

# Wiring SmartIntego (RS-485)

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## Information

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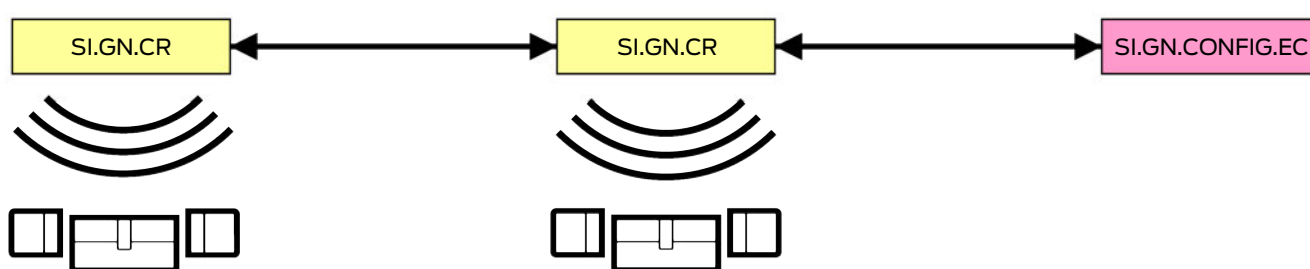
## 1 System description

This system specification describes the connection of a SmartIntego network to an existing integrator system via an RS-485 bus.

Basically, there are two different phases that the system can be in:

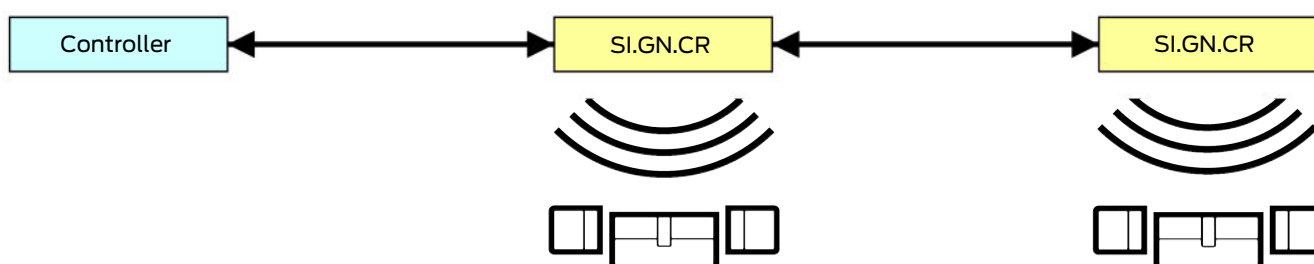
- Initial setup and configuration changes
- Operation:

### Initial setup and configuration changes



If you are connecting a SmartIntego system with an RS-485 bus for the first time or want to change its configuration, you need a configuration device (SI.GN.CONFIG.EC) to transfer the initial setup or the change with the RS-485 bus.

### Operation:



During operation, the controller of the integrator system is connected to the SmartIntego routers via an RS-485 bus. The SmartIntego routers communicate wirelessly (868 MHz in WaveNet) with network-capable SmartIntego locks, which then close or open depending on authorisation.

On an RS-485 bus, only one station may transmit at a time. If more than one participant tries to transmit at the same time, this leads to a conflict. In order to resolve conflicts independently and reduce the load on the RS-485 bus in the event of errors, SimonsVoss SmartIntego nodes (SI.GN.CR/SI.GN.CONFIG.EC) automatically restart if one of the following conditions occur at the node:

