

# SIM2000-2 P & SIM2000-2 C

Sensor Integration Machines for  
SICK Track & Trace Systems

**SICK**  
Sensor Intelligence.



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**Described product**

SIM2000-2 P and SIM2000-2 C

**Manufacturer**

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**Original document**

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# 1 About this document

## 1.1 Information on the operating instructions

These operating instructions provide important information on how to use devices from SICK AG.

Prerequisites for safe work are:

- Compliance with all safety notes and handling instructions supplied.
- Compliance with local work safety regulations and general safety regulations for device applications

The operating instructions are intended to be used by qualified personnel and electrical specialists.



### NOTE

Read these operating instructions carefully to familiarize yourself with the device and its functions before commencing any work.

The operating instructions are an integral part of the product. Store the instructions in the immediate vicinity of the device so they remain accessible to staff at all times. Should the device be passed on to a third party, these operating instructions should be handed over with it.

These operating instructions do not provide information on the handling and safe operation of the machine or system in which the device is integrated. Information on this can be found in the operating instructions for the machine or system.

## 1.2 Explanation of symbols

Warnings and important information in this document are labeled with symbols. Signal words introduce the instructions and indicate the extent of the hazard. To avoid accidents, damage, and personal injury, always comply with the instructions and act carefully.



### DANGER

... indicates a situation of imminent danger, which will lead to a fatality or serious injuries if not prevented.



### WARNING

... indicates a potentially dangerous situation, which may lead to a fatality or serious injuries if not prevented.



### CAUTION

... indicates a potentially dangerous situation, which may lead to minor/slight injuries if not prevented.



### NOTICE

... indicates a potentially harmful situation, which may lead to material damage if not prevented.



### NOTE

... highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

### 1.3 Further information

More information can be found on the product page.

The call is made via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

**The following information is available depending on the product:**

- Data sheets
- This document in all available language versions
- CAD files and dimensional drawings
- Certificates (e.g., declaration of conformity)
- Other publications
- Software
- Accessories

### 1.4 SICK service

If you require any technical information, our SICK Service will be happy to help. To find your agency, see the final page of this document.



#### **NOTE**

To help us to resolve the matter quickly, please note down the details on the type label.

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## 2 Safety information

### 2.1 General safety notes

The following safety notes must always be observed regardless of specific application conditions:

- The device must only be mounted, commissioned, operated, and maintained by professionally qualified safety personnel.
- Electrical connections with peripheral devices must only be made when the voltage supply is disconnected.
- The device is only to be operated when mounted in a fixed position.
- The device voltage supply must be protected in accordance with the specifications.
- The specified ambient conditions must be observed at all times.
- The electrical connections to peripheral devices must be screwed on or clamped correctly.
- The cooling fins or fan - if present - must not be covered or restricted in their functionality.
- The pin assignment of pre-assembled cables must be checked and adjusted if necessary.
- These operating instructions must be made available to the operating personnel and kept ready to hand.

### 2.2 Intended use

The device is a programmable control and evaluation unit that is used, for example, for sensors, 2D and 3D cameras, and image processing devices.

The device also acts as a link between system and plant controls, and the connected terminal devices. The device is mainly used in an industrial environment in production, testing, and control. Other applications are possible depending on the device-specific properties.

The device is programmed on a PC by using the development environment software SICK AppSpace. Depending on the application, a browser-based, graphical user interface (HMI) can be created, which provides opportunities defined by the application developer to influence an application at operator level.

The device connection to the peripherals is established by means of a range of industrial fieldbuses and other interfaces.

The device offers various interfaces for controlling, programming, and operating purposes, which can be activated as necessary via development environments, control systems (programmable logic controllers), or applications.

However, configuration, programming, and control requires various technical skills, depending on how the device is connected and used.

### 2.3 Improper use

Any use outside of the stated areas, in particular use outside of the technical specifications and the requirements for intended use, will be deemed to be incorrect use.

- The device does not constitute a safety component in accordance with the respective applicable safety standards for machines.
- The device must not be used in explosion-hazardous areas, in corrosive environments or under extreme environmental conditions.
- Any use of accessories not specifically approved by SICK AG is at your own risk.



### **WARNING**

#### **Danger due to improper use!**

Any improper use can result in dangerous situations.

Therefore, observe the following information:

- Product should be used only in accordance with its intended use.
  - All information in the documentation must be strictly observed.
  - Shut down the product immediately in case of damage.
- 

## 2.4 Cybersecurity

### **Overview**

To protect against cybersecurity threats, it is necessary to continuously monitor and maintain a comprehensive cybersecurity concept. A suitable concept consists of organizational, technical, procedural, electronic, and physical levels of defense and considers suitable measures for different types of risks. The measures implemented in this product can only support protection against cybersecurity threats if the product is used as part of such a concept.

You will find further information at [www.sick.com/psirt](http://www.sick.com/psirt), e.g.:

- General information on cybersecurity
- Contact option for reporting vulnerabilities
- Information on known vulnerabilities (security advisories)

An overview of cybersecurity concepts for the SICK AppSpace Eco-System is available in the SICK Support Portal: [supportportal.sick.com](http://supportportal.sick.com), under the search term: **SICK AppSpace Security Concepts**

## 2.5 Limitation of liability

Relevant standards and regulations, the latest technological developments, and our many years of knowledge and experience have all been taken into account when compiling the data and information contained in these operating instructions. The manufacturer accepts no liability for damage caused by:

- Non-adherence to the product documentation (e.g., operating instructions)
- Incorrect use
- Use of untrained staff
- Unauthorized conversions or repair
- Technical modifications
- Use of unauthorized spare parts, consumables, and accessories

## 2.6 Modifications and conversions



### **NOTICE**

Modifications and conversions to the device may result in unforeseeable dangers.

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Interrupting or modifying the device or SICK software will invalidate any warranty claims against SICK AG. This applies in particular to opening the housing, even as part of mounting and electrical installation.



## 2.7 Requirements for skilled persons and operating personnel



### WARNING

#### Risk of injury due to insufficient training.

Improper handling of the device may result in considerable personal injury and material damage.

- All work must only ever be carried out by the stipulated persons.

The following qualifications are required for various activities:

Table 1: Activities and technical requirements

Activities	Qualification
Mounting, maintenance	<ul style="list-style-type: none"> <li>■ Basic practical technical training</li> <li>■ Knowledge of the current safety regulations in the workplace</li> </ul>
Electrical installation, device replacement	<ul style="list-style-type: none"> <li>■ Practical electrical training</li> <li>■ Knowledge of current electrical safety regulations</li> <li>■ Knowledge of the operation and control of the devices in their particular application</li> </ul>
Commissioning, configuration	<ul style="list-style-type: none"> <li>■ Basic knowledge of the computer operating system used</li> <li>■ Basic knowledge of the design and setup of the described connections and interfaces</li> <li>■ Basic knowledge of data transmission</li> </ul>
Operation of the device for the particular application	<ul style="list-style-type: none"> <li>■ Knowledge of the operation and control of the devices in their particular application</li> <li>■ Knowledge of the software and hardware environment for the particular application</li> </ul>

## 2.8 Operational safety and specific hazards

Please observe the safety notes and the warnings listed here and in other sections of this product documentation to reduce the possibility of risks to health and avoid dangerous situations.



### WARNING

#### Electrical voltage!

Electrical voltage can cause severe injury or death.

- Work on electrical systems must only be performed by qualified electricians.
- The power supply must be disconnected when attaching and detaching electrical connections.
- The product must only be connected to a voltage supply as set out in the requirements in the operating instructions.
- National and regional regulations must be complied with.
- Safety requirements relating to work on electrical systems must be complied with.



### WARNING

#### Risk of injury and damage caused by potential equalization currents!

Improper grounding can lead to dangerous equipotential bonding currents, which may in turn lead to dangerous voltages on metallic surfaces, such as the housing. Electrical voltage can cause severe injury or death.

- Work on electrical systems must only be performed by qualified electricians.
  - Follow the notes in the operating instructions.
  - Install the grounding for the product and the system in accordance with national and regional regulations.
- 



### WARNING

#### Risk of injury due to damage to the device!

For reasons of safety, if a device shows visible signs of damage do not put it into operation, or take it out of operation immediately.

