

# CUBE20S expansion manual

Terminal and power module incl. base

**This document is valid for the following products:**

| <b>Material short text</b>                     | <b>Art.-No.</b> |
|--|-----------------|
| Cube20S terminal module 8x24 V DC              | 57120           |
| Cube20S terminal module 8x0 V DC               | 57121           |
| Cube20S terminal module 4x24 V + 0 V           | 57122           |
| Cube20S power module 24 V DC                   | 57130           |
| Cube20S power module 24 V DC + 5 V<br>DC / 2 A | 57131           |

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**NOTE**

Translation of the original instructions

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# 1 Introduction

## 1.1 Service and support

|                                      |   |
|--------------------------------------|---|
| <b>Sales</b>                         | Support is available at all times from our technicians, office support team and field service staff.  |
| <b>CONNECTIVITY system advisors</b>  | <p>Our system advisors are your competent contact partners if you want to develop CONNECTIVITY solutions. They cooperate with you to find the best solutions for your electrical installations.</p> <p>Our CONNECTIVITY system advisors work with you to find ways to help you permanently strengthen the competitiveness of your machines and systems.</p>   |
| <b>Customer Service Center (CSC)</b> | <p>Our staff of the Customer Service Center will help you with all questions concerning installation and set-up. They support you, for example, if you have problems with combining hardware and software products from different manufacturers.</p> <p>A number of support tools and measurement facilities are available for field bus systems and EMC interferences.</p> <p>Please do not hesitate to call us at +49 (0) 7191 47-2050 or send an e-mail to <a href="mailto:support@murrelektronik.com">support@murrelektronik.com</a>.</p> |
| <b>Service addresses</b>             | <p>Please visit our website to find your contact person:</p> <p><a href="http://www.murrelektronik.com">www.murrelektronik.com</a></p>  |

## 1.2 Introduction / about this document

|                             |   |
|-----------------------------|---|
| <b>Use of this document</b> | This document describes the use of the Terminal/power modulesFunction modules incl. base from the Cube20S of Murrelektronik GmbH. It includes a description of the design, engineering and application. |
|-----------------------------|---|



### NOTE

Translation of the original manual.

## 1.3 Symbols

This document includes information and notes that have to be observed for your own safety and to avoid injuries and material damage. They are marked as follows:



### DANGER!

#### Immediate danger

→ Failure to observe this warning involves an imminent risk of death or serious injuries.



### WARNING!

#### Possible danger

→ Failure to observe this warning can lead to death or serious injuries.

**CAUTION!****Low-risk danger**

→ Failure to observe this warning can lead to mild to moderate injuries.

**NOTICE****Possible material damage**

→ Failure to observe the warning may cause damage to the device and/or the system.

**NOTE**

Other technical information and notes of Murrelektronik GmbH.

**RECOMMENDATION**

Notes with this symbol are recommendations of Murrelektronik GmbH.

**PRODUCTS AND ACCESSORIES**

This symbol indicates accessories or product recommendations.

**Instruction for use**

→ An arrow marks instructions.

→ Read and observe the instructions.

1 | If they are numbered, it is absolutely necessary to follow them in the correct order.

2 | Read and observe the instructions.

**Hexadecimal numbers**

Hexadecimal numbers are written in the **0x** format usually used by programmers, e.g. : **0x15AE** = 15AEh

## 1.4 Trademarks

Trademarks of the following companies and institutions are used in this documentation:

|                             |  |
|-----------------------------|--|
| <b>PROFIBUS</b>             | PROFIBUS Nutzerorganisation e.V. (PNO)                               |
| <b>PROFINET/PROFINET IO</b> | PROFIBUS Nutzerorganisation e.V. (PNO)                               |
| <b>Ethernet/IP</b>          | Open DeviceNet Vendor Association (ODVA)                             |
| <b>CANopen</b>              | CAN in AUTOMATION - International Users and Manufacturers Group e.V. |
| <b>Modbus</b>               | Gould Inc. Corporation   |
| <b>PRONETA</b>              | Siemens AG   |
| <b>S7-300</b>               | Siemens AG   |
| <b>S7-400</b>               | Siemens AG   |
| <b>S7-1500</b>              | Siemens AG   |
| <b>SIMATIC</b>              | Siemens AG   |

**STEP**

Siemens AG

**TIA Portal**

Siemens AG

## 2 For your own safety

### 2.1 Target group

|                      |  |
|----------------------|--|
| <b>Documentation</b> | Please give this manual to all employees involved in the following tasks: <ul style="list-style-type: none"><li>■ Planning</li><li>■ Installation</li><li>■ Set-up</li><li>■ Operation</li></ul> |
| <b>Users</b>         | This manual is intended for users who have knowledge of automation systems.  |

#### 2.1.1 Training / qualification



#### **WARNING!**

##### **Risk of injury in case of insufficient qualification!**

Improper use can result in severe personal injuries and material damage.

→ Have specific activities carried out only by persons specified in the corresponding chapters of these operating instructions.

|                            |  |
|----------------------------|--|
| <b>Qualification</b>       | In the operating instructions, the following qualifications for different fields of activity are named:  |
| <b>Operating personnel</b> | <p>The automation system may only be operated by persons that are trained, instructed and authorized for this kind of work.</p> <p>Troubleshooting, servicing, cleaning, maintenance and replacement may only be carried out by trained or instructed personnel. These persons must know the contents of the operating instructions and act accordingly.</p> <p>Start-up and instruction must be carried out by qualified personnel only.</p>  |
| <b>Qualified personnel</b> | <p>Authorized by the manufacturer electrical engineers and skilled electricians of the customer or third parties who have been trained by the manufacturer in the installation and start-up and are entitled to put circuits and devices into operation, to ground and label according to the standards of safety technology.</p> <p>Qualified personnel is trained or instructed in the respective local valid standards of the safety technology in maintenance and use of the appropriate safety equipment.</p> |

### 2.2 Intended purpose

|                           |  |
|---------------------------|--|
| <b>Designated use</b>     | <p>The Cube20S system has been designed and manufactured for:</p> <ul style="list-style-type: none"><li>■ communication and process control</li><li>■ general control and automation tasks</li><li>■ industrial use</li><li>■ operation under the ambient conditions specified under technical data</li><li>■ installation in a switch cabinet</li></ul> |
| <b>Foreseeable misuse</b> | <p>The device is not approved for being used:</p> <ul style="list-style-type: none"><li>■ in potentially explosive atmospheres (EX Zone)</li><li>■ outside of switch cabinets.</li></ul>   |



## 2.3 General safety instructions

### Please note:

- the relevant safety and accident prevention regulations;
- the EC Directives or other national regulations;
- generally recognized safety rules;
- the section 2.5 "EMC installation guidelines".

### NOTICE

#### Defective device!

Improper use of hardware and software can cause damage to the device.

- ➔ Only qualified personnel of Murrelektronik GmbH may manipulate the device.
- ➔ Use the device only to the extent described in the manual.

#### ***Avoid accidents caused by electrical voltage!***

- ➔ Comply with the 5 safety rules of electrical engineering!
- ➔ Disconnect the device from the mains.
- ➔ Then carry out installation or repair work.

#### ***Avoid personal injury and material damage due to malfunctions!***

- ➔ Provide external circuit breakers.
- ➔ The device may only be operated within the specified tolerances.

#### ***Avoid undefined states!***

- ➔ Select and install connection lines so that capacitive and inductive interferences do not have adverse effects on the system.
- ➔ Protect the device against improper and unintended use.

## 2.4 Notes on electrostatically sensitive equipment

### NOTICE

#### Electrostatic sensitive product

The assemblies might get damaged.

- ➔ Ensure sufficient grounding of persons and working material!

### Handling



Murrelektronik assemblies include highly integrated MOS components. These components are extremely sensitive to over-voltage occurring, for example, due to electrostatic discharge. Assemblies at risk are marked with the adjacent symbol.

The symbol is affixed to assemblies, sub-racks or packaging and indicates electrostatically sensitive equipment. These assemblies may become irreparably damaged by voltage and energy levels which are far below the perception levels of human beings.

If a person who is not electrostatically discharged handles electrostatically sensitive equipment, voltages may be produced. They may damage components, impair the functioning of assemblies or render assemblies inoperative. Frequently, assemblies thus damaged cannot directly be recognized as faulty. The fault may only show up after prolonged operation.

Components damaged by electrostatic discharge may produce temporary faults in case of temperature changes, vibrations or load changes.

Only with a consistent use of protective devices and a responsible compliance of the instructions for use can you avoid malfunctions or failures of the electrostatically sensitive equipment.

### Shipping

- ➔ For shipping electrostatically sensitive equipment, use **always** the original packaging.

### Measurements

Observe the following notes for measurements on electrostatically sensitive equipment:

- ➔ Discharge potential-free measuring instrument briefly
- ➔ Ground the measuring instruments used

## 2.5 EMC installation guidelines

### Industrial use

The Cube20S is an electronic device manufactured according to the current state-of-the-art standards. Both the robust mechanical construction and the design of the electronic components make it ideal for industrial use.

To guarantee a trouble-free operation, observe the following rules when installing the device in systems. Otherwise, the high interference immunity and resistance to damage of the device may become partially ineffective.

The interference immunity of the entire system considerably depends on the correct installation, location and wiring.

- 1 | For safe operation, check the installation regulations stipulated by the manufacturer of the controller.
- 2 | Bring them in line with the recommendations for an EMC-compatible design.
- 3 | Then install Cube20S.

## 2.6 Notes on spare parts and accessories

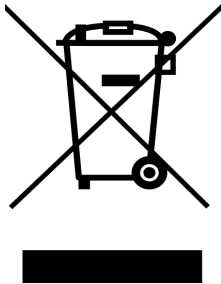
### Spare parts

- Only use the original spare parts or spare parts by other manufacturers expressly authorized by Murrelektronik GmbH.
- Check the function of the device after having replaced a component.

### Accessories

- The use of accessories may alter the device function. Use only accessories authorized by Murrelektronik GmbH.
- Observe the enclosed instructions of the accessories when installing them.