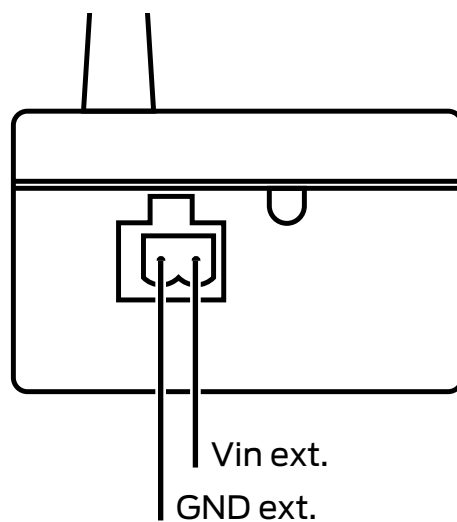
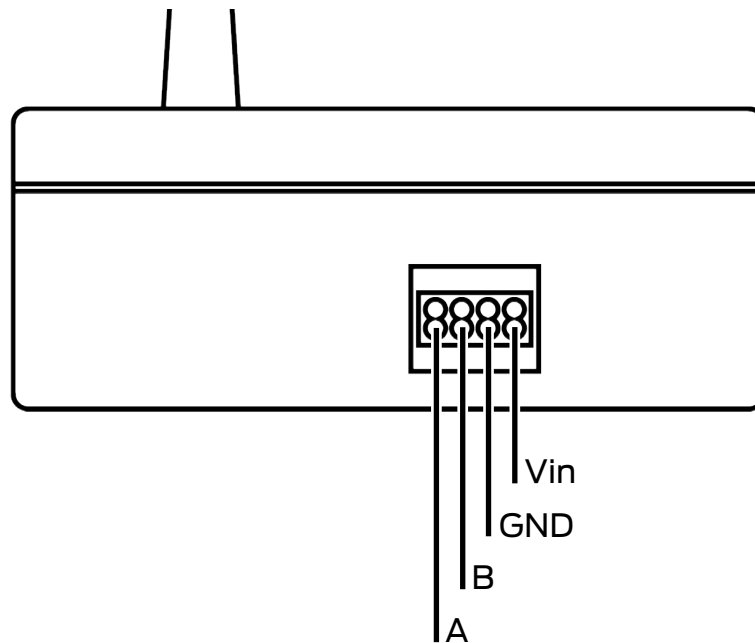
- Three conflicts occurred consecutively at the same node.

- ❑ The node could not detect a signal for several seconds.

## 2 Connections

Information on electrical properties and connectors can be found in the technical data (see *Technical specifications* [[▶ 13](#)]).

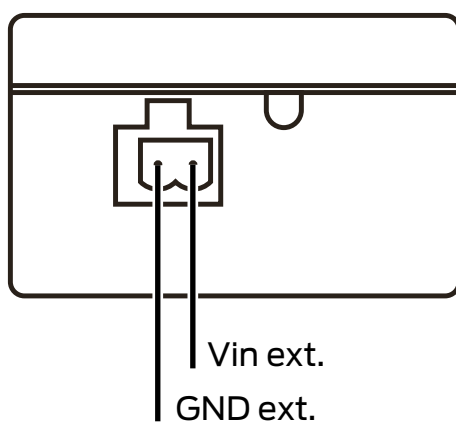
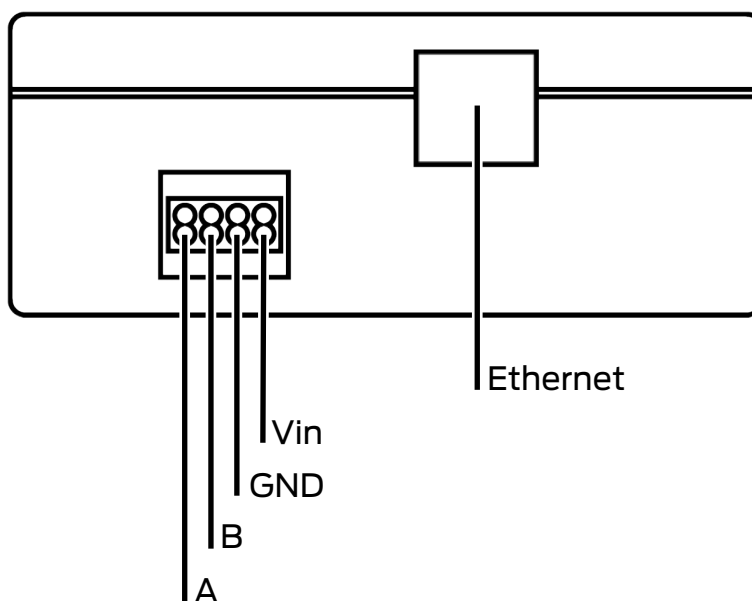
### Connections (SI.GN.CR)



Connection	Meaning
$V_{in}$	Connection of the supply voltage of the RS-485 bus.
GND	Connection of the ground potential of the RS-485 bus. Internally connected to GND ext.
B	Connection of the positive data line of the RS-485 bus.