#### Possible damage (depending on type):

- Housing: cracking, splitting or fracture
  - Electrical connections (male connector or female connector): cracks or detachment from the housing
- 

### 2.8.1 LED RGO

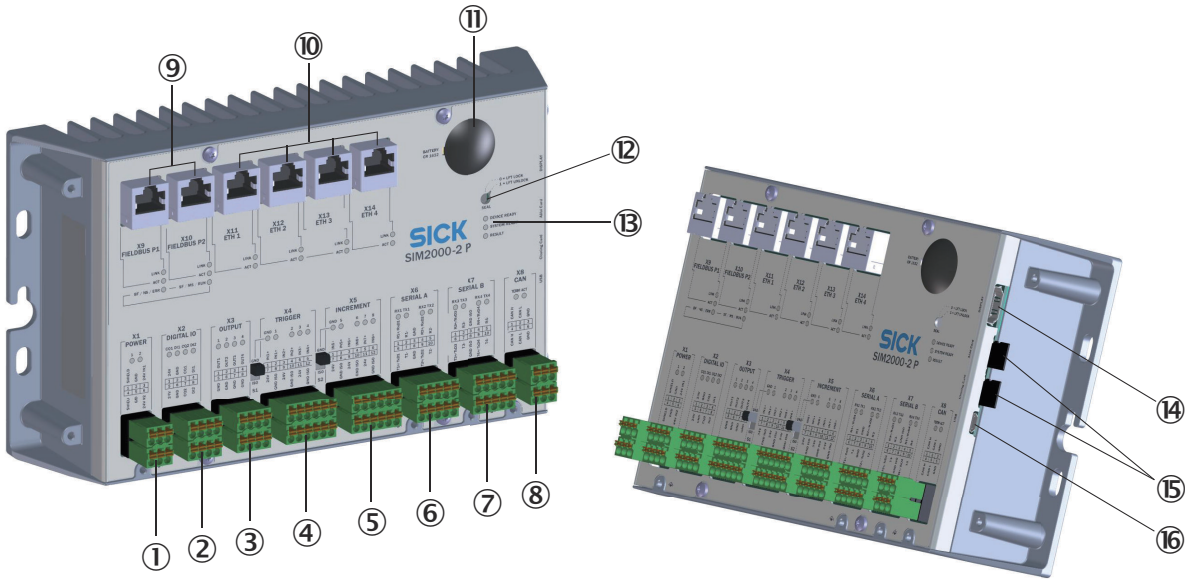
The product is fitted with LEDs in risk group 0. The accessible radiation from these LEDs does not pose a danger to the eyes or skin.

### 3 Product description

#### 3.1 Device view

##### SIM2000-2 P

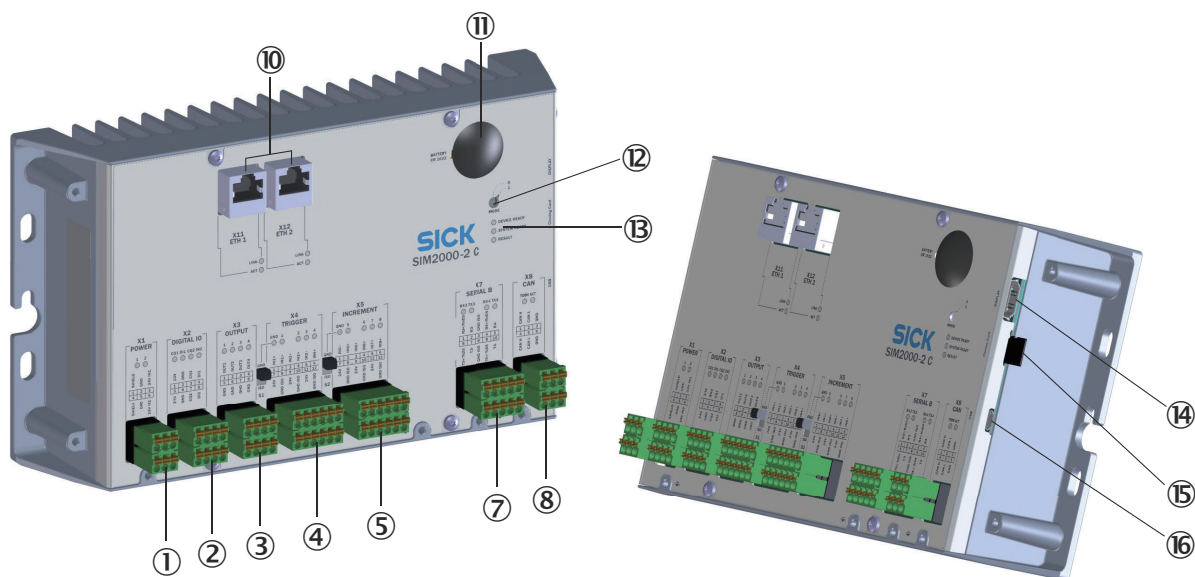
The SIM2000-2 P product variant is designed for use in SICK track and trace systems. It has a specialized firmware and a preinstalled standard app for SICK track and trace systems.



- ① X1 - POWER: connections for the device voltage supply
- ② X2 - DIGITAL IO: configurable digital inputs and digital outputs
- ③ X3 - OUTPUT: connections for digital switching outputs
- ④ X4 - TRIGGER: trigger input
- ⑤ X5 - INCREMENT: incremental input
- ⑥ X6 - SERIAL A: serial connections A
- ⑦ X7 - SERIAL B: serial connections B
- ⑧ X8 - CAN: connections for SICK CAN sensor network with termination resistor which can be activated
- ⑨ X9 ... X10 - FIELDBUS: 2 connections for Ethernet-based fieldbuses
- ⑩ X11 ... X14 - ETHERNET: 4 Ethernet connections
- ⑪ Battery compartment
- ⑫ Function selector switch (configurable by SensorApp)
- ⑬ Device status indicators
- ⑭ Display connection (under development)
- ⑮ 2 x microSD card slot for saving alibi data (left card slot) and configuration/cloning data (right card slot)
- ⑯ USB connection

##### SIM2000-2 C

The SIM2000-2 C product variant is designed for use in SICK track and trace systems. It has a specialized firmware and a preinstalled standard app for SICK track and trace systems.



- ① X1 - POWER: connections for the device voltage supply
- ② X2 - DIGITAL IO: configurable digital inputs and digital outputs
- ③ X3 - OUTPUT: connections for digital switching outputs
- ④ X4 - TRIGGER: trigger input
- ⑤ X5 - INCREMENT: incremental input
- ⑥ -
- ⑦ X7 - SERIAL B: serial connections B
- ⑧ X8 - CAN: connections for SICK CAN sensor network with termination resistor which can be activated
- ⑨ -
- ⑩ X11 ... X12 - ETHERNET: 2 Ethernet connections
- ⑪ Battery compartment
- ⑫ Function selector switch (configurable by SensorApp)
- ⑬ Device status indicators
- ⑭ Display connection (under development)
- ⑮ MicroSD card slot for saving configuration/cloning data
- ⑯ USB connection

## 3.2 Functionality

### SIM2000-2 P

Data from SICK sensors such as 1D / 2D code sensors and VMS4xx / 5xx for detecting object geometry can be imported, evaluated, archived, and transmitted. Four fast Ethernet interfaces are available for sensors. In addition, data from SICK LiDAR scanners can be read, merged into a point cloud, evaluated, archived, and transmitted.

Other sensors can be integrated via IO-Link (under development), for example for distance and height measuring purposes. Depending on the application, additional sensors can be connected for the read cycle, for detecting the object distance (e.g., MLG, as an alternative to the VMS4xx / 5xx), and for generating the increment signal.

Fieldbus and Ethernet interfaces with OPC-UA and MQTT provide preprocessed data (edge computing) for the controller and for cloud computing. In addition, the SIM can be integrated into a SICK CAN sensor network.

Thanks to the high-performance multi-core processor and a dedicated I/O processor core, the device allows fast sensor data processing and the handling of input and output signals in real time.