## 2.7 Environmentally friendly disposal



### Disposal

The product can be returned to Murrelektronik GmbH free of charge for disposal. The same is true for the original packaging and any batteries or power packs. Any units that have been contaminated with hazardous substances will not be accepted for repair or disposal.

### Returns

- ➔ Label the product and the packaging with **"For disposal"**.
- ➔ Package the product.
- ➔ Send the package to:  
**Murrelektronik GmbH**  
**Falkenstraße 3**  
**71570 Oppenweiler | GERMANY**

We will make sure that the items are disposed of in accordance with German legislation. The most recent owner is responsible for transport to the return point until items arrive at their destination.

## 2.8 EC Declaration of Conformity



Murrelektronik GmbH herewith declares that the products and systems comply with the basic requirements and directives:

- 2004/108/EC Electromagnetic compatibility
- 2011/65/EU RoHS

## 2.9 Warranty and liability

### Warranty and liability claims

Warranty and liability claims shall be lost if

- the product is not used according to its designated use,
- damage is caused because the manual and the operating instructions have not been observed,
- the personnel was/is not qualified.

### 3 System description

#### Overview

The Cube20S system is a modular automation system mounted on a 35 mm DIN rail in the control cabinet.

Using 2-, 4- and 8-channel expansion modules, you can adapt this system exactly to your automation tasks.

You do not need much wiring because the 24 V DC power supply is integrated in the backplane bus. Defective electronic modules can be replaced without having to replace the wiring.

The use of power modules with different colors allows you to define further potential ranges for the 24 V DC power supply within the system or expand the electronic supply by 2 A.

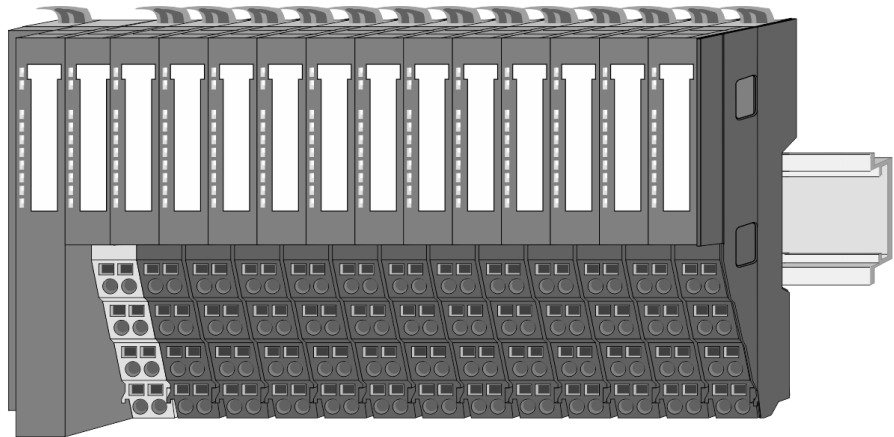


Fig. 3-1: Cube20S system

#### Components

The Cube20S system consists of the following components:

- Bus node
- Expansion modules
- Accessories



#### NOTE

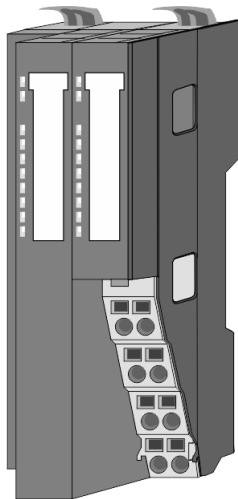
The use of the Cube20S system is only permitted with a combination of modules from Murrelektronik. Operation together with modules of other manufacturers is impermissible!

### Bus node

Bus interface and power module of the bus node are integrated in one housing. The bus interface is used for connection to a superior bus system.

Both bus interface and the electronics of the connected expansion modules are supplied with power via the power module.

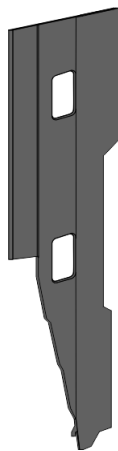
There is another connection on the power module for the 24 V DC power supply of the connected expansion modules.



By installing up to 64 expansion modules on the bus node, they will be electrically connected, i.e.:

- they are incorporated in the back-plane bus,
- the electronic modules are supplied with power,
- each expansion module is connected to the 24 V DC power supply.

### Bus cover



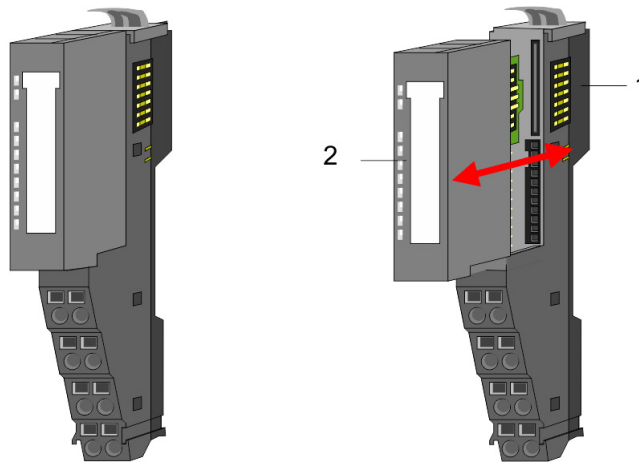
Each bus node has a cover to protect the contacts.

- ➔ Remove the cover on the bus node before installing Cube20 modules.
- ➔ To protect the contacts, mount the bus cover on the outermost module.

The bus cover is also available as accessory (see chapter 11.1 "Accessories").

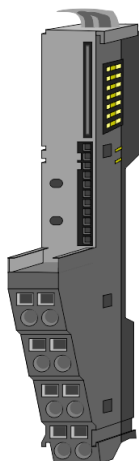
## Expansion modules

Each expansion module consists of a terminal and an electronic module.



- 1 Terminal module
- 2 Electronic module

## Terminal module

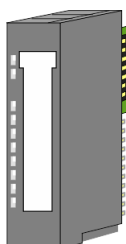


The terminal module consists of the following functional elements:

- sliding mechanism to fasten the electronic module,
- backplane bus with power supply for the electronics,
- connection to the 24 V DC power supply,
- staircase-shaped terminal block for wiring,
- safe locking system for fastening on a mounting rail.

This locking mechanism allows you to mount your Cube20S system outside the control cabinet and fix the complete system later in the control cabinet.

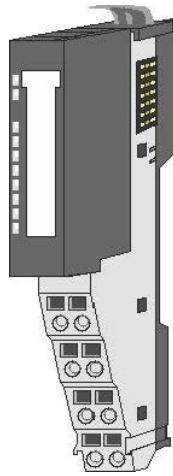
## Electronic module



The functionality of an expansion module is defined over the electronic module.

- If the electronic module is defective, it can be replaced while wiring is kept.
- There are LEDs indicating the status on the front side.
- To facilitate wiring, there are wiring diagrams on the front and on the side of each electronic module.

### Power modules



Power modules provide the Cube20S system with power. The power modules are either integrated into the bus node or may be plugged in between the expansion modules.

Depending on the type of power module, groups of potential can be defined for the 24 V DC power supply, or the electronics supply may be extended by 2 A.

For better recognition, the power modules have a color different from the expansion modules.



## 3.1 Hardware revision

### Front printing

- The hardware revision is printed on each Cube20S module.
- Since a Cube20S module consists of a terminal and an electronic module, the respective hardware revision is printed on both modules.
- Important for the hardware revision of a Cube20S module is the hardware revision of the electronic module, which can be found below the labeling strip of the respective electronic module.
- On modules without labeling strip, the hardware revision is printed on the front side.



The example below shows the hardware revision 1. The number 1 is identified with an "X".

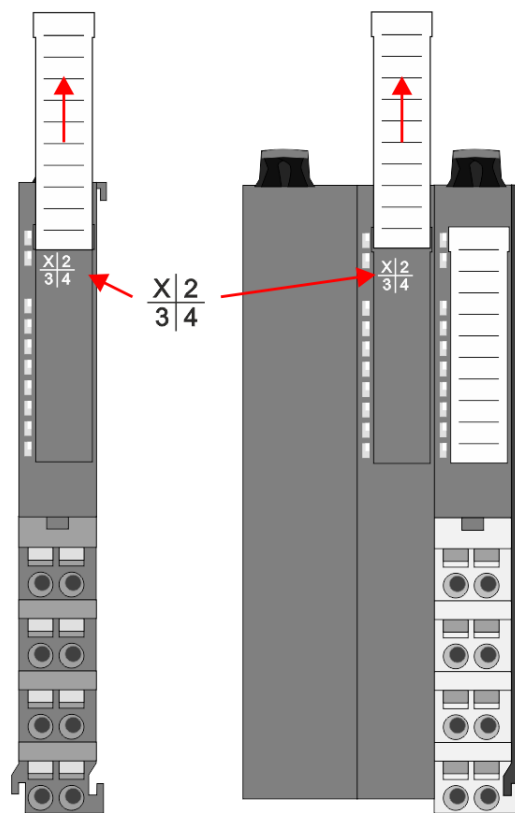



Fig. 3-2: Front printing

### Web server

The hardware version "HW revision" for bus nodes with web server can be output via the integrated web server.