Connection	Meaning
A	Connection of the negative data line of the RS-485 bus.
V <sub>in</sub> ext.	Connection of the supply voltage of an external power supply unit.
GND ext.	Connecting the ground potential of an external power supply. Internally connected to GND.

### Connections (SI.GN.CONFIG.EC)



Connection	Meaning
Ethernet	Connect the network connection to change the system.
V <sub>in</sub>	Connection of the supply voltage of the RS-485 bus.

Connection	Meaning
GND	Connection of the ground potential of the RS-485 bus. Internally connected to GND ext.
B	Connection of the positive data line of the RS-485 bus.
A	Connection of the negative data line of the RS-485 bus.
$V_{in}$ ext.	Connection of the supply voltage of an external power supply unit (positive pole).
GND ext.	Connecting the ground potential of an external power supply. Internally connected to GND.

## 3 wiring

You release the spring-loaded terminals of the RS-485 bus connection by pressing the orange lever inwards with a suitable object (e.g. slotted screwdriver) and pulling the cable carefully at the same time.

The wiring for initial operation consists of three parts:

1. Wiring of the bus subscribers (see *Wiring the routers* [▶ 8])
2. Connection of the configuration device (see *Wiring with the configuration device* [▶ 11])
3. Connection to the integrator system (see *Wiring with the integrator system* [▶ 12])



### IMPORTANT

#### Communication error due to poor contact

If the contact between a connector and the corresponding cable is not good, communication errors may occur.

- Make sure that all subscribers have a stable connection to shielding and ground potential.



### IMPORTANT

#### Increased interference immunity due to twisted cores

If you are using a cable that is twisted in pairs, make sure that the data lines A and B occupy a pair of wires that are twisted together.

In principle, you must always terminate the ends of an RS-485 bus with a length of 100 m or longer. Use suitable resistors (100  $\Omega$  to 120  $\Omega$ , recommended: 120  $\Omega$ ). If you also terminate the RS-485 bus below a length of 100 m, you further increase the operational safety. SimonsVoss therefore always recommends terminating both ends of an RS-485 bus. Connect the positive data line (B) and the negative data line (A) at each end with a suitable resistor. If you use a leaded resistor, you can use the contacts of the double sockets that are not assigned at the ends of the RS-485 bus cable.