The HMI and data visualization features can be provided on any browser-enabled notebook/PC or tablet.

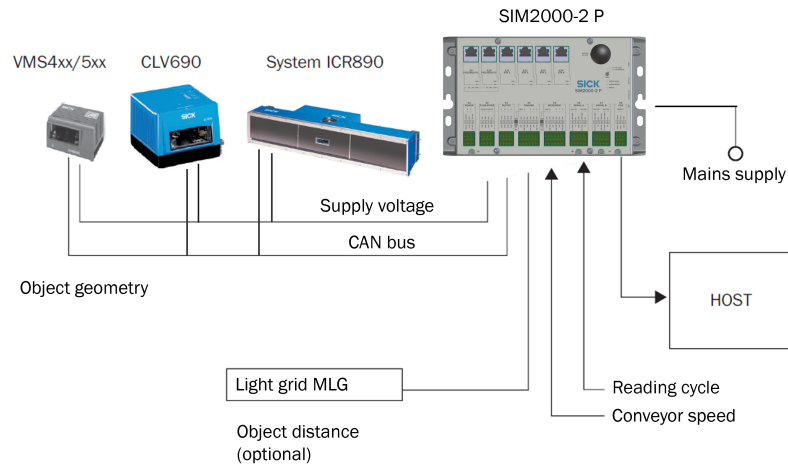


Figure 1: Connection example for SIM2000-2 P

### SIM2000-2 C

Data from SICK sensors such as 1D / 2D code sensors and VMS4xx / 5xx for detecting object geometry can be imported, evaluated, archived, and transmitted. Two fast Ethernet interfaces are available for sensors. In addition, data from SICK LiDAR scanners can be read, merged into a point cloud, evaluated, archived, and transmitted.

Other sensors can be integrated via IO-Link (under development), for example for distance and height measuring purposes. Depending on the application, additional sensors can be connected for the read cycle, for detecting the object distance (e.g., MLG, as an alternative to the VMS4xx / 5xx), and for generating the increment signal.

Ethernet interfaces with OPC-UA and MQTT provide preprocessed data (edge computing) for the controller and for cloud computing. In addition, the SIM can be integrated into a SICK CAN sensor network.

Thanks to the high-performance multi-core processor and a dedicated I/O processor core, the device allows fast sensor data processing and the handling of input and output signals in real time.

The HMI and data visualization features can be provided on any browser-enabled notebook/PC or tablet.

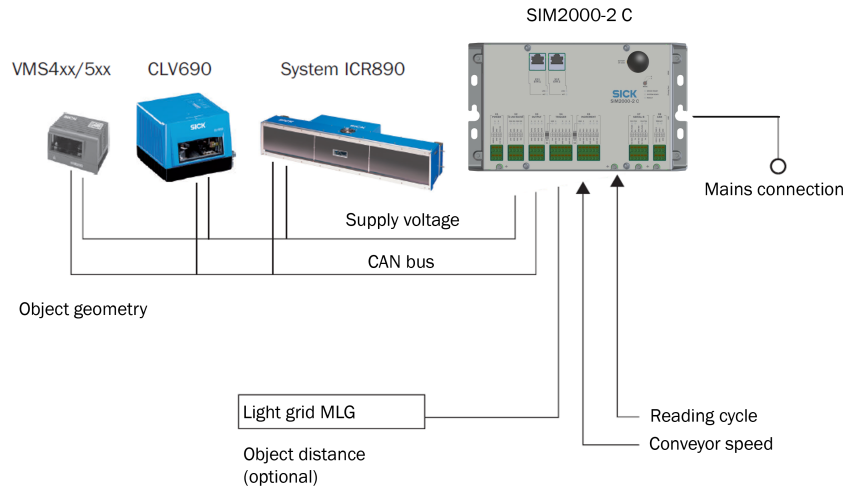


Figure 2: Connection example for SIM2000-2 C

### 3.3 Preset Ethernet interfaces



#### NOTE

Preset IP addresses of the ETHERNET interfaces:

- ETHERNET 1: 192.168.0.1
- ETHERNET 2: 192.168.1.1
- ETHERNET 3: 192.168.2.1 (SIM2000-2 P only)
- ETHERNET 4: 192.168.3.1 (SIM2000-2 P only)

#### Changing the IP addresses

The individual IP addresses can be changed using the SICK “SOPAS-ET” PC tool.

## 4 Transport and storage

### 4.1 Transport

**NOTICE****Damage due to improper transport!**

- The product must be packaged with protection against shock and damp.
- Recommendation: Use the original packaging.
- Note the symbols on the packaging.
- Do not remove packaging until immediately before you start mounting.

### 4.2 Transport inspection

Immediately upon receipt in Goods-in, check the delivery for completeness and for any damage that may have occurred in transit. In the case of transit damage that is visible externally, proceed as follows:

- Do not accept the delivery or only do so conditionally.
- Note the scope of damage on the transport documents or on the transport company's delivery note.
- File a complaint.

**NOTE**

Complaints regarding defects should be filed as soon as these are detected. Damage claims are only valid before the applicable complaint deadlines.

### 4.3 Storage

- Do not store outdoors.
- Store in a place protected from moisture and dust.
- Recommendation: Use the original packaging.
- Do not expose to any aggressive substances.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: see ["Technical data", page 36](#).
- For storage periods of longer than 3 months, check the general condition of all components and packaging on a regular basis.

# 5 Mounting

## 5.1 Overview of mounting procedure



### NOTE

The mounting procedure described here for the device meets the requirements for use in the target system.

Additional or different requirements may become necessary in the laboratory and during preparation, and should be taken into account as necessary, [see "Commissioning", page 26](#). If you have any questions or anything remains unclear in this regard, please contact our service team.

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- Install the device.
- Connect the cables.
- Connecting peripheral devices.
- Connecting the voltage supply.

## 5.2 Scope of delivery

- Device in the version ordered
  - 4 x grounding screw
  - 4 x toothed lock washer
  - Safety Notes (printed)
- 



### NOTE

The device is equipped with spring terminals as standard.

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The actual scope of delivery may differ for special designs, additional orders or due to the latest technical changes.

## 5.3 Preparing for mounting

### Mounting requirements

- Select the mounting site:  
Plan space requirements and sufficient distance from other devices.  
Be aware of the possibility of heat dissipation.
- Unpack the device and allow to acclimatize to avoid formation of condensation.

### Preparing for mounting

1. Place the device at the mounting site.
2. Mark the mounting holes.
3. Proceed to drill the mounting holes.

## 5.4 Mounting the device

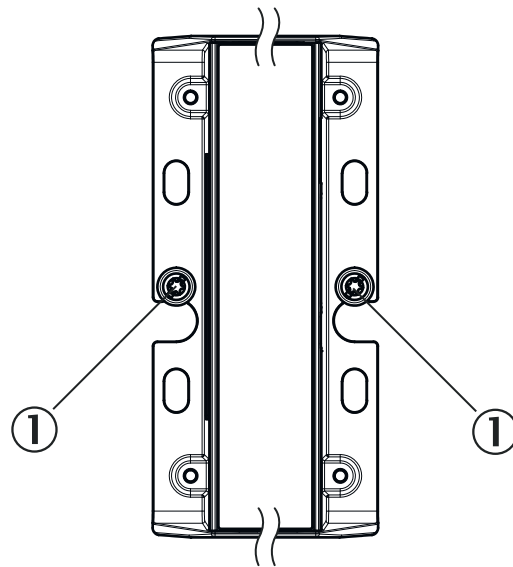
### Mounting the device

1. Set the device on the mounting site.
2. Fasten device with at least two M5 screws (max. 6 Nm) on opposite device sides and corresponding washers.



**NOTICE**

Use self-locking or lock nuts on mounting sites that are exposed to vibrations to prevent the holding plates from loosening.



① M5 screws

### 6 Electrical installation

#### 6.1 Important notes



##### **WARNING**

##### **Risk of injury and damage caused by electrical current!**

Due to equipotential bonding currents, incorrect earthing can lead to the following dangers and faults: Voltage is applied to the metal housing, cable fires due to cable shields heating up, the product and other devices become damaged.