## 4 General data

| Conformity                     |   |                 |  |
|--------------------------------|---|-----------------|--|
|                                | CE                                      | 2014/30/EU      | EMC Directive  |
|                                |   | 2011/65/EU      | RoHS   |
| Certifications                 |   |                 |  |
|                                | Certification according to UL           |                 | Yes  |
|                                | Certification according to KC           |                 | Yes  |
| Personal and device protection |   |                 |  |
|                                | Degree of protection                    | EN 60529        | IP20   |
|                                | Electrical isolation                    |                 |  |
|                                | To fieldbus                             | -               | Galvanically decoupled   |
|                                | To process level                        | -               | Galvanically decoupled   |
|                                | Insulation resistance                   | EN 61131-2      | -  |
|                                | Insulation voltage to reference ground  |                 |  |
|                                | Inputs / outputs                        | -               | 50 V ~ /  ,<br>at a test voltage of 500 V ~ |
|                                | Protective measures                     | -               | against short circuit  |
| Ambient conditions             |   |                 |  |
|                                | Climatic                                |                 |  |
|                                | Storage / transport                     | EN 60068-2-14   | -25 ... +70 °C   |
|                                | Operation                               |                 |  |
|                                | Horizontal installation, sus-<br>pended | EN 61131-2      | 0 ... +60 °C   |
|                                | Horizontal installation, lying          | EN 61131-2      | 0 .... +55 °C  |
|                                | Vertical installation                   | EN 61131-2      | 0 ... +50 °C   |
|                                | Air humidity                            | EN 60068-2-30   | RH1 (without condensation,<br>relative humidity 10 ... 95<br>%)  |
|                                | Pollution                               | EN 61131-2      | Degree of pollution 2  |
|                                | Installation height                     | Above sea level | ≤2000 m  |
|                                | Mechanical                              |                 |  |
|                                | vibration                               | EN 60068-2-6    | 1 g, 9 Hz ... 150 Hz   |
| Shock                          | EN 60068-2-27                           | 15 g, 11 ms     |  |
| Mounting conditions            |   |                 |  |
|                                | Installation site                       | -               | Inside the switch cabinet  |
|                                | Installation position                   | -               | Horizontal and vertical  |
|                                | Fastening                               | -               | 35 mm DIN rail   |

| EMC / standards |                      |              | Remarks  |
|-----------------|----------------------|--------------|--|
|                 | Emitted interference | EN 61000-6-4 | Class A (industrial environments)  |
|                 | Immunity Zone B      | EN 61000-6-2 | Industrial environments  |
|                 |                      | EN 61000-4-2 | ESD<br>8 kV with air discharge (severity grade 3),<br>4 kV with contact discharge (severity grade 2)   |
|                 |                      | EN 61000-4-3 | HF irradiation (housing)<br>80 MHz ... 1000 MHz, 10 V/m, 80 % AM (1 kHz)<br>1.4 GHz ... 2.0 GHz, 3 V/m, 80 % AM (1 kHz)<br>2 GHz ... 2.7 GHz, 1 V/m, 80 % AM (1 kHz) |
|                 |                      | EN 61000-4-6 | conducted 150 kHz ... 80 MHz,<br>10 V, 80 % AM (1 kHz)   |
|                 |                      | EN 61000-4-4 | Burst, severity grade 3  |
|                 |                      | EN 61000-4-5 | Surge, installation class 3 *)   |

\*) Due to single high-energy impulses, a suitable external wiring with lightning protection elements is required for surge, e.g. lightning arresters and surge arresters.

## 5 Mounting

### 5.1 Dimensions

#### Dimensions of the bus node

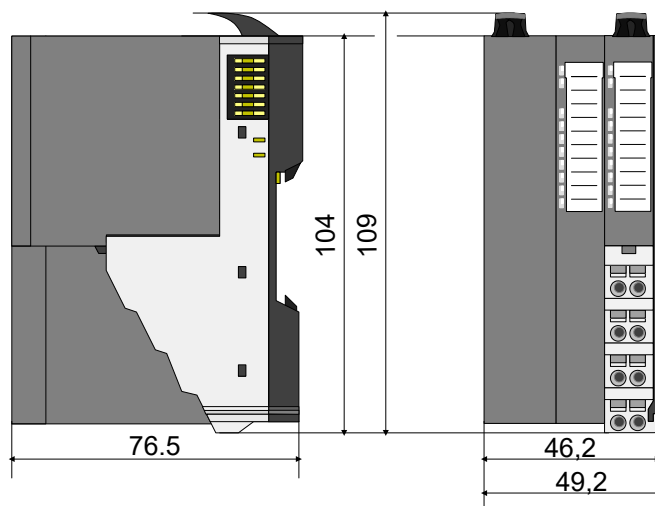


Fig. 5-1: Dimensions of the bus node in mm

#### Dimensions Expansion module

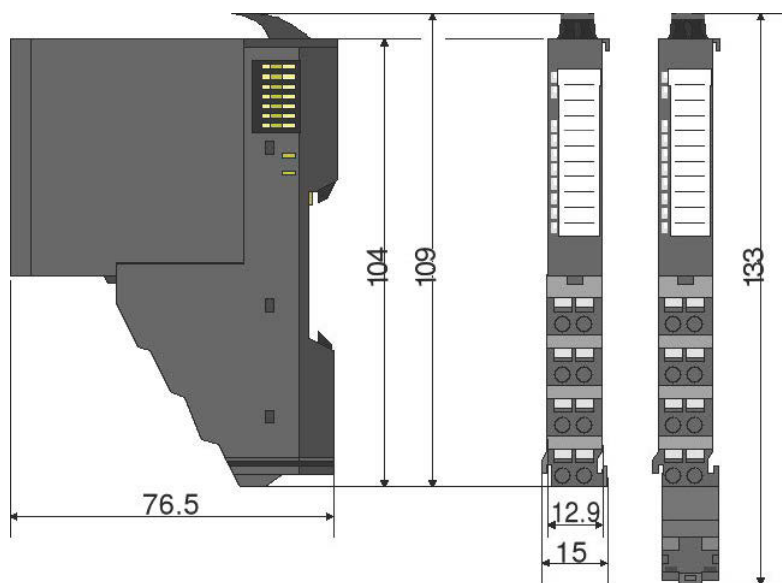


Fig. 5-2: Dimensions of the expansion module in mm

#### Dimensions of the electronic module

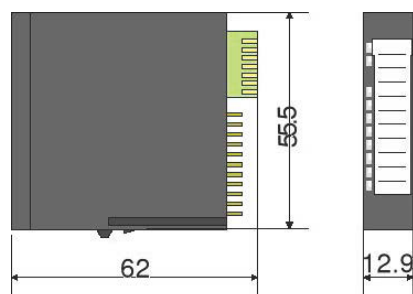


Fig. 5-3: Dimensions of the electronic module in mm

## 5.2 General notes



### WARNING!

#### Danger due to electric current!

Device and environment in the switch cabinet may carry lethal voltages.

- ➔ Before carrying out any work, make sure that the device and environment are disconnected from the power supply.
- ➔ Observe the relevant safety regulations when handling live devices.
- ➔ Ensure that only qualified personnel mount and install this module.



### CAUTION!

#### Power module and bus interface as well as power and terminal module each form one unit!

Separating destroys the modules.

- ➔ Do not separate power module and bus interface or power and terminal module! Disconnecting destroys the modules.



### NOTE

You can mount the modules individually or as a whole block on the DIN rail. For block installation, please observe the following: **All** locking levers must be open.

The individual modules are mounted directly on a DIN rail. Electronics and power supply are connected over the backplane bus.

Conditions:

- Max. number of plug-in modules: 64
- Max. total current of the electronics supply: 3 A

A **power module Art.-No. 57131** extends the current for the electronics (refer to section 7.8 Using power modules, Seite 44).

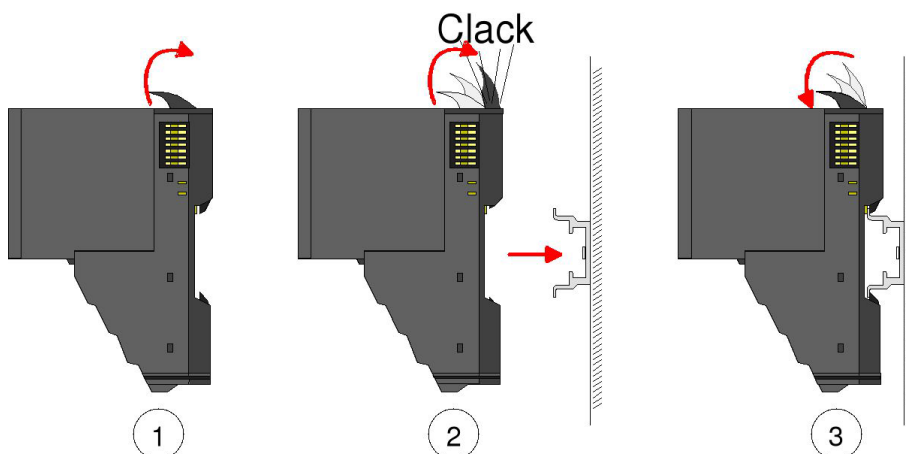


Fig. 5-4: Installing the module

## 5.2.1 Functional principle of the locking

### *Inserting and locking the module*

- ✂ The terminal module has a locking lever at its top.
- 1 | For installation and disassembly, please press this locking lever upwards until it engages audibly.
- 2 | Plug the module to be mounted in the previously plugged-in module.
- 3 | Slide the module with the help of the guide strips at top and bottom onto the DIN rail.
- 4 | Flap the locking lever downwards.

*The module is fastened to the DIN rail.*

### 5.3 Installing the DIN rail

- ➔ Install the DIN rail with the necessary distances (see Fig. 5-5: "Installation distances").

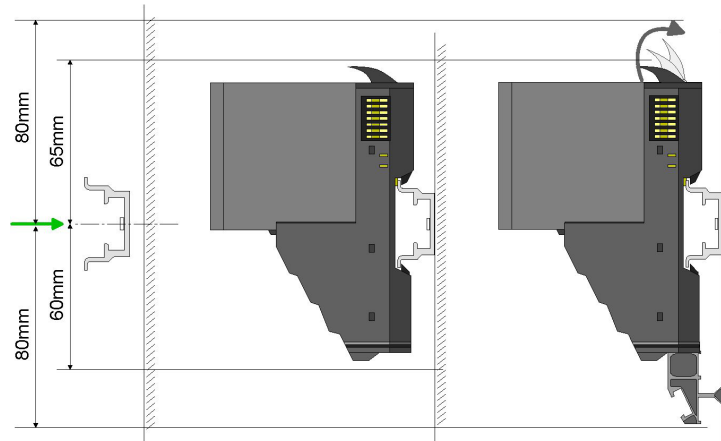


Fig. 5-5: Installation distances

## 5.4 Mounting of the bus node

- ✓ To mount the system, start on the left with the bus node.
- 1 | Flap the two locking levers of the bus node upwards (Figure 1).
- 2 | Plug the bus node in the DIN rail (Figure 1).
- 3 | Flap the two locking levers of the bus node downwards (Figure 2).
- 4 | To remove the right bus cover, pull it out towards the front (Figure 2).
- 5 | Store the bus cover to use it as termination of the system.