### 3.1 Wiring the routers

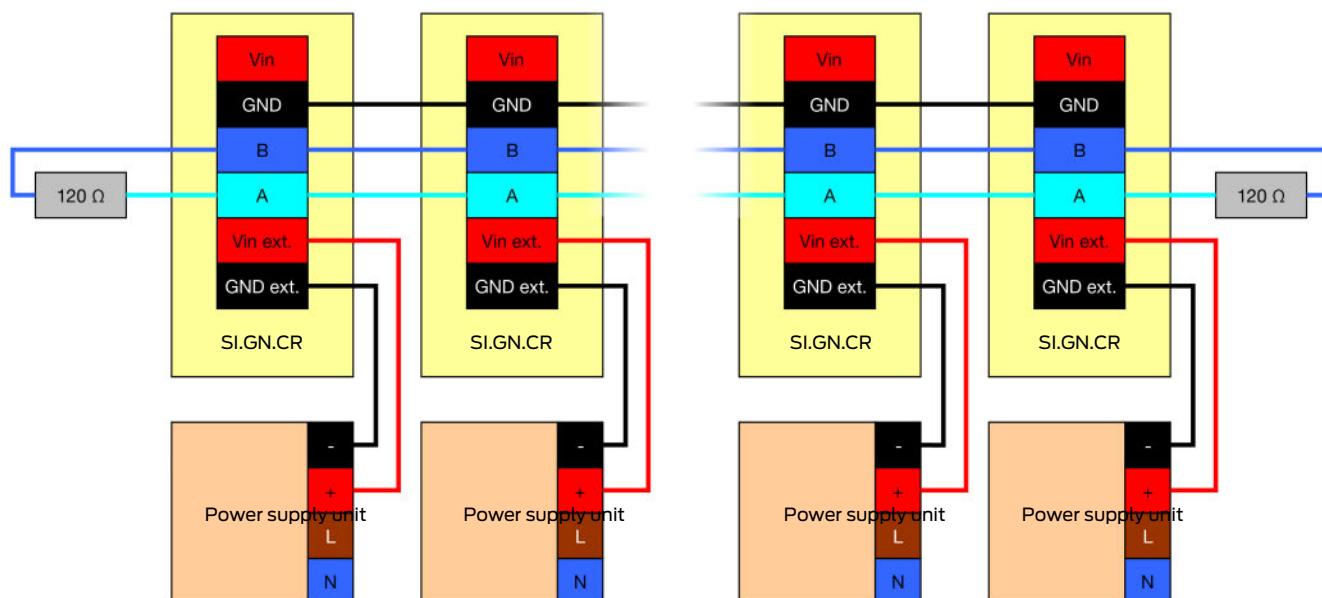
You have several options for connecting the routers (SI.GN.CR) with each other. The following table gives an overview of the advantages and disadvantages of the connection options described here. The wiring options are sorted in descending order (recommendation).



	Power supply units in the middle of the bus required	Wiring from bus terminal to $V_{in\ ext.}$ and GND ext. required	Problems resulting from voltage drop
Separate power supply units for bus participants	yes	no	unlikely
Daisy-chaining through $V_{in\ ext.}$ and GND ext.	no	yes	unlikely (if high operating voltage is applied)
Daisy-chaining through $V_{in}$ and GND	no	no	possible

The shown wiring options are not a complete list of all wiring options. Further options are possible!

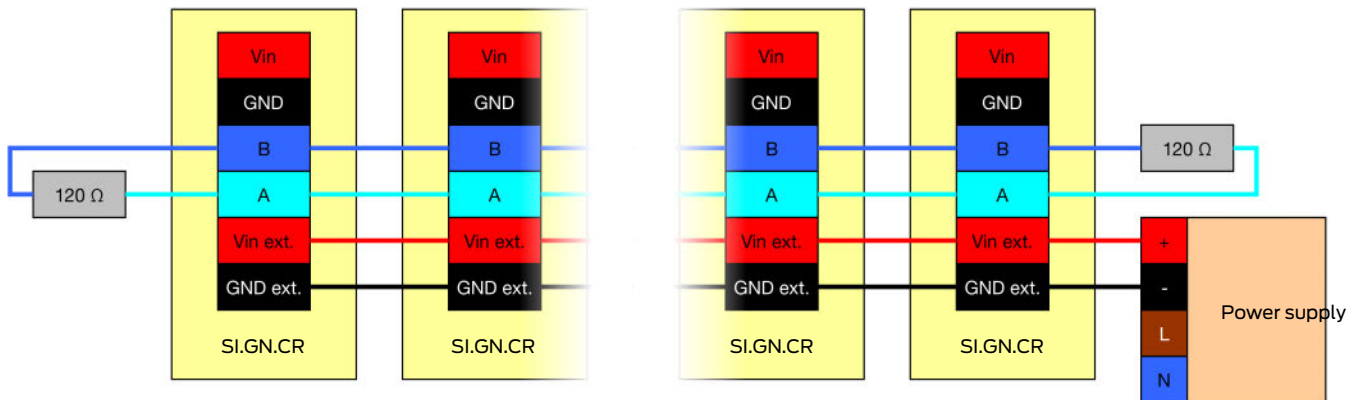
### Separate power supply units for bus participants



With this variant, each router (SI.GN.CR) is supplied with its own power supply unit at the external power supply connection ( $V_{in\ ext.}$  and GND ext.) (power supply unit optionally available, see *Technical specifications* [▶ 13]). This means that no power supply is transmitted via the long RS-485 bus cable, only signals. As a result, only little current and voltage drop flows in the RS-485 bus line and the associated problems are minimised.