- Generate the same ground potential at all grounding points.
- Ground the equipotential bonding via the functional ground connection with a low impedance.



##### **NOTICE**

##### **Device damage due to improper supply voltage!**

- Only operate the device with the specified supply voltage.
- The voltage supply and all connected signals must meet the requirements for extra-low voltages with safe separation (SELV) as specified in EN 61010. The external voltage supply of the device must bridge a short-term power interruption of 20 ms in order to meet the requirements of EN 60204-1.
- Only devices that are also supplied with safety extra-low voltage must be connected.



##### **NOTE**

##### **Layout of data cables**

- Use screened data cables with twisted-pair wires.
- Implement the screening design correctly and completely.
- To avoid interference, e.g. from switching power supplies, motors, clocked drives, and contactors, always use cables and layouts that are suitable for EMC.
- Do not lay cables over long distances in parallel with power supply cables and motor cables in cable channels.

#### 6.2 Preparing the electrical installation

To carry out the electrical installation, you will need:

- Connection cables for the peripheral devices, including the corresponding data sheets
- Voltage supply cable
- If customers assemble the cables: crimping tool, ferrules, soldering iron, and other installation material

#### 6.3 Preparing the cables

For a list of cables suitable for use with the device, see: [supportportal.sick.com](https://supportportal.sick.com) or [www.sick.com](https://www.sick.com).

Customer assembly of the cables is only necessary in special cases. Ensure a sufficient length of cable is provided, e.g., for strain-relief clamps.

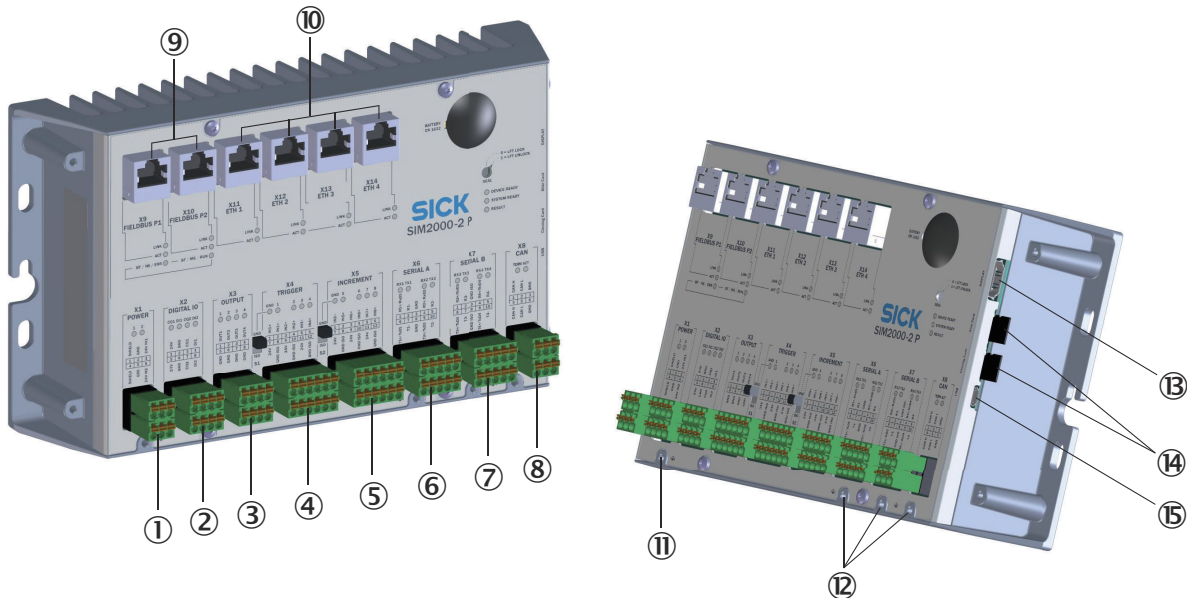
**NOTICE****Risk of damage/malfunction due to incorrect PIN assignment**

Incorrect wiring of the male connectors/female connectors can lead to damage to or malfunctions in the system.

- Observe data sheets provided by the cable manufacturer.
- Observe the pin assignment.

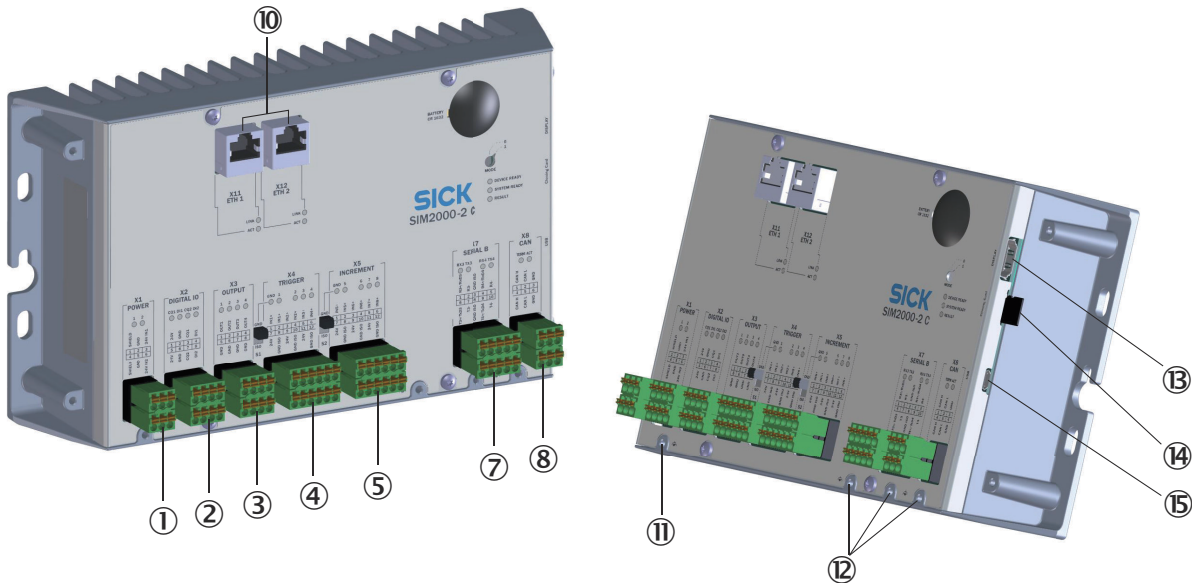
## 6.4 Overview of connections

### SIM2000-2 P



- ① X1 - POWER
- ② X2 - DIGITAL IO
- ③ X3 - OUTPUT
- ④ X4 - TRIGGER
- ⑤ X5 - INCREMENT
- ⑥ X6 - SERIAL A
- ⑦ X7 - SERIAL B
- ⑧ X8 - CAN (SICK CAN sensor network)
- ⑨ X9 ... X10 - fieldbus
- ⑩ X11 ... X14 - ETHERNET
- ⑪ Functional earth
- ⑫ Cable shield connections (e.g. via screening clamps using the supplied M3 screws)
- ⑬ DISPLAY - Connection for monitor (under development)
- ⑭ 2 x microSD card slot: Alibi card and configuration/cloning card
- ⑮ USB connection (Micro-B, for configuration/diagnostics)

SIM2000-2 C



- ① X1 - POWER
- ② X2 - DIGITAL IO
- ③ X3 - OUTPUT
- ④ X4 - TRIGGER
- ⑤ X5 - INCREMENT
- ⑥ -
- ⑦ X7 - SERIAL B
- ⑧ X8 - CAN (SICK CAN sensor network)
- ⑨ -
- ⑩ X11 ... X12 - ETHERNET
- ⑪ Functional earth
- ⑫ Cable shield connections (e.g. via screening clamps using the supplied M3 screws)
- ⑬ DISPLAY - Connection for monitor (under development)
- ⑭ MicroSD card slot: cloning card
- ⑮ USB connection (Micro-B, for configuration/diagnostics)

6.4.1 Functional earth connection



Figure 3: Alternative FE connection

The functional earth (FE) is connected either via the housing or via an FE connection with cable lug.