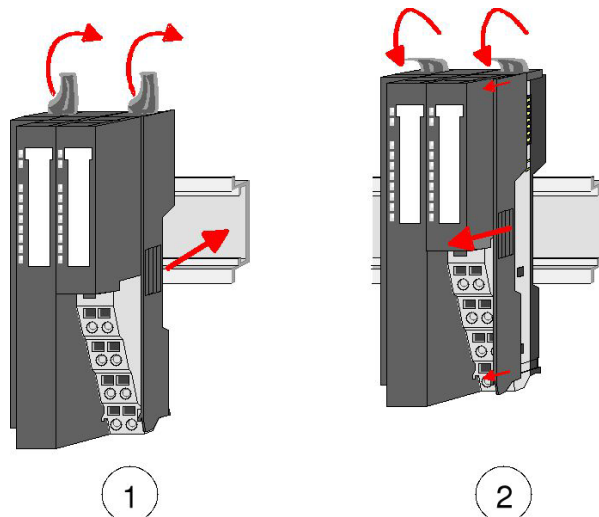


Fig. 5-6: Installing the bus node



## 5.5 Installing the expansion modules

- 1 | Flap the locking lever of the expansion module upwards.
- 2 | Plug the expansion module in the DIN rail.
- 3 | Push the expansion module towards the bus node or the last expansion module.
- 4 | Flap the locking lever of the expansion module downwards.
- 5 | Mount all expansion modules as described.
- 6 | To protect the contacts, mount the bus cover on the outmost module (see section 5.7 "Installing the bus cover").

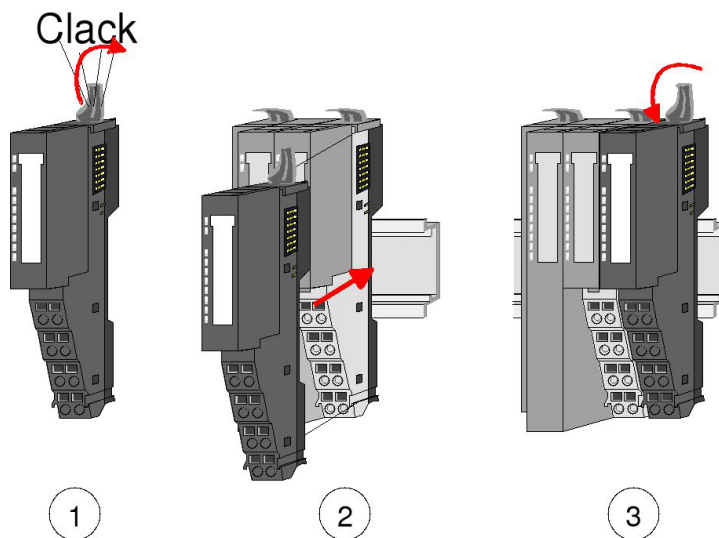
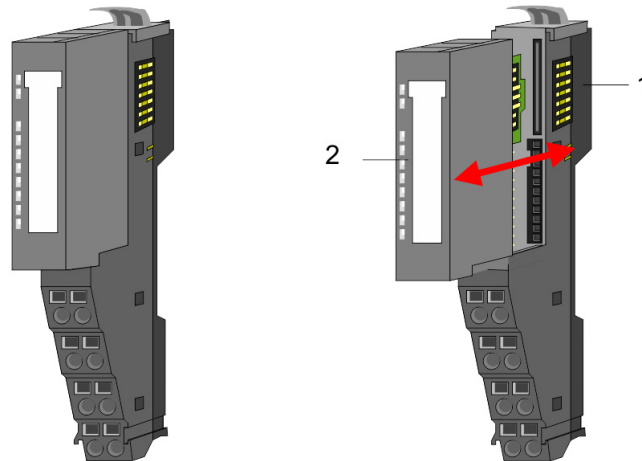


Fig. 5-7: Installing the expansion module

## 5.6 Replacing an electronic module

### Expansion modules

Each expansion module consists of a terminal and an electronic module.



- 1 Terminal module
- 2 Electronic module

#### Disassembly

✓ The electronic module has a locking lever at the bottom.

1 | **Power-off your system!**

2 | Press the locking lever upwards for disassembly.

3 | To remove the electronic module, pull it out towards the front.

*The electronic module has been removed.*

#### Installation

✓ The electronic module has a locking lever at the bottom.

➔ Slide the electronic module with the help of the guide strip into the terminal module.

*The electronic module engages audibly at the bottom.*

*Now you can bring your system back into operation.*

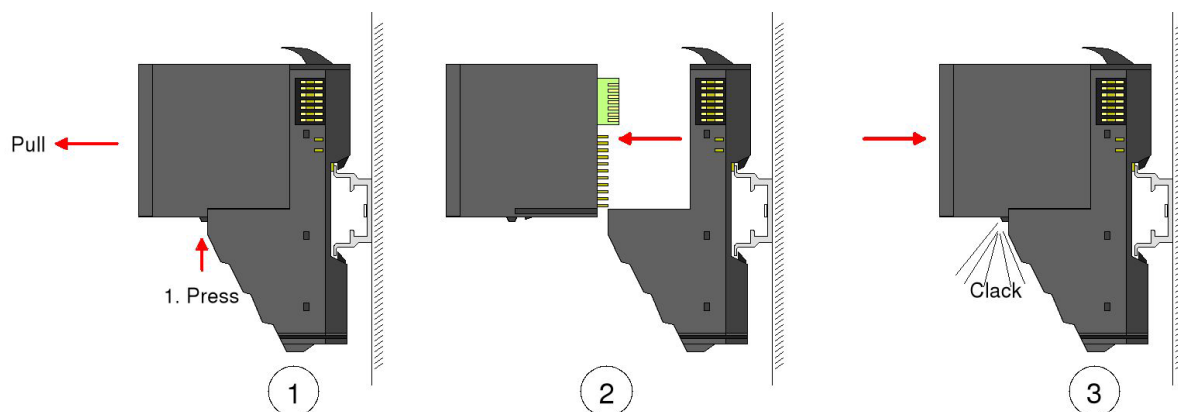


Fig. 5-8: Disassembling and installing the electronic module

## 5.7 Installing the bus cover

### Protection of the bus contacts by means of the bus cover

#### *Placing the bus cover on the expansion module*

- ✓ Prerequisite: The system has been completely mounted.
- ➔ Attach the bus cover to the outermost module.

#### *Placing the bus cover on the terminal module*

- ✓ Prerequisite: The system has been completely mounted.
- ➔ Break the front part off the bus cover.
- ➔ Attach the bus cover to the terminal module.

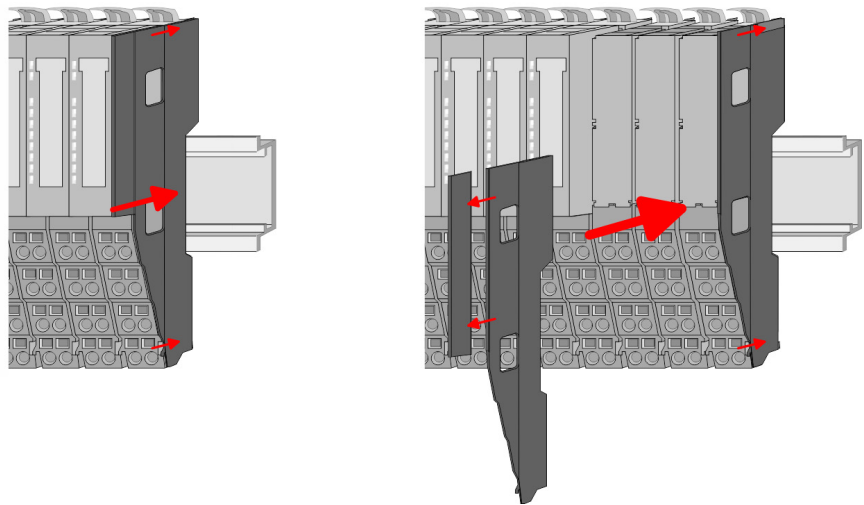
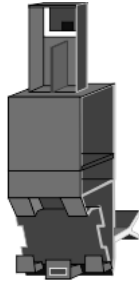


Fig. 5-9: Installing the bus cover

## 5.8 Installing the shield bus carrier

### Carrier for shield busses art. no. 57191

The shield busses (10 mm x 3 mm) for connection of cable shields are fastened to the carrier.



#### NOTE

Carriers for shield busses, shield busses and cable shield fasteners are not included in the scope of delivery.

### Installing the carrier

- ✓ Prerequisite: The Cube20S system has been completely mounted.
- ➔ If the DIN rail is flat, break the spacer off the carrier.
- ➔ Plug the carrier into the terminal module below the terminal block until it engages.

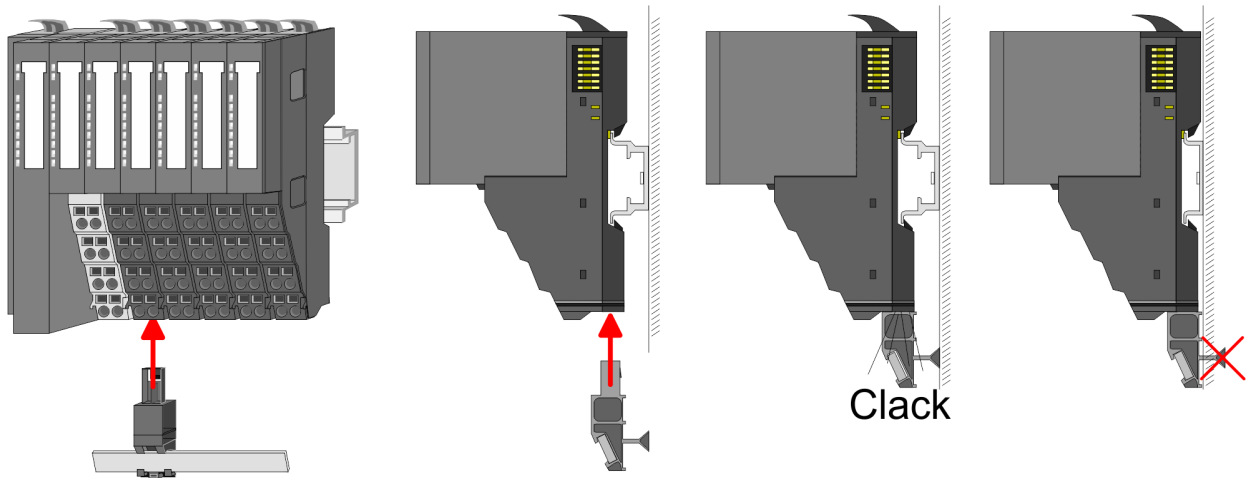


Fig. 5-10: Installing the carriers for shield busses

## 6 Disassembling and replacing modules

### 6.1 Procedure



---

**NOTE**

For demounting and exchange of a bus node, a module or a group of modules, due to mounting reasons you always have to remove the electronic module right beside. After mounting it may be plugged again.