In addition, one wire in laid cables is saved because the supply voltage no longer has to be transmitted through the RS-485 bus line.

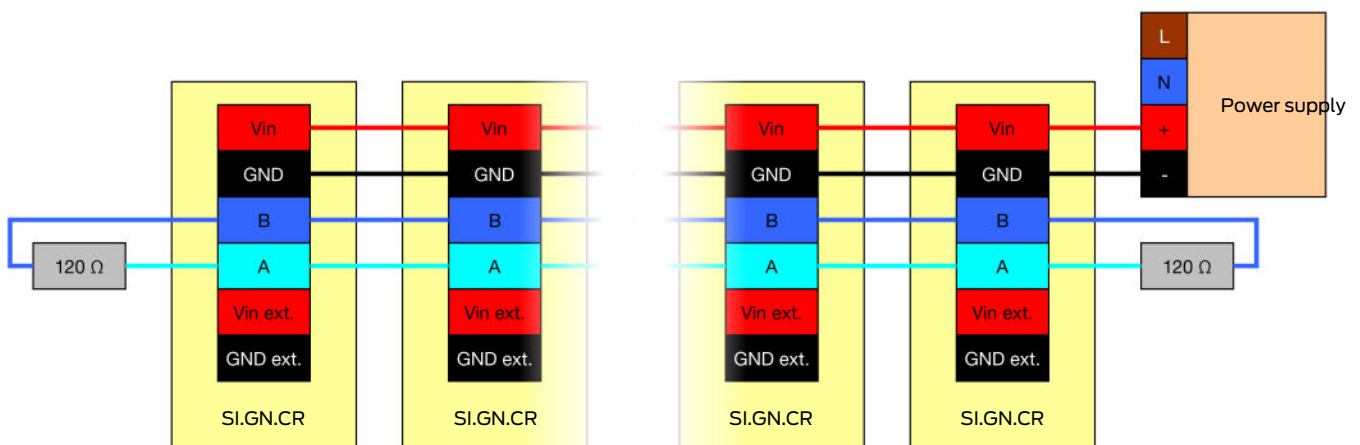
## Loop through $V_{in}$ ext. and GND ext.



With this variant, each router (SI.GN.CR) is supplied with the same power supply unit at the external power supply connection ( $V_{in}$  ext. and GND ext.). This makes high operating voltages possible (see *Technical specifications* [▶ 13]). When higher operating voltages (e.g. 24 V) are used, little current flows through the RS-485 bus line and the voltage drop or associated problems are minimised.

In contrast to the first wiring variant, only one power supply unit is required at the beginning or end of the RS-485 bus.

## Looping through at $V_{in}$ and GND



With this variant, each router (SI.GN.CR) is supplied with the same power supply unit at the bus power supply connection ( $V_{in}$  and GND in). The connection cable therefore does not have to be routed to the external power supply connection on the side. However, only low operating voltages are possible (see *Technical specifications* [▶ 13]). This results in a significantly higher current flow compared to the other wiring variants and problems can occur due to voltage drop with long cables (for recommended cable lengths, see *Technical specifications* [▶ 13]).

In contrast to the first wiring variant, only one power supply unit is required at the beginning or end of the RS-485 bus.

## 3.2 Wiring with the configuration device

If you are setting up the system for the first time or making changes to the configuration, you must connect the configuration device to the RS-485 bus.

### ATTENTION

#### Communication error due to simultaneous connection to integrator system and configuration device

If you connect the RS-485 bus to the integrator system and the configuration device at the same time, both devices will attempt to communicate with the routers (SI.GN.CR) at the same time. This leads to conflicts and communication errors.