**Alternative FE connection**

Screw connection of the alternative functional earth connection

- Screw: M3 × 15

Suitable cable lugs

- Forked cable lug or ring cable lug
- Width ≤ 10 mm
- Hole diameter for screw: typically 3.1 mm

The functional earth must be connected in a low-inductance manner and with an adequate cross-section while keeping the cable length as short as possible.

## 6.5 Pin allocation of the connections

### 6.5.1 X1 - POWER

PIN	Signal	Function
1	Shield	Shield
2	GND	GND (ground)
3	24 V IN1	Supply voltage 1
4	Shield	Shield
5	GND	GND (ground)
6	24 V IN2	Supply voltage 2

#### Additional notes:

- Permanent load: max. 5.4 A (IN1 + IN2)
- Supply voltage: 24 V ± 20%
- Maximum power consumption: 20 W (internal)
- Maximum power output of all connections: 100 W
- Supply voltage IN1 and IN2 can be set up redundantly.  
Observe the requirements for the design of overcurrent protective devices according to EN 61010.

### 6.5.2 X2 - DIGITAL IO

PIN	Signal	Function
1	24 V	Supply voltage
2	GND	GND (ground)
3	CQ1	Configurable digital input or digital output (prepared for IO-Link)
4	DI1	Digital input
5	24 V	Supply voltage
6	GND	GND (ground)
7	CQ2	Configurable digital input or digital output (prepared for IO-Link)
8	DI2	Digital input

#### Additional notes:

- CQ1/2: not isolated
- DI<sub>n</sub>: digital input (non-insulated)
- Max. 0.7 A total output for 24 V supply voltage connections
- Digital output:
  - Max. output 100 mA
  - Min. high output logic level: VCC – 3 V
  - Max. low output logic level: 3 V
  - Push-pull
  - Max. IO-Link output frequency: 230 kHz
  - Max. IO output frequency: 5 kHz (all digital inputs and digital outputs used)
- Digital input:
  - Min. high input logic level: 12 V
  - Max. low input logic level: 4 V

- Max. IO-Link input frequency: 230 kHz
- Max. IO input frequency: 5 kHz (all digital inputs and digital outputs used)
- The digital inputs and outputs are not reverse polarity protected. The voltage at the X1 inputs and outputs must never be higher than the 24 V supply voltage of the device to prevent feedback.

### 6.5.3 X3 - OUTPUT

PIN	Signal	Function
1	OUT1	Digital switching output
2	OUT2	Digital switching output
3	OUT3	Digital switching output
4	OUT4	Digital switching output
5	GND	Reference potential for switching outputs
6	GND	Reference potential for switching outputs
7	GND	Reference potential for switching outputs
8	GND	Reference potential for switching outputs

**Additional notes:**

- OUT1 to OUT4: Non-insulated push-pull outputs with max. 100 mA
- Min. high output logic level: VCC - 3 V
- Max. frequency: 1 kHz (1 kohm load resistance)

### 6.5.4 X4 - TRIGGER

Table 2: X4 - TRIGGER

Pin	Signal	Function
1	IN1+	Isolated digital input
2	IN1+	Isolated digital input
3	IN2+	Isolated digital input
4	IN2+	Isolated digital input
5	IN3+	Isolated digital input
6	IN4+	Isolated digital input
7	24 V	Non-insulated supply voltage for external sensors
8	GND ISO (X4)	Isolated reference potential for digital inputs (X4)*
9	24 V	Non-insulated supply voltage for external sensors
10	GND ISO (X4)	Isolated reference potential for digital inputs (X4)*
11	24 V	Non-insulated supply voltage for external sensors
12	GND ISO (X4)	Isolated reference potential for digital inputs (X4)*

\* S1 switch in GND position: Reference potential also for 24 V (X4)

**Additional notes:**

- IN1 and IN2 are designed with redundancy
- Max. 0.7 A total output for all 24 V supply voltage connections
- Min. high input logic level: 12 V
- Max. low input logic level: 4 V
- Input frequency: 30 kHz

**S1 switch**

- GND ISO: volt-free connection
- GND: GND of the connected device connected to GND of the SIM

## 6.5.5 X5 - INCREMENT

Table 3: X5 - INCREMENT

Pin	Signal	Function
1	IN5+	Isolated digital input
2	IN5+	Isolated digital input
3	IN6+	Isolated digital input
4	IN6+	Isolated digital input
5	IN7+	Isolated digital input
6	IN8+	Isolated digital input
7	24 V	Non-insulated supply voltage for external sensors
8	GND ISO (X5)	Isolated reference potential for digital inputs (X5)*
9	24 V	Non-insulated supply voltage for external sensors
10	GND ISO (X5)	Isolated reference potential for digital inputs (X5)*
11	24 V	Non-insulated supply voltage for external sensors
12	GND ISO (X5)	Isolated reference potential for digital inputs (X5)*

\* S2 switch in GND position: Reference potential also for 24 V (X5)

**Additional notes:**

- IN5 and IN6 are designed with redundancy
- Max. 0.7 A total output for all 24 V supply voltage connections
- Min. high input logic level: 12 V
- Max. low input logic level: 4 V
- Input frequency: 30 kHz

**S2 switch**

- GND ISO: volt-free connection
- GND: GND of the connected device connected to GND of the SIM

## 6.5.6 X6 - SERIAL A (SIM2000-2 P only)

**Not isolated**

PIN	Signal	Mode				
		RS-422	RS-232	LED	RS-485	LED
1	R1+/ RxD1	R1+	RxD1	Rx1	-	-
2	R1-	R1-	-		-	
3	GND (ground)					
4	R2+/ RxD2	R2+	RxD2	Rx2	-	-
5	R2-	R2-	-		-	
6	T1+/ TxD1	T1+	TxD1	Tx1	-	-
7	T1-	T1-	-		-	
8	GND (ground)					
9	T2+/ TxD2	T2+	TxD2	Tx2	-	-
10	T2-	T2-	-		-	

- Default mode: RS-232
- Data transmission rates:
  - RS-232: 115.2 kBaud
  - RS-422: 2 MBaud
  - RS-485: 2 MBaud

6.5.7 X7 - SERIAL B

Isolated

PIN	Signal	Mode				
		RS-422	RS-232	LED	RS-485	LED
1	R3+/ RxD3	R3+	RxD3	Rx3	-	-
2	R3-	R3-	-		-	-
3	GND ISO (isolated reference potential)					
4	R4+/ RxD4	R4+	RxD4	Rx4	Rx4+	-
5	R4-	R4-	-		Rx4-	-
6	T3+/ TxD3	T3+	TxD3	Tx3	-	-
7	T3-	T3-	-		-	-
8	GND ISO (isolated reference potential)					
9	T4+/ TxD4	T4+	TxD4	Tx4	Tx4+	Receive: Rx4 Transmit: Tx4
10	T4-	T4-	-		Tx4-	

- Default mode: RS-232
- Data transmission rates:
  - RS-232: 115.2 kBaud
  - RS-422: 2 MBaud
  - RS-485: 2 MBaud

6.5.8 X8 - CAN

Table 4: X8 - CAN

PIN	Signal	Function	Factory settings
1	CAN H	CAN high	Termination deactivated *)
2	CAN L	CAN low	
3	GND	Ground	
4	CAN H	CAN high (redundant)	Termination deactivated *)
5	CAN L	CAN low (redundant)	
6	GND	Ground	

\* Termination controllable via app

Additional notes:

- 1 x CAN (IN/OUT) not isolated
- Access to SICK devices in the SICK CAN network

6.5.9 X9, X10 - FIELDBUS (SIM2000-2 P only)

The RJ45 fieldbus connections can be used to connect the device to a controller.

Additional notes:

- Designed for line topology
- Data transmission rates: 10/100 Mbit/s
- PROFINET and EtherNet/IP support, EtherCAT® under development
- PROFINET: The output data are set to 0 in the “Stop” CPU operating mode and in case of an AR interruption.



\*EtherCAT® is a registered trademark and patented technology licensed by Beckhoff Automation GmbH, Germany.