---

***During disassembly or when replacing bus node, a module or module group, please observe the following:***

- 1 | Switch off the system's power supply.
- 2 | If existing remove the shield, the shield bus and the shield bus carriers.
- 3 | Remove the electronic module to the right of the module or module group.
  - a) For this purpose, actuate the unlocking device of the electronic module.
  - b) To remove the electronic module, pull it out towards the front.
- 4 | Dismount/replace the module or module group to be exchanged.
- 5 | Plug the electronic module in again to the right of the module.
- 6 | If necessary, fit the shield rail carriers, shield bus and shield.

## 6.2 Replacing the bus node

### Disassembly



#### CAUTION!

**Power module and bus interface belong together!**

If separated, the modules get destroyed.

→ Do not separate power module and bus interface!

- 1 | **Switch off the system's power supply!**
- 2 | Remove the wiring from the bus node, if any (see section 7 "Installation").
- 3 | Unlock the electronic module to its right at the bottom.
- 4 | To remove the electronic module, pull it out towards the front.
- 5 | Flap the locking lever of the bus node upwards.
- 6 | To remove the bus node, pull it out towards the front.

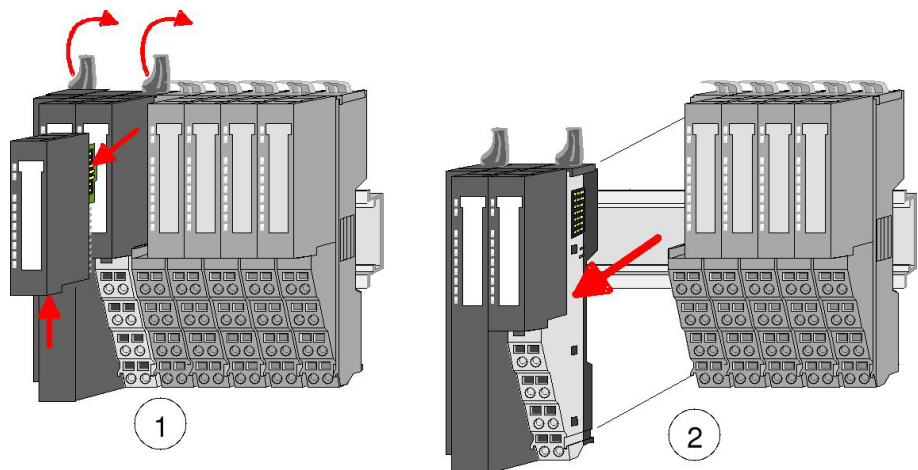


Fig. 6-1: Disassembling the bus node

### Installing the new bus node

- 1 | Flap the locking levers of the bus node upwards.
- 2 | Plug the bus node in the left module.
- 3 | Slide the bus node with the help of the guide strips onto the DIN rail.
- 4 | Flap the locking levers downwards.
- 5 | Plug in the electronic module.

Now you can bring your system back into operation.

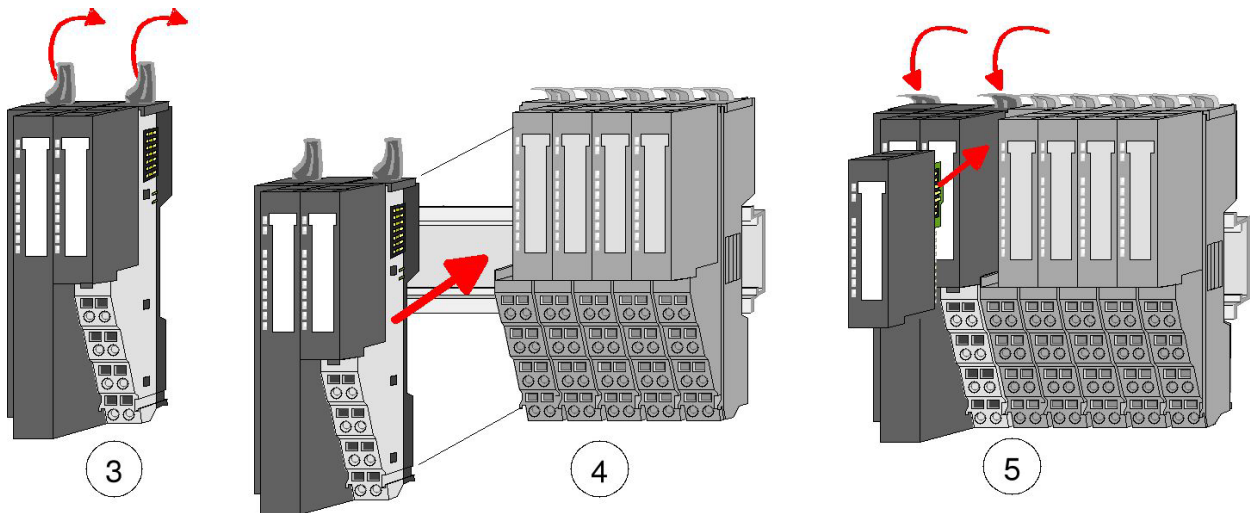


Fig. 6-2: Installing the new bus node

## 6.3 Replacing an expansion module



### NOTE

For demounting and exchange of a bus node, a module or a group of modules, due to mounting reasons you always have to remove the electronic module right beside. After mounting it may be plugged again.

### Dismounting

- 1 | **Switch off the system's power supply!**
- 2 | Remove the wiring from the module, if any. For details refer to section 7 "Installation".
- 3 | Unlock the electronic module to its right at the bottom.
- 4 | To remove the electronic module, pull it out towards the front.
- 5 | Flap the locking lever of the module to be replaced upwards.
- 6 | To remove the module, pull it out towards the front.

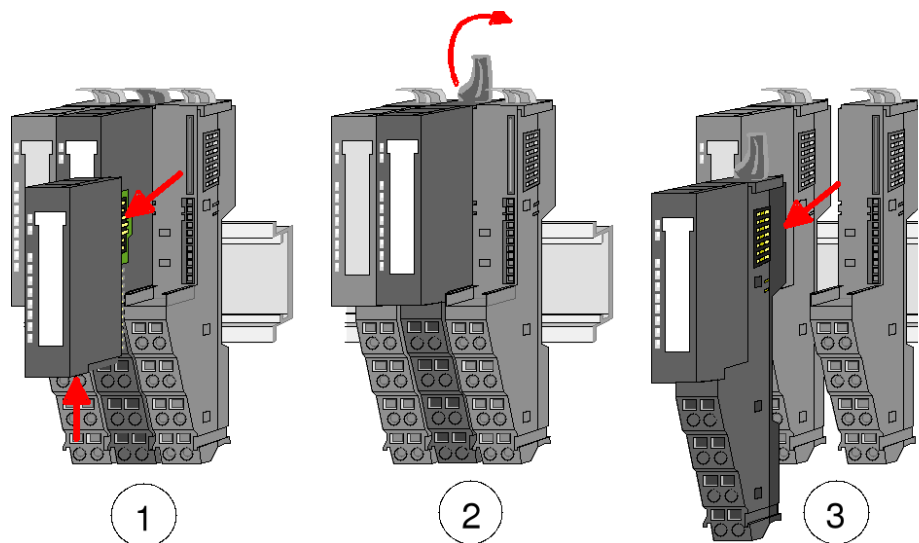


Fig. 6-3: Disassembling a module

#### Installing the new module

- 1 | Flap the locking lever of the module upwards.
- 2 | Plug the module in the gap between the modules.
- 3 | Slide the module with the help of the guide strips at both sides onto the DIN rail.
- 4 | Flap the locking lever of the module downwards.
- 5 | Plug in the electronic module.

Now you can bring your system back into operation.

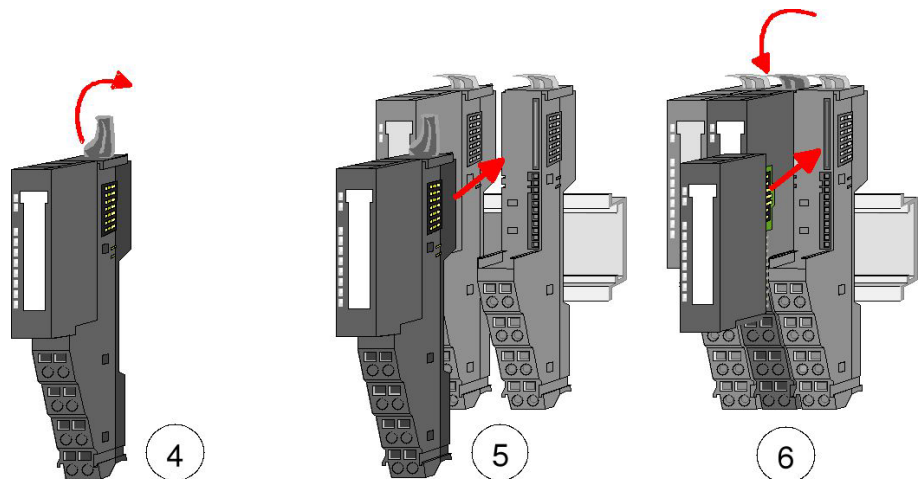


Fig. 6-4: Installing the new module



## 6.4 Replacing an electronic module

### Disassembly

✓ The electronic module has a locking lever at the bottom.