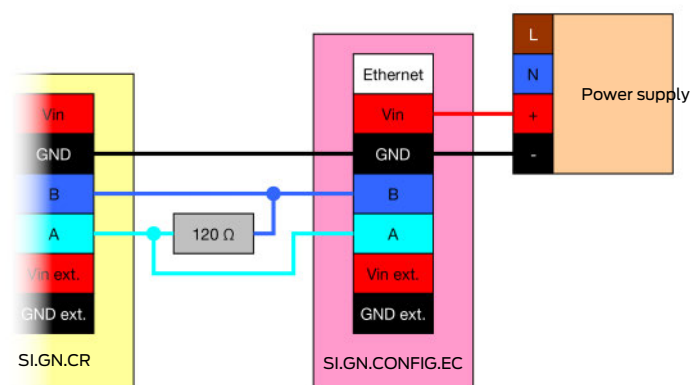
1. Do not connect the integrator system until you have disconnected the configuration device from the RS-485 bus.
2. Only connect the configuration device after you have disconnected the integrator system from the RS-485 bus.



### IMPORTANT

#### No connection during configuration changes

If you want to change the configuration of the SmartIntego components, you have to disconnect the integrator's system from the RS-485-bus first. As long as the integrator's system is disconnected from the RS-485-bus, the routers (SI.GN.CR) aren't connected to the integrator's system. As long as this is the case, SmartIntego locks are working offline with a previously configured whitelist only.



You can connect the configuration device as shown, regardless of the wiring of the remaining RS-485 bus. Then connect the configuration device to the SmartIntego Manager via the network interface in order to perform the initial setup or change the configuration.

### 3.3 Wiring with the integrator system

Once you have set up the SmartIntego system, you must then connect it to the integrator system.

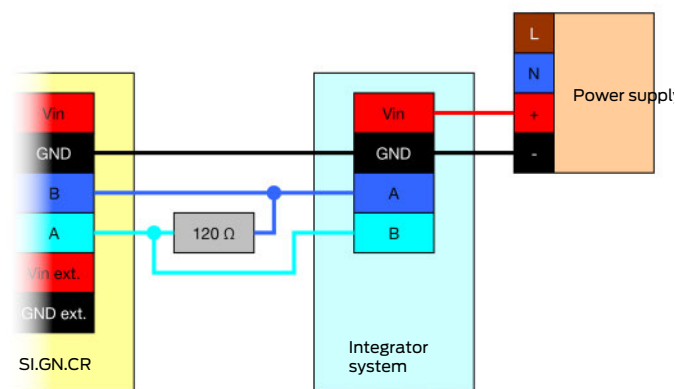
#### ATTENTION

#### Communication error due to simultaneous connection to integrator system and configuration device

If you connect the RS-485 bus to the integrator system and the configuration device at the same time, both devices will attempt to communicate with the routers (SI.GN.CR) at the same time. This leads to conflicts and communication errors.

1. Do not connect the integrator system until you have disconnected the configuration device from the RS-485 bus.
2. Only connect the configuration device after you have disconnected the integrator system from the RS-485 bus.

1. Undo the connection to the configuration device.
2. Connect the integrator system.



You can connect the integrator system as shown, regardless of the wiring of the rest of the RS-485 bus.

## 4 Technical specifications

Interfaces		
SI.GN.CR	<ul style="list-style-type: none"> <li>■ 868 MHz (WaveNet)</li> <li>■ Spring-loaded terminal: RS-485 bus, no support of OSDP (Open Supervised Device Protocol)</li> </ul>	
SI.GN.CONFIG.EC	<ul style="list-style-type: none"> <li>■ 868 MHz (WaveNet)</li> <li>■ Spring-loaded terminal: RS-485 bus, no support of OSDP (Open Supervised Device Protocol)</li> <li>■ RJ45 socket: TCP</li> </ul>	
Power supply		
Optional network	<p>WN.POWER.SUPPLY.PPP suitable for:</p> <ul style="list-style-type: none"> <li>■ 9 V</li> <li>■ SI.GN.CR</li> <li>■ SI.GN.CONFIG.EC</li> <li>■ 400 mA</li> </ul>	
Input voltage	RS-485 bus connection ( $V_{in}$ )	9 V - 12 V (regulated)
	External power supply connection ( $V_{in}$ ext.)	9 V - 36 V (regulated)
Power consumption	max. 21 mW	
Connections	RS-485-bus connection A, B, $V_{in}$ and GND	Spring-loaded terminals single-core conductor, AWG27 (0,102 mm <sup>2</sup> ) to AWG22 (0,324 mm <sup>2</sup> )
	External power supply connection ( $V_{in}$ ext.) ( $V_{in}$ ext. and GND ext.)	Plug (included in delivery): Phoenix Contact MSTB 2.5/2-ST-5.08 (1757019)
Cable		
Recommended type	CAT5 with the following properties (or comparable cable type)	
	■ Solid core (single-wire)	
	■ shielded	
	■ twisted in pairs	
	■ DC resistance $\leq 0.2 \Omega/m$	
■ Characteristic impedance $Z_0 = 100 \Omega \pm 15\%$		

