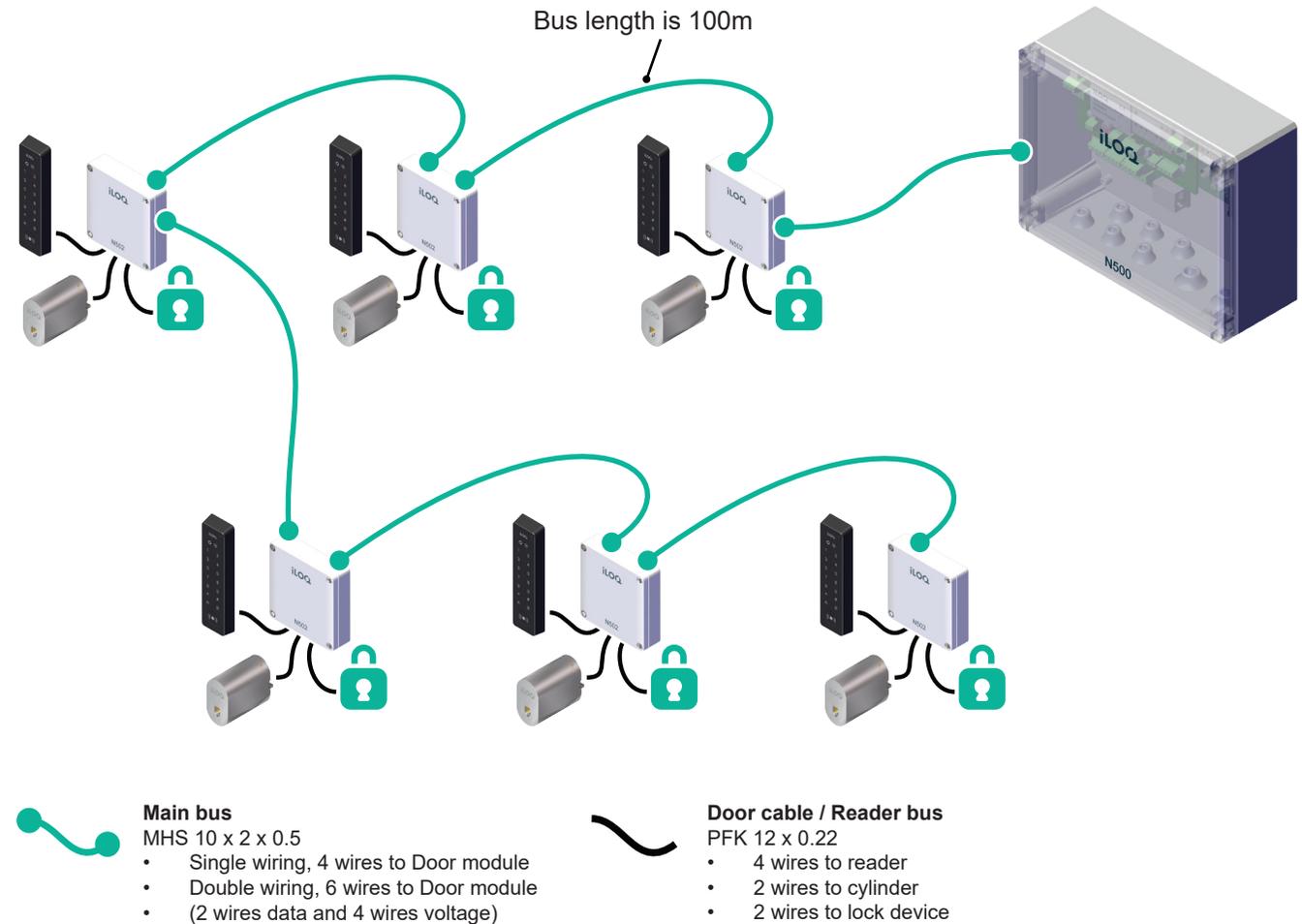
The following examples are tested and proven for different wiring and device configurations. Please note that you can use the [calculation tool](#) to make sure that the designed configuration meets the bus requirements.

CONFIGURATION A

This example shows one branch (1x100m).
The branch has 6 bus devices:
6 readers and 6 door modules.

Each pair of devices (reader and door module)
has a total power consumption of **2.45W**.

The total combined power consumption is approx.
15W when all bus devices are counted together.