1 | **Power-off your system!**

2 | Press the locking lever upwards for disassembly.

3 | To remove the electronic module, pull it out towards the front.

*The electronic module has been removed.*

### Installation

✓ The electronic module has a locking lever at the bottom.

➔ Slide the electronic module with the help of the guide strip into the terminal module.

*The electronic module engages audibly at the bottom.*

*Now you can bring your system back into operation.*

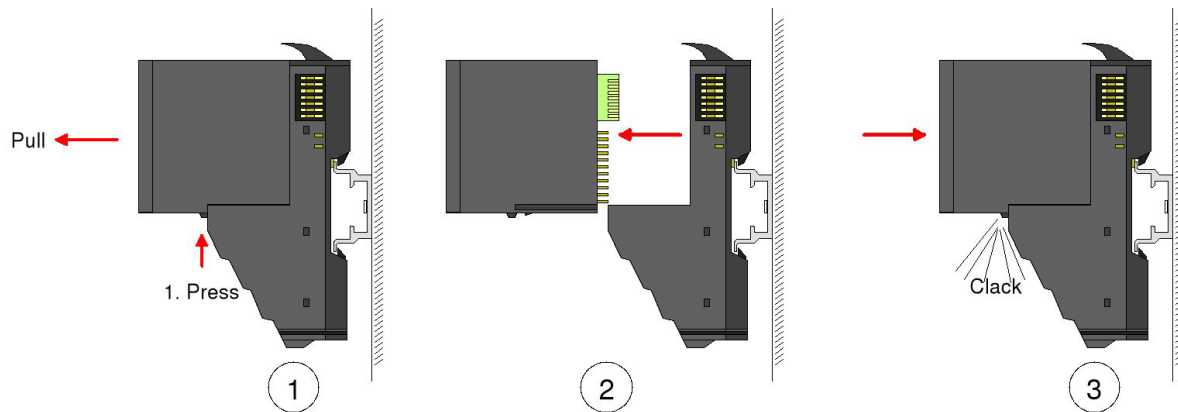


Fig. 6-5: Disassembling and installing the electronic module

## 6.5 Replacing a module group



### NOTE

For demounting and exchange of a bus node, a module or a group of modules, due to mounting reasons you always have to remove the electronic module right beside. After mounting it may be plugged again.

### Disassembly

- 1 | **Switch off the system's power supply!**
- 2 | Remove the wiring from the module group, if any (see section 7 "Installation").
- 3 | Unlock the electronic module to its right at the bottom.
- 4 | To remove the electronic module, pull it out towards the front.
- 5 | Flap the locking levers of the module group to be exchanged upwards.
- 6 | To remove the module group, pull it out towards the front.

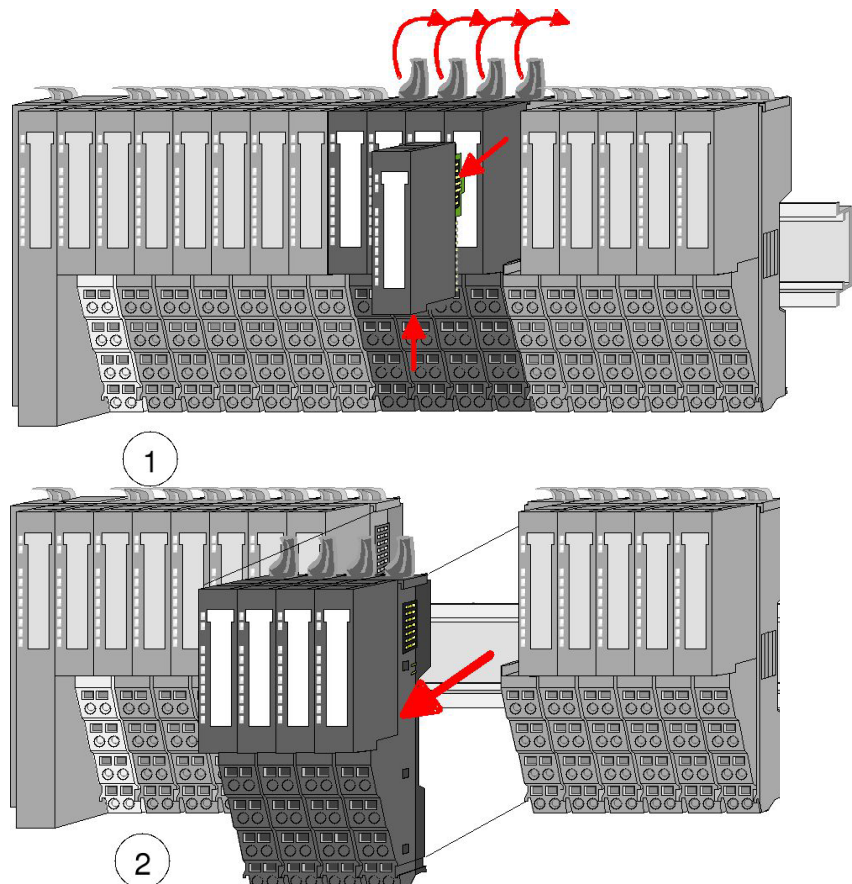


Fig. 6-6: Disassembling the module group

### Installing the new module group

- 1 | Flap the locking levers of the module group upwards.
- 2 | Plug the module group in the gap between the modules.
- 3 | Slide the module group with the help of the guide strips at both sides onto the DIN rail.
- 4 | Flap the locking levers of the module group downwards.
- 5 | Plug in the electronic module.
- 6 | Wire the new module group.

*Now you can bring your system back into operation.*

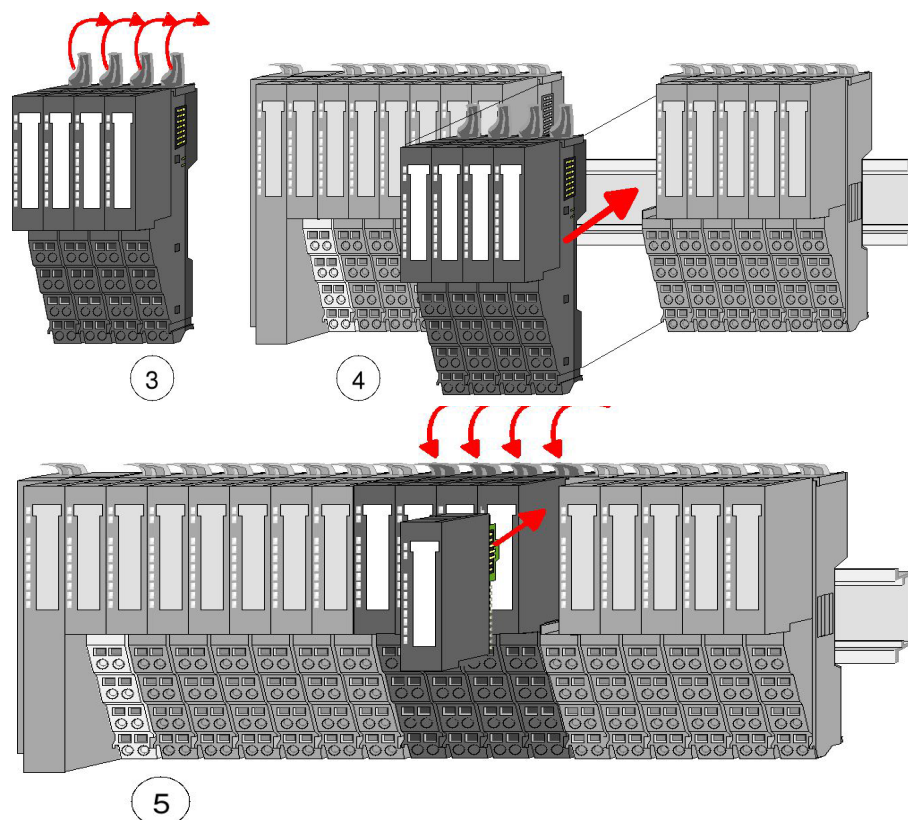


Fig. 6-7: Mounting of the module group

## 7 Installation

### 7.1 General notes



#### WARNING!

##### **Danger due to electric current!**

Device and environment in the switch cabinet may carry lethal voltages.

- ➔ Before carrying out any work, make sure that the device and environment are disconnected from the power supply.
- ➔ Observe the relevant safety regulations when handling live devices.
- ➔ Ensure that only qualified personnel mount and install this module.



#### CAUTION!

##### **Temperature rise of external lines!**

The heat dissipation of the system can raise the temperature of external lines.

- ➔ Only use thermally suitable connecting cables. The temperature specification must be 5 °C above the ambient temperature!

#### NOTICE

##### **Destruction of the bus node by the compensating currents**

Potential differences between grounding points may cause compensating current in the shield connected on both sides.

- ➔ Eliminate this situation by means of lines for equipotential bonding.



#### NOTE

##### **Separate the insulation areas!**

The Cube20S is specified for the SELV/PELV environment. The devices connected to the system must be specified for the SELV/PELV environment.

- ➔ Install cables of devices which do not correspond to the SELV/PELV environment separately from the SELV/PELV environment!



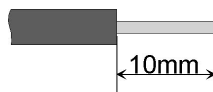
#### NOTE

##### **Conditions for UL compliant operation:**

- ➔ Use only SELV / PELV power supplies for power.
- ➔ The Cube20S system may only be installed and operated in a housing in accordance with IEC 61010-19.3.2 c).