#### 6.5.10 X11 ... X12 - Ethernet (SIM2000-2 C), X11 ... X14 - Ethernet (SIM2000-2 P)

The RJ45 Ethernet connections can be used to connect SICK LiDAR-scanners as well as to connect to a PC or network.

The relevant drivers for using SICK LiDAR scanners have been implemented in the SIM. Jumbo frame support is required when using Ethernet switches.

Transmission rates:

ETH1 - 4: 0.01; 0.1; 1 Gb/s

## 6.6 Connecting peripheral devices

The device can be connected to a wide range of sensors and cameras.

The required pin assignments can be found in the data sheets for the peripherals to be connected as well as in the relevant connection descriptions, [see "Pin allocation of the connections", page 21](#).

1. If necessary, assemble connection cables, [see "Preparing the cables", page 18](#).
2. Connect the cables to peripheral devices.
3. Route the cables to the device using installation materials (cable channels, cable ties, etc.). When doing so, pay attention to cable strain relief.
4. Connect cables to the relevant device connections.

## 6.7 Connecting voltage supply



### NOTICE

#### Risk of damage to peripheral devices!

If peripheral devices are connected when the voltage supply is also applied, these devices can become damaged.

- Only connect peripheral devices when the voltage supply is disconnected.

1. Ensure that the voltage has been disconnected by the user.
2. Connect the voltage supply cable(s) to the device.
3. Lay the cable(s) with strain relief.
4. Have the user connect the voltage supply.
5. Have the user activate the voltage.

# 7 Commissioning

## 7.1 Preparatory commissioning

Commissioning for preparatory purposes and under laboratory conditions differs in some respects from commissioning in the target system.

In general, all safety and hazard warnings applicable to mounting (see ["Mounting", page 16](#)) and electrical installation (see ["Important notes", page 18](#)) must also be observed under laboratory conditions. In addition, further notes must be taken into consideration to guarantee the most effective preparation possible:

- Only connect those devices to the product that you want to configure or program.
- Operate the connected device in a controlled and contained network environment for the time being to check network communication if necessary.
- Note the company standards that apply to the use of checking and testing devices.
- For initial programming, use ideal conditions for sensor or camera recognition.
- Use the largest possible deviations from these ideal conditions to check the programming with respect to its error tolerance and reliability, and to determine error limit values.

### Procedure

1. Place the device on a non-slip base.
2. Connect the required peripheral devices, see ["Connecting peripheral devices", page 25](#).
3. Connect the network connection.
4. Connect the voltage supply.

## 8 Operation







### 8.1 Status LEDs

When the device is operating, the operational status of the connections is indicated visually by status LEDs.

Using these status indicators, the operator can find out quickly and easily whether the device and the peripherals are working properly or whether any faults or errors have occurred.

Monitoring the visual indicators is part of the routine inspection carried out on the device and the machine/plant area into which the device is incorporated.

#### Meaning of symbols

Symbol	Meaning
	LED off
	LED on
	LED flashes
	LED goes out briefly
	LED lights up briefly
	LED flashes alternately in different colors

8.1.1 Situation and function of the LEDs

Device status

Table 5: Device status LEDs


















































LEDs	Designation	LED behavior	Description
<input type="radio"/> DEVICE READY <input type="radio"/> SYSTEM READY <input type="radio"/> RESULT	DEVICE READY		Device booting
			Runlevel READY, no errors detected
			Runlevel READY, boot process error
	SYSTEM READY		System READY, no errors detected in the track and trace system
			
			
	RESULT		User-defined
			
			

Table 6: Fieldbus status LEDs (SIM2000-2 P only)

LEDs	Designation	LED behavior	Description
X9-X10 fieldbus P1-P2  <input type="radio"/> LINK <input type="radio"/> ACT	LINK		Device has no connection to the Ethernet
			Device has a connection to the Ethernet
	ACT		Device is not sending or receiving any Ethernet frames
			Device is sending and receiving Ethernet frames
<b>PROFINET</b>			
<input type="radio"/> SF / MS / RUN	SF	System error	
			Not an error
			DCP signal service is triggered via the bus: Device not configured or not configured correctly; Check configuration
			Watchdog timeout: Channel, generic or advanced diagnostics are available; System error




LEDs	Designation	LED behavior	Description
BF / NS / ERR 	BF	Bus error	
			Not an error
			No data exchange
			No configuration, slow physical connection or no physical connection
<b>EtherNET/IP</b>			
SF / MS / RUN 	MS	Module status	
			The device is in operation and functioning correctly
			Standby: The device has not been configured.
			The device is running a self-test after being switched on.
		 	The flash sequence is used to visually identify the device.
			Serious recoverable error
			Serious non-recoverable error
			The device is switched off.

LEDs	Designation	LED behavior	Description
BF / NS / ERR 	NS	Network status	
			Connected: An IP address is configured, at least one CIP connection (of an arbitrary transport class) is established.
			No connections: An IP address is configured, however no CIP connections have been established.
		 	Self-test: The device is running a self-test after being switched on.
		 	The flash sequence is used to visually identify the device.
			Timeout of connection: An IP address is configured and the time limit was exceeded for one exclusive owner connection in which this device is the target.
			Duplicate IP: The device has detected that its IP address is already in use.
			Switched off, no IP address: The device has no IP address or is switched off.
<b>EtherCAT</b>			
SF / MS / RUN 	RUN	RUN status	
			INIT: The device is in INIT state.
		 (2.5 kHz)	PRE-OPERATIONAL: The device is in the state before operation.
		 (Single flashing)	SAFE-OPERATIONAL: The device is in safe mode.
	OPERATIONAL: The device is in operation.		

LEDs	Designation	LED behavior	Description
	ERR	Error status	
			No error: The EtherCAT communication of the device is in operation.
		 (2.5 kHz)	Invalid configuration: General configuration error. Possible cause: A status change specified by the master is not possible due to the register or object settings.
		 (Single flashing)	Local error: The slave device application has automatically changed the EtherCAT status. Possible cause 1: A host watchdog timeout has occurred. Possible cause 2: Synchronization error, the device changes automatically to safe-operational.
		 (Double flashing)	Process data watchdog timeout: A process data watchdog timeout has occurred. Possible cause: Sync manager watchdog timeout.




### X1 - POWER

Table 7: Power LEDs

LEDs	Designation	LED behavior	Description
	1; 2		Supply voltage is not on
			Supply voltage is on




### X2 - DIGITAL IO

Table 8: Digital IO LEDs

LEDs	Designation	LED behavior	Description
	C/Q1; DI1; C/Q2; DI2		IO LINK mode: no data activity Dig-IO mode: status of current signal level = low
			IO LINK mode: data activity Dig-IO mode: status of current signal level = high






### X3 - OUTPUT

Table 9: Output LEDs

LEDs	Designation	LED behavior	Description
	1; 2; 3; 4		No voltage applied to connection
			Voltage applied to connection






**X4 - TRIGGER**

Table 10: Trigger LEDs

LEDs	Designation	LED behavior	Description
	GND		GND S1 switch to GND ISO
			GND S1 switch to GND
	1; 2; 3; 4		Current signal level = low
			Current signal level = high




**X5 - INCREMENT**

Table 11: Increment LEDs

LEDs	Designation	LED behavior	Description
	GND		GND S2 switch to GND ISO
			GND S2 switch to GND
	5; 6; 7; 8		Current signal level = low
			Current signal level = high




**X6 - SERIAL A (SIM2000-2 P only)**

Table 12: Serial A LEDs

LEDs	Designation	LED behavior	Description
	Rx1; Tx1; Rx2; Tx2		No signal activity
			Signal activity

**X7 - SERIAL B**






Table 13: Serial B LEDs

LEDs	Designation	LED behavior	Description
	Rx3; Tx3; Rx4; Tx4		No signal activity
			Signal activity








## X8 - CAN

Table 14: CAN LEDs

LEDs	Designation	LED behavior	Description
	ACT		No signal activity
			Signal activity
	TERM		Termination resistor not activated
			Termination resistor activated

## X11 - X14 ETHERNET 1 - 4 (SIM2000-2 P) / X11 - X12 ETHERNET 1 - 2 (SIM2000-2 C)

Table 15: Ethernet LEDs

LEDs	Designation	LED behavior	Description
	LINK		Connection not established with Ethernet
			Connection established with Ethernet
	ACT		No activity
			Data transmission via Ethernet

## 9 Maintenance

### 9.1 Cleaning



**NOTICE**

**Equipment damage due to improper cleaning.**

Improper cleaning may result in equipment damage.