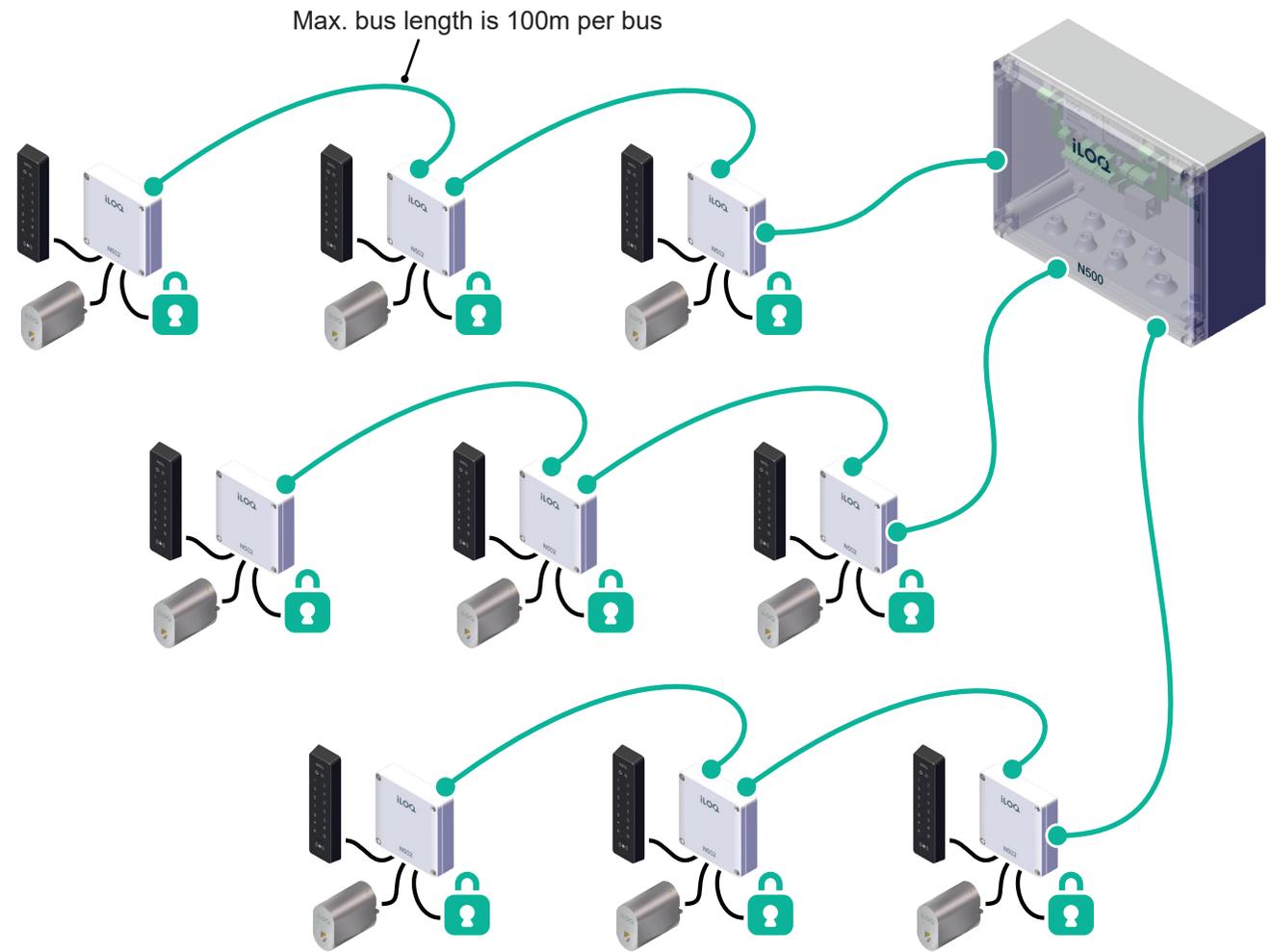
CONFIGURATION B

This example shows three branches (3x100m).
Each branch has six bus devices:
three Readers and three Door Modules.

Each pair of devices (Reader and Door Module)
has a total power consumption of **2.45W**.

The total combined power consumption is approx-
imately **22W** when all bus devices are counted
together.

	N500 Net Bridge Power consumption: 3W
	N502 Door Module Power consumption: 1W
	N504i RFID Reader Power consumption: 1.45W
	C5S.x.xx Oval Cylinder* * Only available in Scandinavia
	Lock device



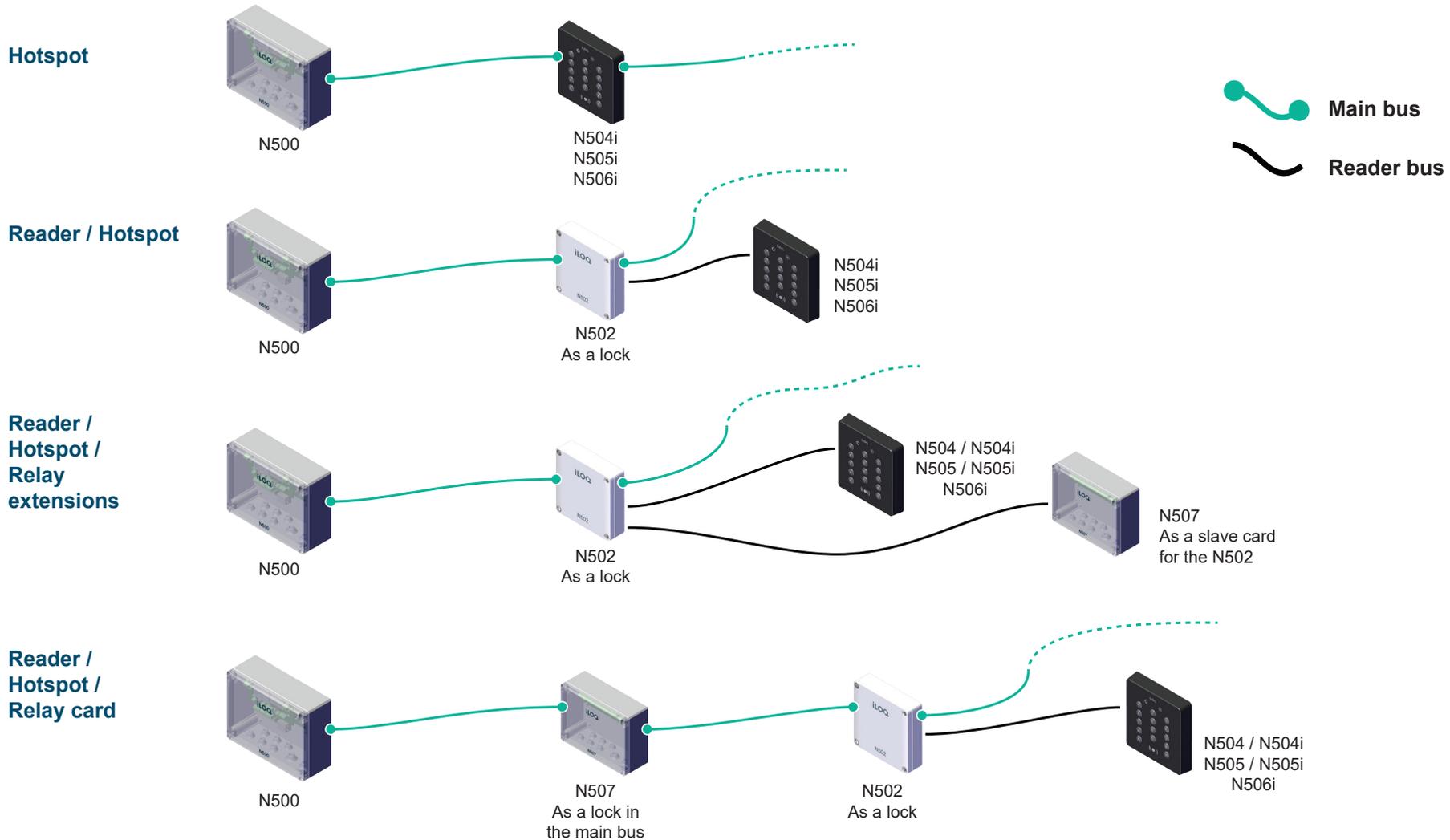
- Main bus**
MHS 10 x 2 x 0.5
- Single wiring, 4 wires to Door Module
 - Double wiring, 6 wires to Door Module
 - (2 wires data and 4 wires voltage)