Maximum cable length (total/return + return)

- 400 m / 200 m (AWG27)
- 1500 m / 750 (AWG21)

The cables can be considerably longer if a higher operating voltage is supplied to the external power supply terminals.

General conditions of the length specification

- Operating voltage: 12 V
- Supply via RS-485 bus cable
- Supply of the power supply at the beginning of the bus
- Number of routers (SI.GN.CR): 10
- No biasing

The function was tested up to 900 m cable length.

A SI.GN.CONFIG.EC can route a maximum of 255 addresses in the system. Each SI.GN.CR occupies two addresses, each LockNode (LNI) one. If you need more addresses to address your devices, you must include another SI.GN.CONFIG.EC. You can only use one SI.GN.CONFIG.EC at a time to configure a system.



## IMPORTANT

### Additional stabilisation measures

If strong electromagnetic interference radiation can occur, the cable lengths are very long (> 1 km) or several subscribers (> 1000) are connected to the RS-485 bus, you may have to take additional measures (e.g. use biasing and/or repeaters).

## 5 Help and other information

### Information material/documents

You will find detailed information on operation and configuration and other documents under Informative material/Documents in the Download section on the SimonsVoss website (<https://www.simons-voss.com/en/downloads/documents.html>).

### Software and drivers

You will find software and drivers in the Download section on the SimonsVoss website (<https://www.simons-voss.com/en/downloads/software-downloads.html>).

### Declarations of conformity

You will find declarations of conformity for this product in the Certificate section on the SimonsVoss website (<https://www.simons-voss.com/en/certificates.html>).

### Declaration of conformity for 2014/53/EU

SimonsVoss Technologies GmbH hereby declares that the radio transmission device SmartIntego complies with the requirements stipulated in Directive 2014/53/EU.

You will find a full declaration of conformity for this product in the certificate section on the SimonsVoss website (<https://www.simons-voss.com/en/certificates.html>).



### Information on disposal

- Do not dispose the device (SmartIntego) in the household waste. Dispose of it at a collection point for electronic waste as per European Directive 2012/19/EU.
- Recycle defective or used batteries in line with European Directive 2006/66/EC.
- Observe local regulations on separate disposal of batteries.
- Take the packaging to an environmentally responsible recycling point.



### Hotline

If you have any questions, the SimonsVoss Service Hotline will be happy to help you on +49 (0)89 99 228 333 (German fixed network; call charges vary depending on the operator).

### Email

You may prefer to send us an email.

support@simons-voss.com

You may prefer to send us an email.

si-support@simons-voss.com

### FAQs

You will find information and help for SimonsVoss products in the FAQ section on the SimonsVoss website (<https://faq.simons-voss.com/otrs/public.pl>).

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## This is SimonsVoss

SimonsVoss is a technology leader in digital locking systems.

The pioneer in wirelessly controlled, cable-free locking technology delivers system solutions with an extensive product range for SOHOs, SMEs, major companies and public institutions.

SimonsVoss locking systems unite intelligent functions, optimum quality and award-winning German-made design. As an innovative system provider, SimonsVoss attaches great importan-

ce to scalable systems, effective security, reliable components, high-performance software and simple operation.

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