### 7.2 Spring terminals

Cable data  
expansion modules



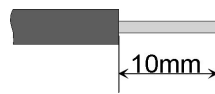
$U_{\max.}$ : 240 V ~ / 30 V ---

$I_{\max.}$ : 10 A

Cross-section: 0.08 – 1.5 mm<sup>2</sup> (AWG 28 – 16)

Stripping length: 10 mm

## Cable data power module

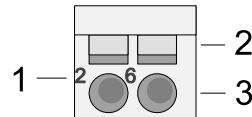


$U_{\max.}: 30 \text{ V } \text{---}$

$I_{\max.}: 10 \text{ A}$

Cross-section:  $0.08 - 1.5 \text{ mm}^2$  (AWG 28 – 16)

Stripping length: 10 mm

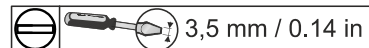


- 1 Pin no. on the plug connector
- 2 Unlocking device for screwdriver
- 3 Connection opening for wire

## 7.2.1 Procedure

### Wiring

✂ Tools: suitable screwdriver



✂ Wire cross section:  $0.08 \text{ mm}^2 \dots 1.5 \text{ mm}^2$  (AWG 28 ... 16)

- 1 | Insert the screwdriver slightly inclined in the rectangular opening (see Fig. 7-3: "Wiring" 1).
- 2 | Press and hold the screwdriver away from the round opening. The contact spring is open (see Fig. 7-3: "Wiring" 2).
- 3 | Put the stripped wire in the round opening (see Fig. 7-3: "Wiring" 2).
- 4 | Remove the screwdriver (see Fig. 7-3: "Wiring" 3).

*The wire is securely connected to the terminal by means of a spring contact.*

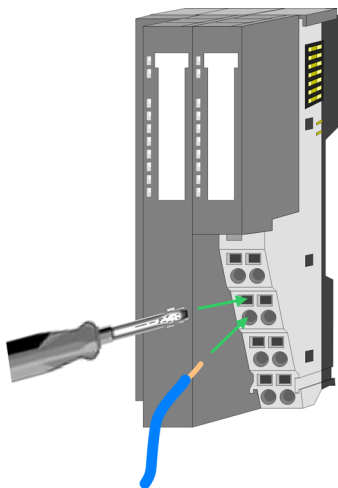


Fig. 7-1: Spring-clamp technology (bus nodes and power modules)

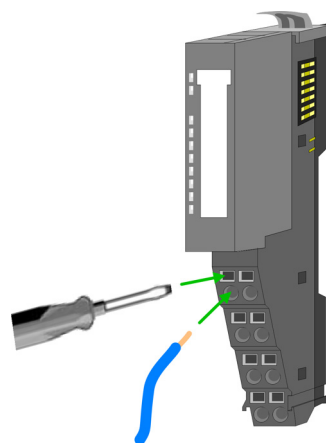


Fig. 7-2: Spring-clamp technology (expansion modules)

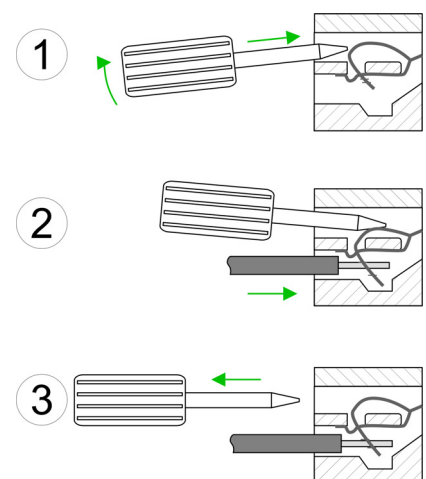


Fig. 7-3: Wiring

## 7.3 Wiring of the bus node

### Terminal module spring terminals

A power module is integrated in the bus node of the Cube20S system. Spring terminals are used for wiring. Spring terminals allow you to connect the signaling lines and power cables fast and easily. In contrast to the screw connection, this type of connection is resistant to vibrations.

The installation procedure with spring terminals is described in 7.2 "Spring terminals".

### Standard wiring

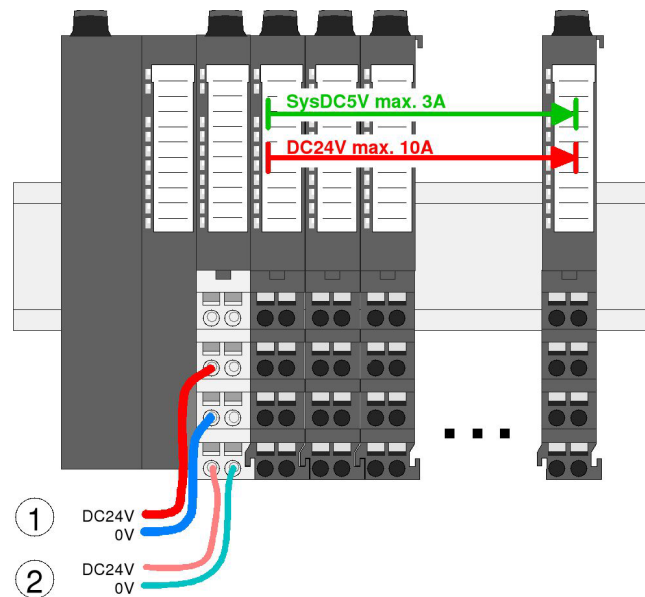


Fig. 7-4: Standard wiring

- 1 24 V DC for power supply of I/O level (max. 10 A)
- 2 24 V DC for electronics supply, bus node and I/O level

### Standard wiring of the power modules

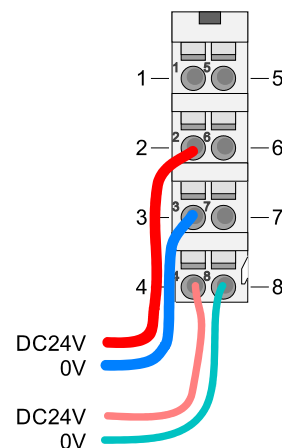


Fig. 7-5: Standard wiring

For wires with a cross-section of 0.08 mm<sup>2</sup> to 1.5 mm<sup>2</sup>.

| Pos. | Function | Type  | Description                     |
|------|----------|-------|---------------------------------|
| 1    | -        | -     | not used                        |
| 2    | 24 V DC  | Input | <b>24 V DC for power supply</b> |
| 3    | 0 V      | Input | GND for power supply            |

| Pos. | Function    | Type  | Description                    |
|------|-------------|-------|--------------------------------|
| 4    | Sys 24 V DC | Input | 24 V DC for electronics supply |
| 5    | -           | -     | not used                       |
| 6    | 24 V DC     | Input | 24 V DC for power supply       |
| 7    | 0 V         | Input | GND for power supply           |
| 8    | Sys 0 V     | Input | GND for electronics supply     |

## 7.4 Wiring of the expansion modules

### Terminal module connection terminals



#### CAUTION!

#### Connection of dangerous voltage

Dangerous voltage on the terminal module will destroy the modules.

**Exception:** If this has been specified explicitly in the module description.

→ Do not connect the terminal module to dangerous voltage!

Terminals with spring-clamp technology are used for wiring the terminal modules. The wiring with spring-clamp technology allow you to connect the signaling lines and power cables fast and easily. In contrast to the screw connection, this type of connection is resistant to vibrations.

The installation procedure with spring terminals is described in 7.2 "Spring terminals".

### Standard wiring

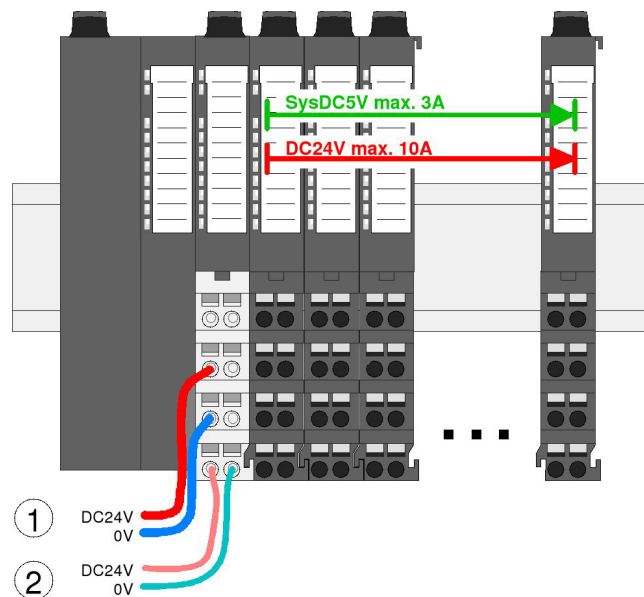


Fig. 7-6: Standard wiring

- 1 24 V DC for power supply of I/O level (max. 10 A)
- 2 24 V DC for electronics supply, bus node and I/O level

## 7.5 Wiring of the power modules

### Terminal module connection terminals

Power modules are either integrated into the bus node or may be plugged between the expansion modules.

Terminals with spring-clamp technology are used for the wiring of power modules. The wiring with spring-clamp technology allow you to connect the signaling lines and power cables fast and easily. In contrast to the screw connection, this type of connection is resistant to vibrations.

The installation procedure with spring terminals is described in 7.2 "Spring terminals".

### Standard wiring

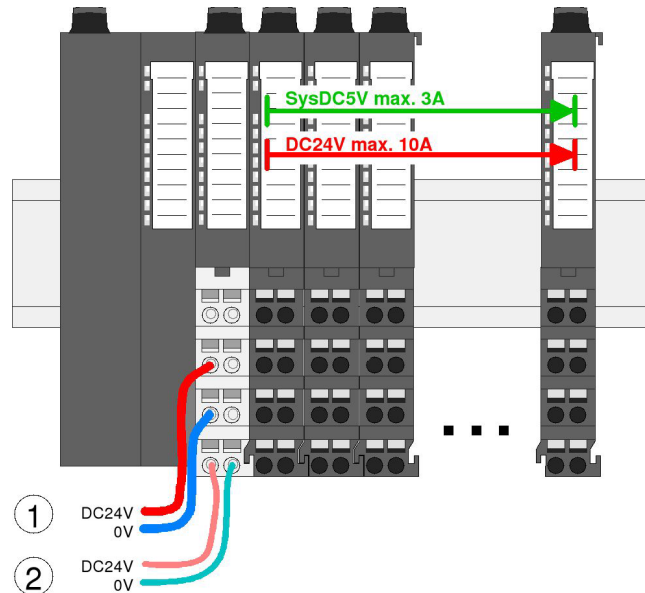


Fig. 7-7: Standard wiring

- 1 24 V DC for power supply of I/O level (max. 10 A)
- 2 24 V DC for electronics supply, bus node and I/O level

### Standard wiring of the power modules

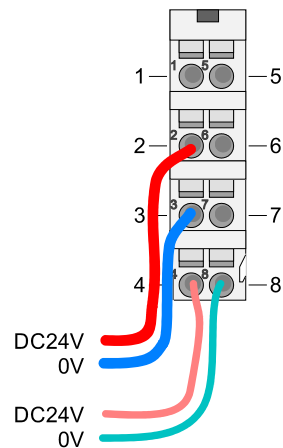


Fig. 7-8: Standard wiring

For wires with a cross-section of 0.08 mm<sup>2</sup> to 1.5 mm<sup>2</sup>.

| Pos. | Function    | Type  | Description                     |
|------|-------------|-------|---------------------------------|
| 1    | -           | -     | not used                        |
| 2    | 24 V DC     | Input | <b>24 V DC for power supply</b> |
| 3    | 0 V         | Input | GND for power supply            |
| 4    | Sys 24 V DC | Input | 24 V DC for electronics supply  |
| 5    | -           | -     | not used                        |



| Pos. | Function | Type  | Description                |
|------|----------|-------|----------------------------|
| 6    | 24 V DC  | Input | 24 V DC for power supply   |
| 7    | 0 V      | Input | GND for power supply       |
| 8    | Sys 0 V  | Input | GND for electronics supply |

## 7.6 Fixing the shield

### Shield bus carrier

Shield bus carriers are required for installing a shield (see section 11.1 "Accessories"). The shield bus carrier supports the shield bus for connecting cable shields.