- Door cable / Reader bus**
PFK 12 x 0.22
- 4 wires to reader
 - 2 wires to cylinder
 - 2 wires to lock device

ONLINE AND OFFLINE INSTALLATION EXAMPLES

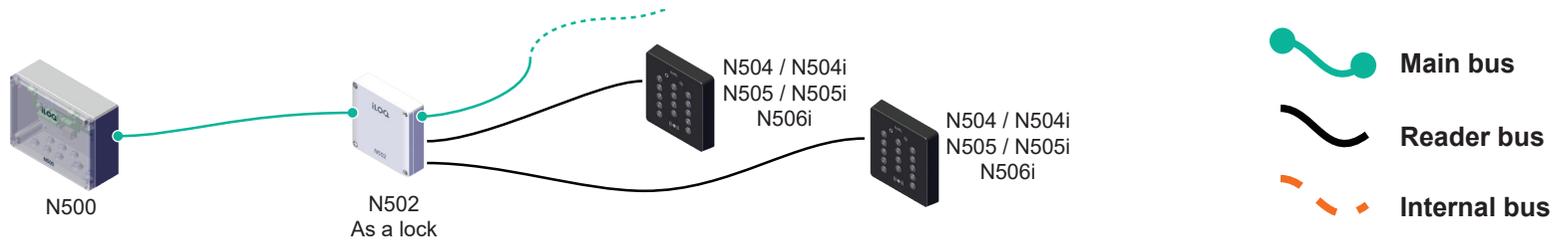
When Door Modules and Readers are connected to a server via the N500 Net Bridge, the system is considered an online installation.

ONLINE INSTALLATION A

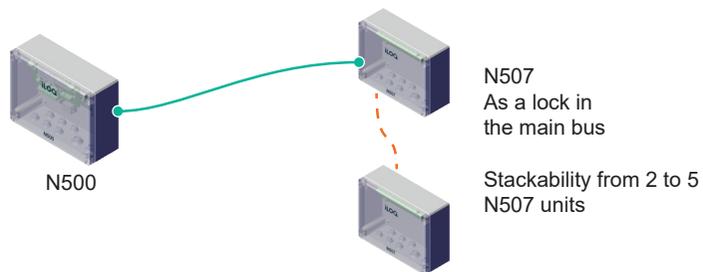
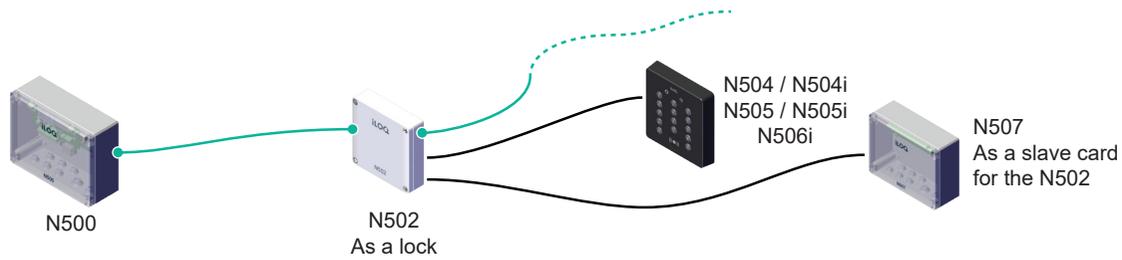