- Only use recommended cleaning agents and tools.
- Never use sharp objects for cleaning.

- ▶ The device must be cleaned regularly from the outside to guarantee heat dissipation and therefore operation. Particular attention must be paid to ensure that the cooling ribs and, if present, the fan are free from dust and dirt. Use a dry cloth or an industrial vacuum cleaner for cleaning. Do not use cleaning agents.

### 9.2 Maintenance plan

During operation, the device works maintenance-free.

Depending on the assignment location, the following preventive maintenance tasks may be required for the device at regular intervals:

*Table 16: Maintenance plan*

Maintenance work	Interval	To be carried out by
Check device and connecting cables for damage at regular intervals.	Depends on ambient conditions and climate.	Specialist
Clean housing.	Depends on ambient conditions and climate.	Specialist
Clean any fans and check their function	Depends on ambient conditions and climate. Recommended: At least every 6 months.	Specialist

## 10 Decommissioning

### 10.1 Disposal

**CAUTION****Risk of injury due to hot device surface.**

The surface of the device can become hot.

- Before performing work on the device (e.g. mounting, cleaning, disassembly), switch off the device and allow it to cool down.
- Ensure good dissipation of excess heat from the device to the surroundings.

---

If a device can no longer be used, dispose of it in an environmentally friendly manner in accordance with the applicable country-specific waste disposal regulations. Do not dispose of the product along with household waste.

- ▶ Remove the battery under the cover (front) and dispose off it in accordance with the national regulations on environmental protection.

**NOTICE****Danger to the environment due to improper disposal of the device.**

Disposing of devices improperly may cause damage to the environment.

Therefore, observe the following information:

- Always observe the national regulations on environmental protection.
  - Separate the recyclable materials by type and place them in recycling containers.
-

## 11 Technical data



### NOTE

The relevant online product page for your product, including technical data, dimensional drawing, and connection diagrams, can be downloaded, saved, and printed from the Internet.

The call is made via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](https://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

Please note: This documentation may contain further technical data.

### 11.1 Features

Feature	SIM2000-2 P	SIM2000-2 C
Task	data recording, evaluation, and archiving	
Supported devices (excerpt)	Encoders, code readers, RFID read/write devices, SICK LiDAR sensors	
Technology	<ul style="list-style-type: none"> <li>ARMv8 architecture</li> <li>Preinstalled SICK SensorApp for track and trace systems</li> </ul>	
Random Access Memory	4 GB DDR4	
Flash memory	16 GB eMMC, of which 12 GB are available for applications	
memory card (optional)	Two industrial-grade microSD memory cards (flash card) SD card 2 must be in the card slot before starting the device, it cannot be dynamically plugged in and used while the device is running.  <b>Supported microSD memory cards:</b> <ul style="list-style-type: none"> <li>microSD card 1: max. 2 TB (SDXC, SDHC, SD); FAT 12/16/32, EXT 2/3/4; intended for saving application-specific alibi data</li> <li>microSD card 2: max. 32 GB (SDHC, SD); FAT 12/16/32, EXT 2/3/4; intended for saving application-specific cloning/configuration data</li> </ul>	Industrial-grade microSD memory card (flash card)  <b>Supported microSD memory cards:</b> <ul style="list-style-type: none"> <li>microSD card/cloning card: max. 2 TB (SDXC, SDHC, SD); FAT 12/16/32, EXT 2/3/4; intended for saving application-specific cloning/configuration data</li> </ul>
Sensor data processing	According to the preinstalled SensorApp	

### 11.2 Interfaces

Feature	SIM2000-2 P	SIM2000-2 C
<b>SERIAL (RS-232 / RS-422 / RS-485)</b>		
Quantity	4	2
Function	RS-232 / RS-422 / RS-485	
Maximum data transmission rate	RS-232: 115.2 kBaud RS-422: 2 MBaud RS-485: 2 MBaud	
<b>FIELDBUS (fieldbus)</b>		
Quantity	2	-
Function	Ethernet-based fieldbus	
Data transmission rate	10/100 Mbit/s	

Feature	SIM2000-2 P	SIM2000-2 C
Protocol	ProfiNet, Ethernet/IP, EtherCAT (under development)	-
<b>ETHERNET</b>		
Quantity	4	2
Function	Host, AUX, image transmission	
Data transmission rate	ETH1 - 4: 0.01; 0.1; 1 Gb/s	ETH1 - 2: 0.01; 0.1; 1 Gb/s
Protocol	TCP/IP, FTP (image transmission)	
<b>CAN</b>		
Quantity	1	
Function	SICK CAN sensor network (master/slave, multiplexer/server), termination controllable via app	
Data transmission rate	20 kbit/s ... 1 Mbit/s	
Protocol	CSN (SICK CAN sensor network)	
<b>Digital inputs/digital outputs</b>		
X2	2 configurable inputs/outputs	
X2	2 inputs	
X3	4 non-insulated outputs (push-pull)	
X4	4 isolated inputs for trigger signals	
X5	4 isolated inputs for incremental signals	
<b>USB</b>	USB 2.0 (mini USB) for configuration/ diagnostics/ firmware update	
<b>Display connection</b>	Connection for monitor for diagnostics and service (under development)	

### 11.3 Mechanics and electronics

Feature	SIM2000-2 P	SIM2000-2 C
Operating elements	1 selector switch, 2 S1 and S2 switches for GND ISO/GND	
Electrical connection	X1 - POWER: spring terminals X2 - DIGITAL IO: spring terminals X3 - OUTPUT: spring terminals X4 - TRIGGER: spring terminals X5 - INCREMENT: spring terminals X6 - SERIAL A: spring terminals X7 - SERIAL B: spring terminals X8 - CAN: spring terminals X9 ... X14: RJ-45	X1 - POWER: spring terminals X2 - DIGITAL IO: spring terminals X3 - OUTPUT: spring terminals X4 - TRIGGER: spring terminals X5 - INCREMENT: spring terminals X7 - SERIAL B: spring terminals X8 - CAN: spring terminals X9 ... X12: RJ-45
Supply voltage	24 V DC $\pm$ 20% in accordance with EN 61010, also applies to digital inputs	
Operating current	limit to max. 6 A from external power supply unit	
Power consumption	15 W typ. (at full CPU load, no sensors connected)	
Power output	Max. 100 W total (all connections)	
<b>Output current</b>		
Digital outputs	X2: 100 mA per output X3: 100 mA per output	
Supply voltages	X2: 700 mA max X4, X5: 700 mA total	
Battery	Type: CR 1632, 3 V, replaceable, not rechargeable Chemical system Lithium manganese dioxide (Li-MnO <sub>2</sub> )	
Housing material	Aluminum die cast	

## 11 TECHNICAL DATA

Feature	SIM2000-2 P	SIM2000-2 C
Housing color	Uncoated aluminum	
Protection class	III	
Weight	1475 g	1435 g
Dimensions (W x D x H)	225 x 132.5 x 73 mm	

### 11.4 Ambient data

Feature	SIM2000-2 P and SIM2000-2 C
Electromagnetic compatibility	IEC 61000-6-2:2016 / EN IEC 61000-6-2:2019 IEC 61000-6-4:2018 / EN IEC 61000-6-4:2019 IEC 61131-9:2013-09
Vibration resistance	IEC 60068-2-6: 2007 (sine) IEC 60068-2-64:2008 (broadband)
Shock resistance	EN 60068-2-27:2009-05
Electrical safety	IEC 61010-1:2010 + COR:2011 + A1:2016, modified + A1:2016 / COR1:201
Enclosure rating	IP20 (device must be installed in a control cabinet of at least IP54 rating)
Ambient conditions	
Operation site	Use inside buildings
Height position	max. 2,000 m
Contamination rating	1
Ambient operating temperature	0 °C ... +60 °C, when the described mounting requirements are taken into account, <a href="#">see "Mounting the device", page 16</a>
Storage temperature	-20 °C ... +70 °C
Permissible relative humidity	90%, non-condensing