ONLINE INSTALLATION B

Double sided readers / Hotspot

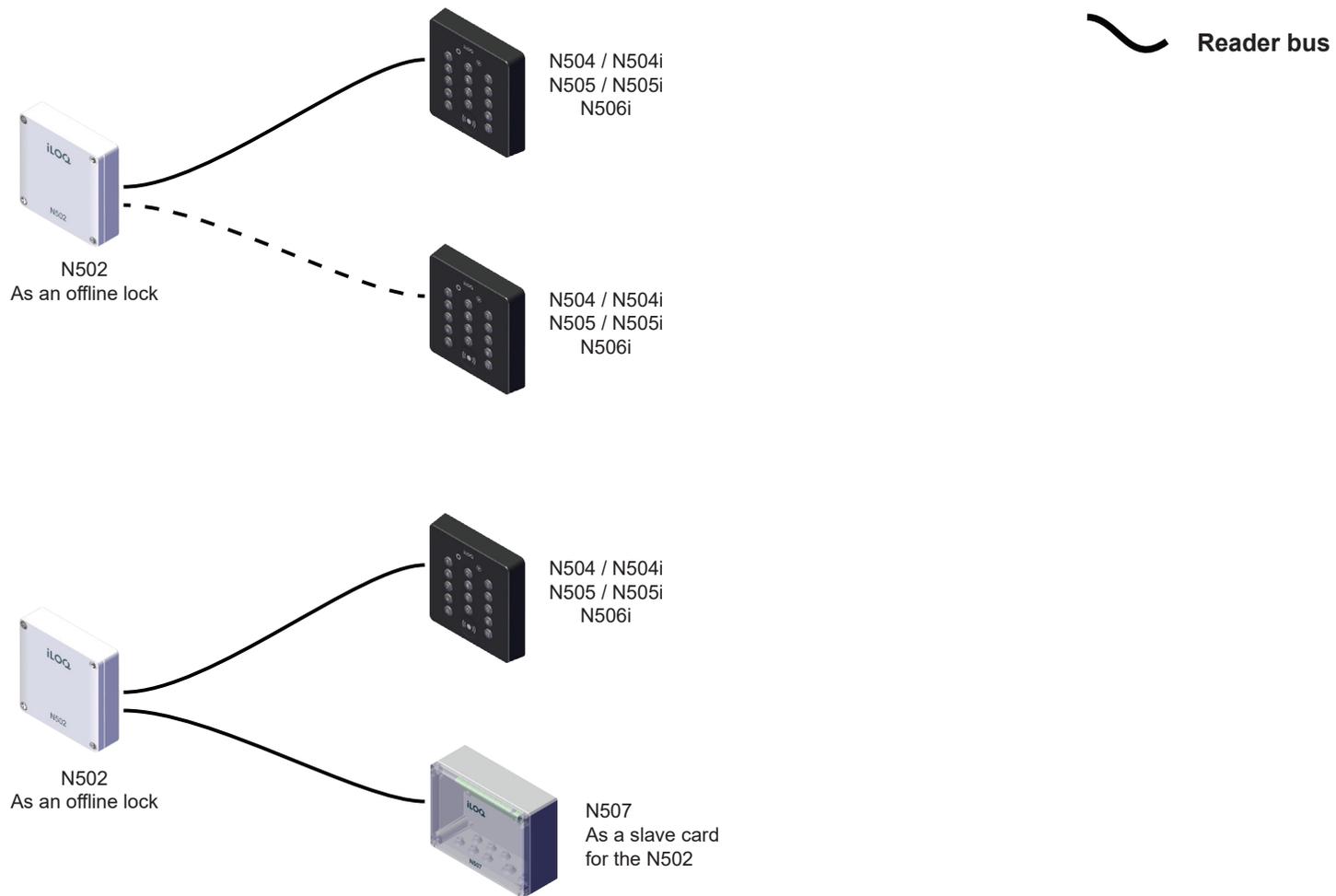


Reader / Hotspot

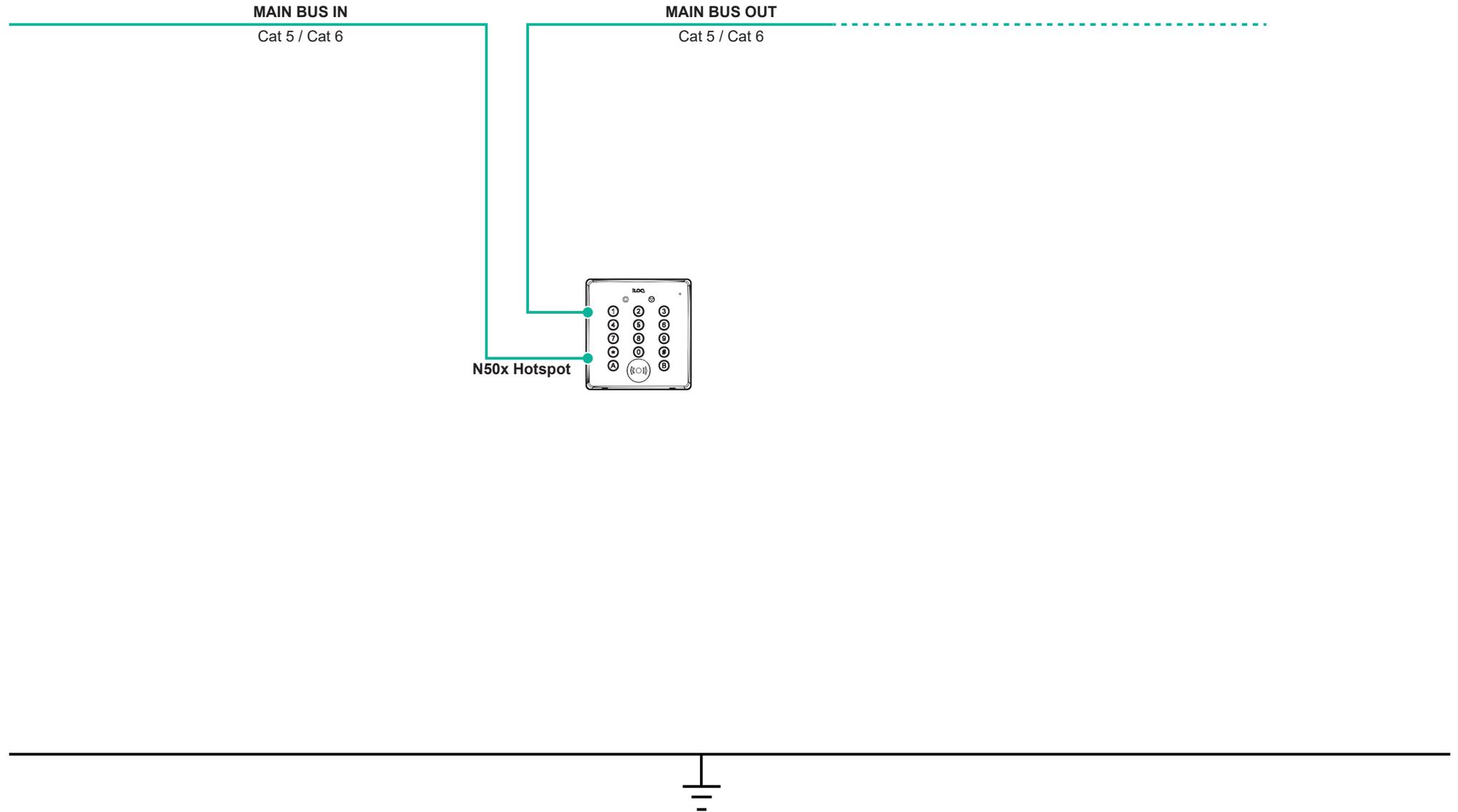


OFFLINE INSTALLATION

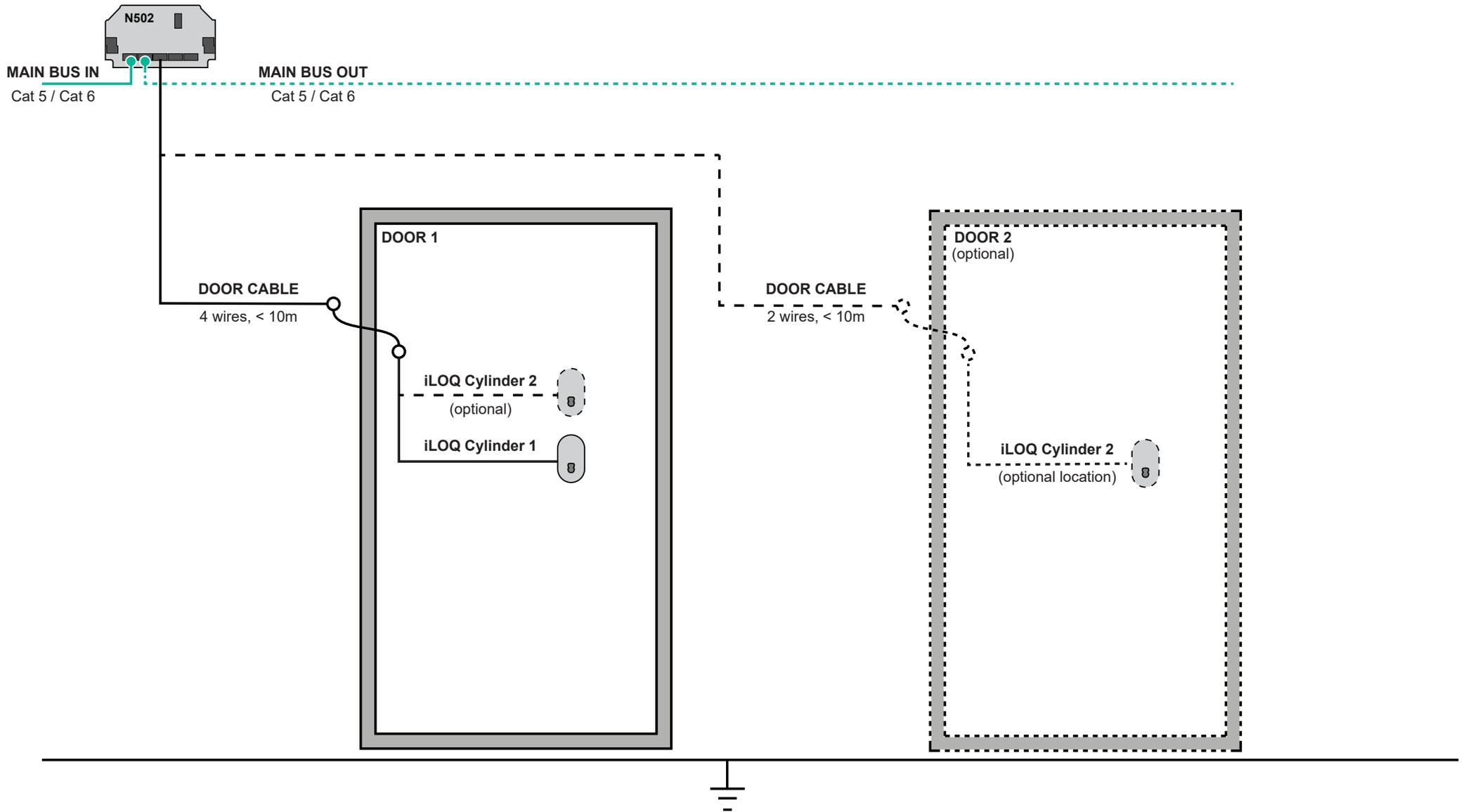
When a Door Module is installed independently without a network connection, it is considered an offline installation.