## 12 Annex

### 12.1 Dimensional drawings

#### SIM2000-2 P

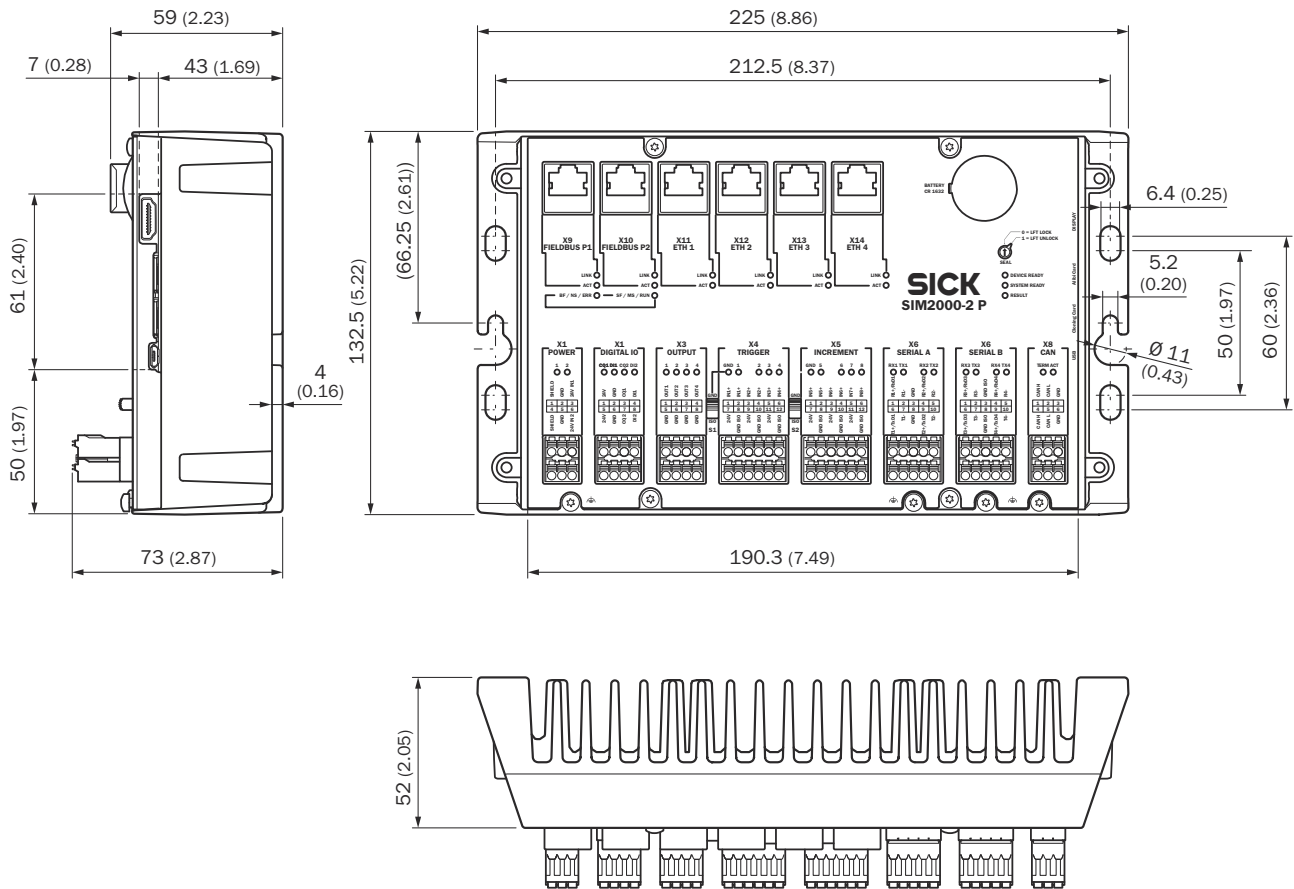


Figure 4: Dimensional drawing for SIM2000-2 P; All dimensions in mm (inch), decimal separator: period

**SIM2000-2 C**

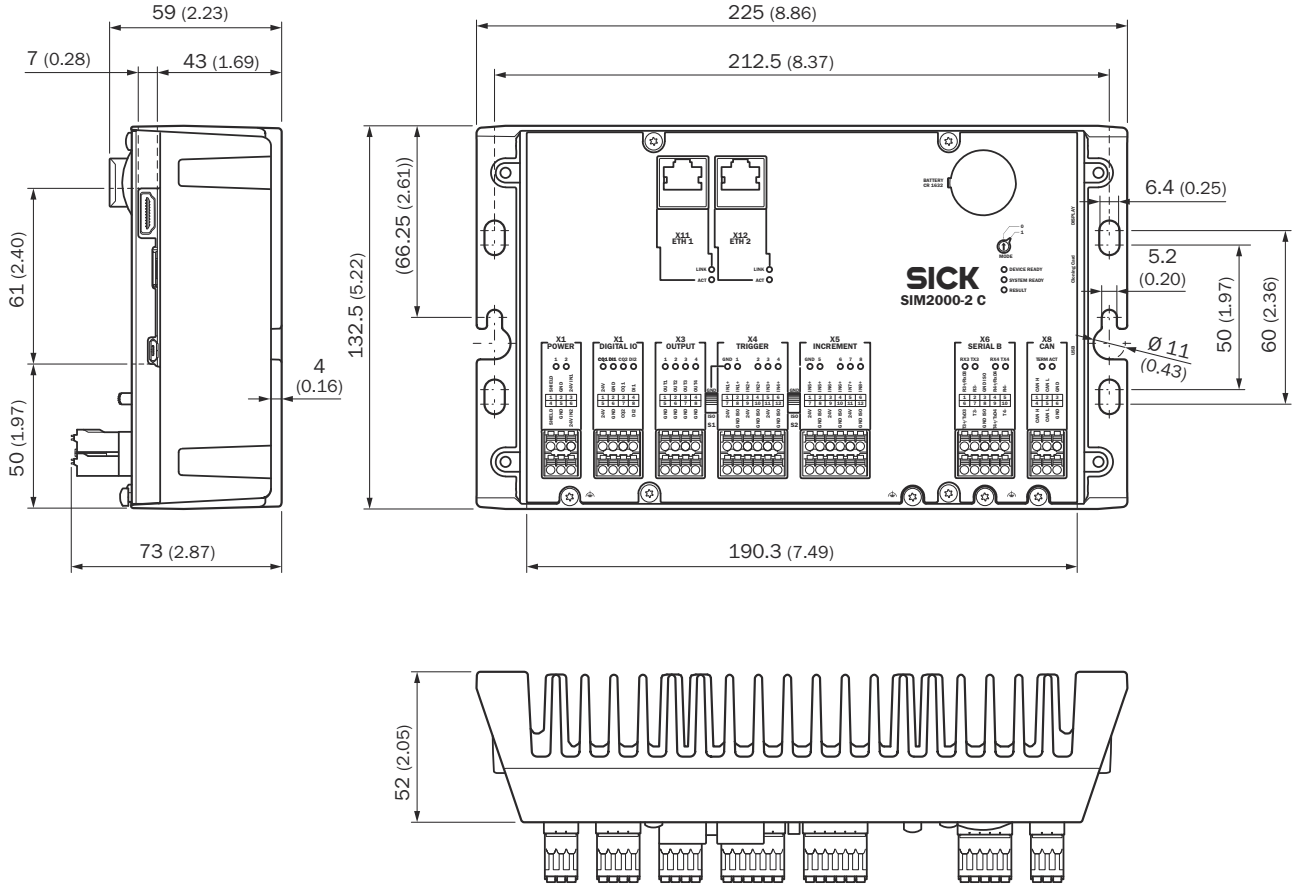


Figure 5: Dimensional drawing for SIM2000-2 C; All dimensions in mm (inch), decimal separator: period

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