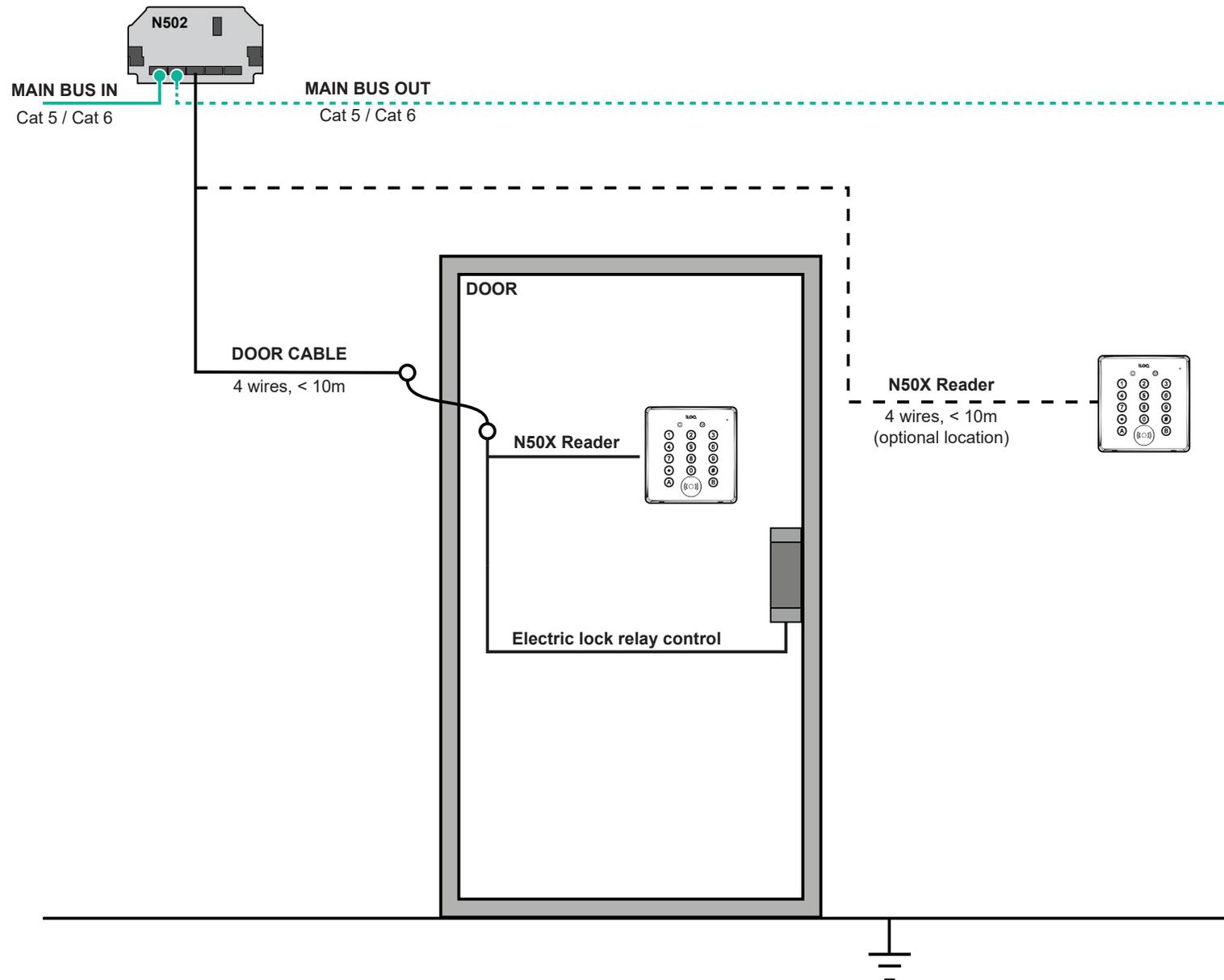
HOTSPOT INSTALLATION EXAMPLE A



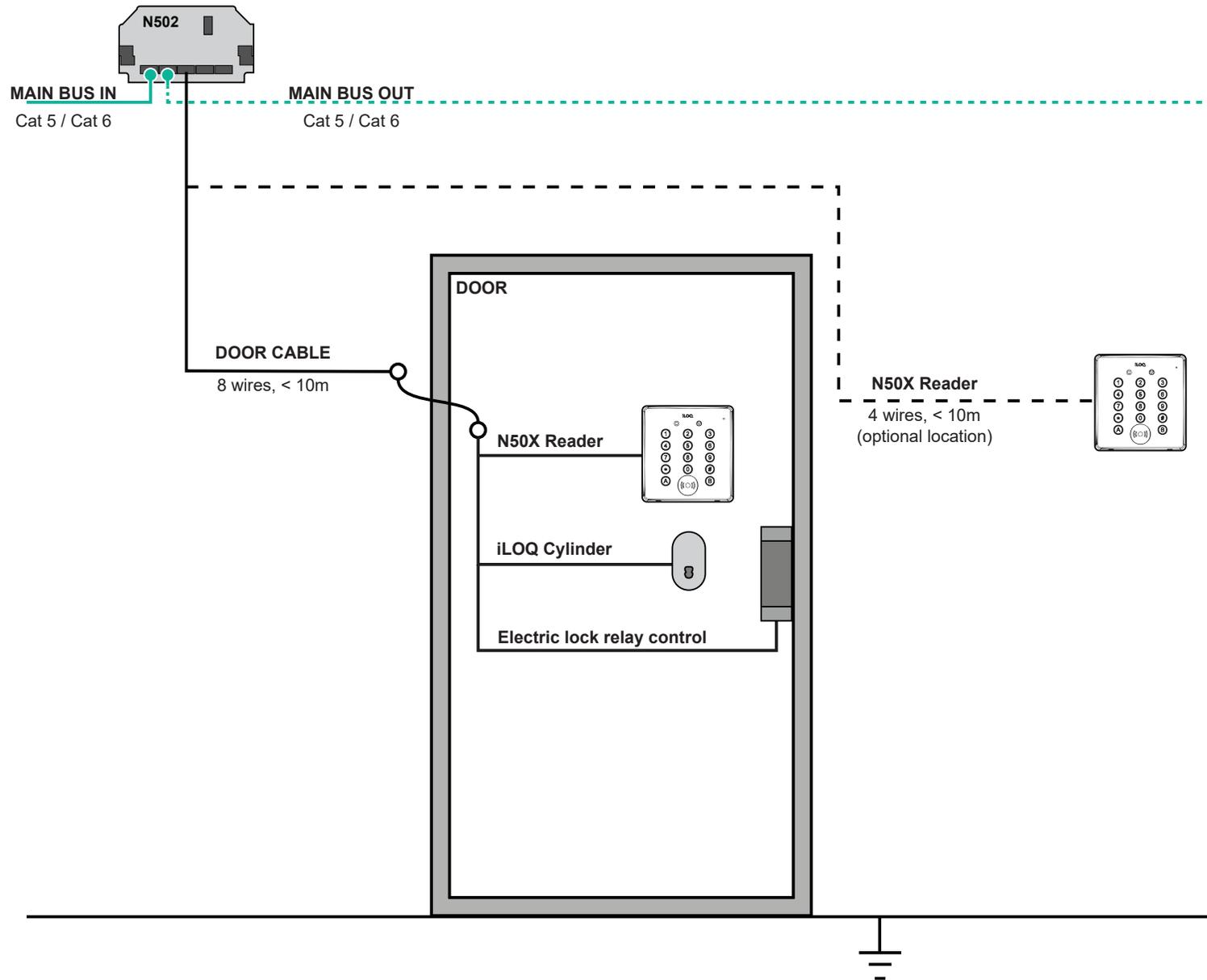
DOOR INSTALLATION EXAMPLE A



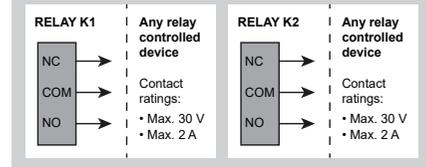
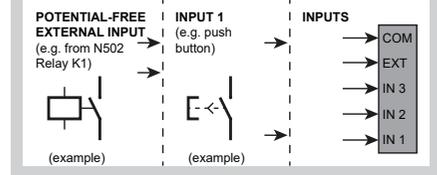
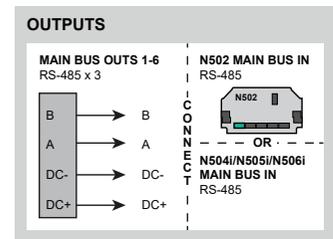
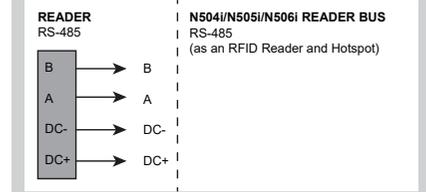
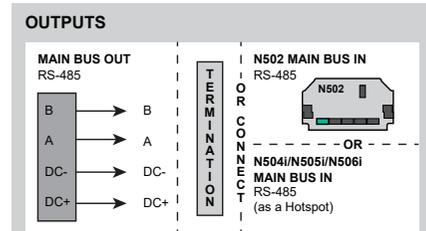
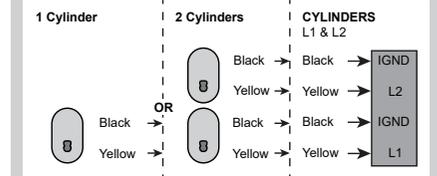
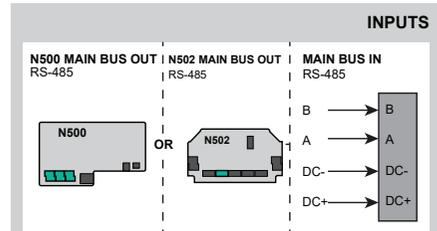
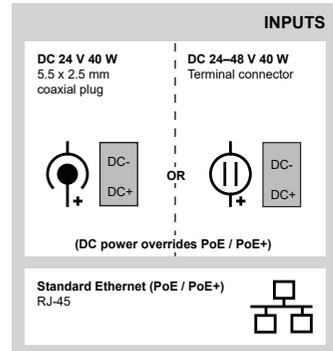
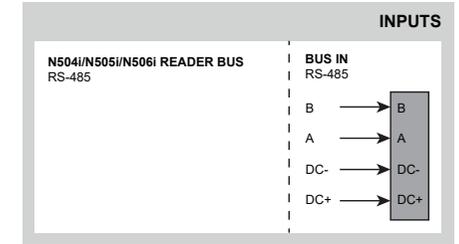
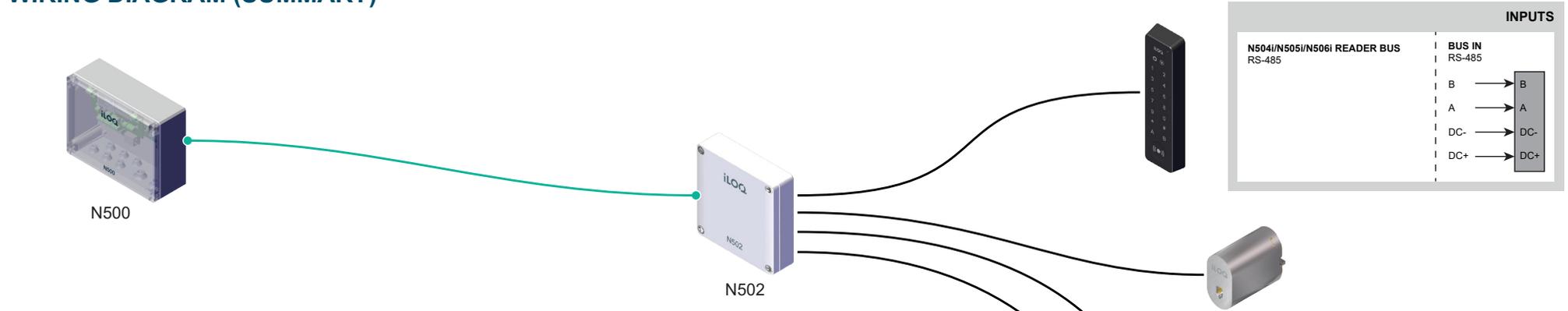
DOOR INSTALLATION EXAMPLE B



DOOR INSTALLATION EXAMPLE C

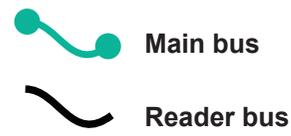


WIRING DIAGRAM (SUMMARY)

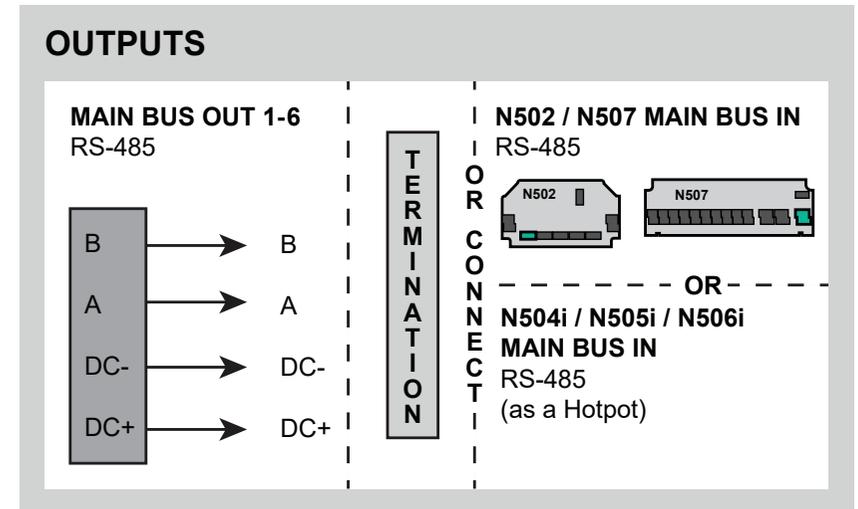
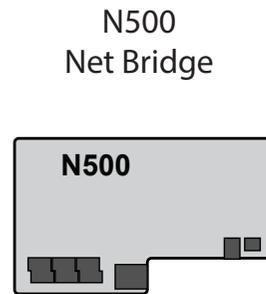
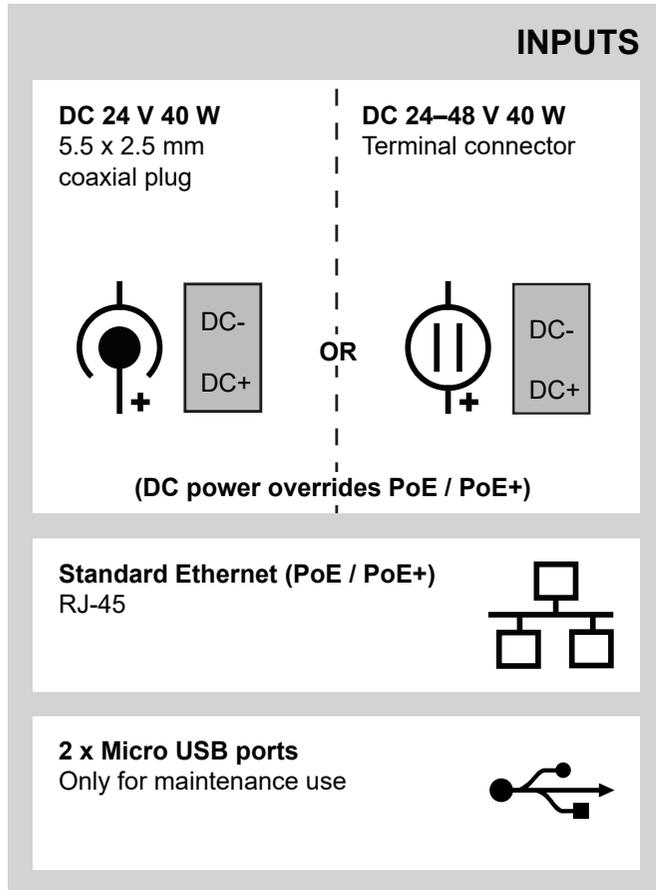


- Lock device**
- Electric lock case
 - Door magnet
 - Automatic doors

- Inputs**
- Opening button - IN1+COM
 - Lock case micro switch - IN2+COM
 - Door contact - IN3+COM
 - Conditional access - EXT/COM



WIRING DIAGRAM, POWER AND MAIN BUS



WIRING DIAGRAM, DOOR MODULE CONNECTIONS