### Fixing the shield

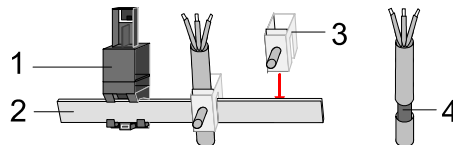


Fig. 7-9: Shield

- 1 Shield bus carrier
- 2 Shield bus (10 mm x 3 mm)
- 3 Shield terminal block
- 4 Shielding

### Installing the shield bus

- ✓ Each Cube20S module is provided on the bottom side with an opening for the shield bus carrier. The bus node has two openings.
- ➔ Insert the shield bus carriers until they engage in the module.
- ➔ If the mounting rail is flat, break the spacer off the shield bus carrier for adjustment.
- ➔ Insert the shield bus into the shield bus carrier.

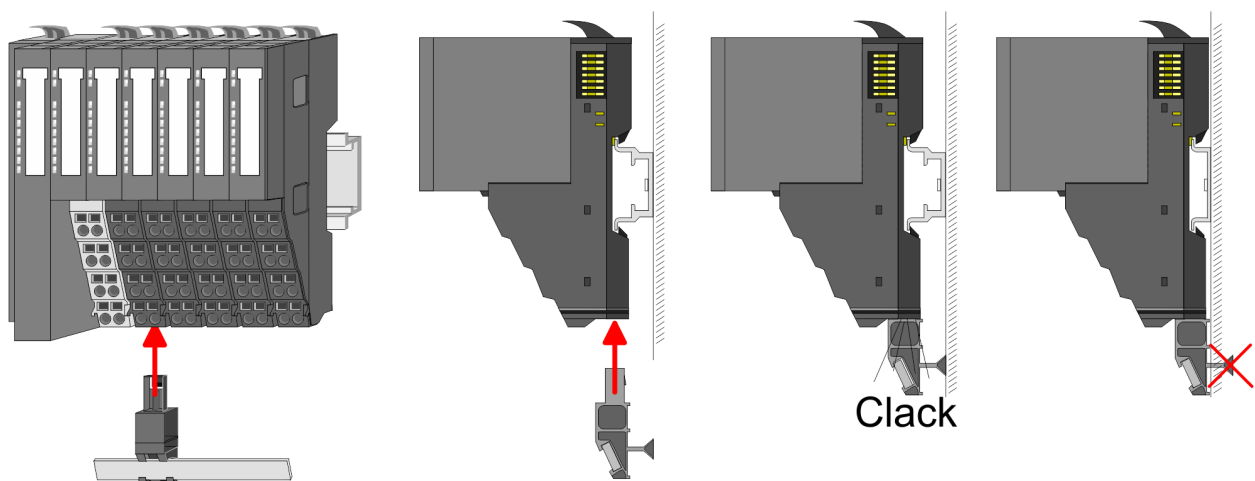


Fig. 7-10: Fixing the shield

### Fixing the shielding

- ✓ The shield bus carrier and the shield bus have been plugged in.
- ➔ Fasten the cables with the stripped cable shielding.
- ➔ Connect the shield terminal block to the shield bus.

## 7.7 Fuse protection

### 7.7.1 Power modules

#### Fuse protection of the power supply



#### CAUTION!

**The power supply of the power module is not internally fuse-protected**  
Without protection, the power modules can be destroyed.

- ➔ The power supply must be fuse-protected externally according to the corresponding maximum current!
- ➔ For up to 10 A use a 10 A fuse (fast) or a 10 A circuit breaker of characteristic Z!

#### Fuse protection of the electronics supply

**The electronics supply of the power module is internally protected against excessive voltage. The fuse is located inside the power module.**

- ➔ Replace the power module if the fuse has tripped!

#### Power module art. no. 57131

#### Fuse protection of the power module electronics supply of the I/O level

- ➔ Fuse-protect the electronics supply externally!
- ➔ Use:
  - A 1 A fuse (fast)  
or
  - a 1 A circuit breaker of characteristic Z  
or
  - MICO load circuit monitoring,  
e.g. MICO 4.4, Art.-No. 9000-41034-0100400

### 7.7.2 System

#### Fuse protection of the power supply

#### **The power supply is not internally fuse-protected**

- ➔ The power supply must be fuse-protected externally according to the corresponding maximum current!
- ➔ For up to 10 A use:
  - A 10 A fuse (fast)  
or
  - a 10 A circuit breaker of characteristic Z  
or
  - MICO load circuit monitoring,  
e.g. MICO 4.10, Art.-No. 9000-41042-0401000

**Bus node and I/O modules**
**External fuse-protection of electronics supply, bus node and I/O modules**

- Externally fuse-protect the electronics supply for bus node and I/O level with a fuse corresponding to the maximum current!
- For up to 10 A use:
  - A 2 A fuse (fast)
  - or
  - a 2 A circuit breaker of characteristic Z
  - or
  - MICO load circuit monitoring, e.g. MICO 4.6, Art.-No. 9000-41034-0100600


**7.7.3 Fuse-protection with MICO circuit breakers**
**External fuse**

To protect the power supply, Murrelektronik provides a number of circuit breakers. They can be found under the product name **MICO** on the internet [www.murrelektronik.com](http://www.murrelektronik.com).

**MICO-variants for intelligent current monitoring**

- MICO monitors currents
- MICO signals limit loads
- MICO detects overloads
- MICO enables flexibility

**MICO 4-channel**

| Art. no.           | Designation | Rated operating branch current [A] | Figure: MICO 4.6  |
|--------------------|-------------|------------------------------------|---|
| 9000-41034-0100400 | MICO 4.4    | 1-2-3-4                            |  |
| 9000-41034-0100600 | MICO 4.6    | 1-2-4-6                            |   |
| 9000-41042-0401000 | MICO 4.10   | 4-6-8-10                           |   |

Tab. 7-1: MICO load circuit monitoring, 4 channels

## 7.8 Using power modules

### Status of the electronics power supply

After switching on the Cube20S system, the RUN or MF LED lights up on every module.

**If the total current for the electronics supply exceeds 3 A, the LEDs are no longer activated.**

➔ In this case, plug in the power module, art. no. 57131, between the expansion modules.



#### NOTE

To guarantee power supply, the power modules can be used in any combination.

### 7.8.1 Power module art. no. 57130

**Use the power module art. no. 57130:**

- ➔ If 10 A is no longer sufficient for the power supply.
- ➔ If you want to have groups of different voltages.

#### Power module Art.-No. 57130

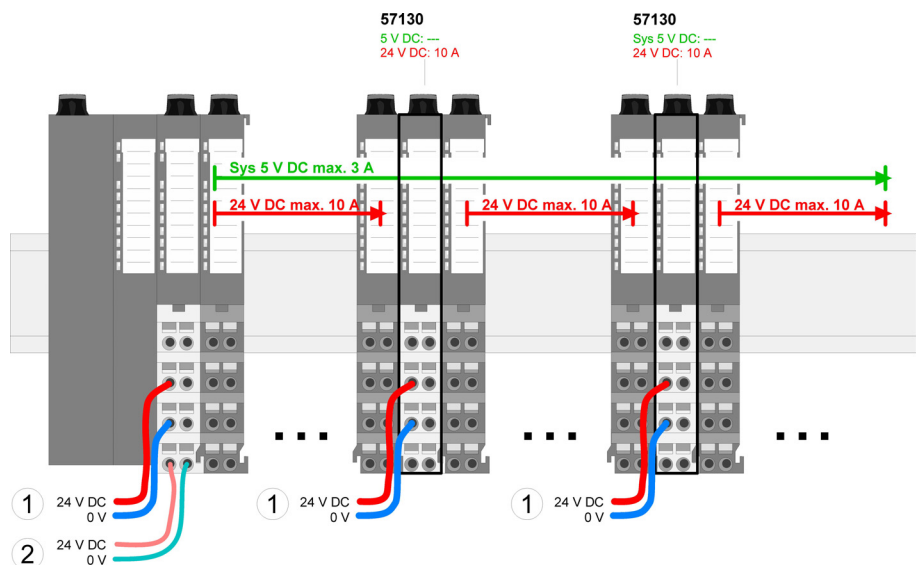


Fig. 7-11: Power module Art.-No. 57130

- 1 24 V DC for power supply of I/O level (max. 10 A)
- 2 24 V DC for electronics supply, bus node and I/O level

### 7.8.2 Power module art. no. 57131

**Using power module Art.-No. 57131:**

- If 3 A are not enough for the electronics supply on the backplane bus.
  - If you want to have groups of different potentials.
- In addition, you will get a new voltage group for 24 V DC power supply with max. 4 A.

**Connecting power module Art.-No. 57130**

- ➔ Plug in a power module.
- ➔ Then, plug in modules with a maximum total current of 2 A in the back-plane bus.
- ➔ Afterwards, you have to plug in another power module.

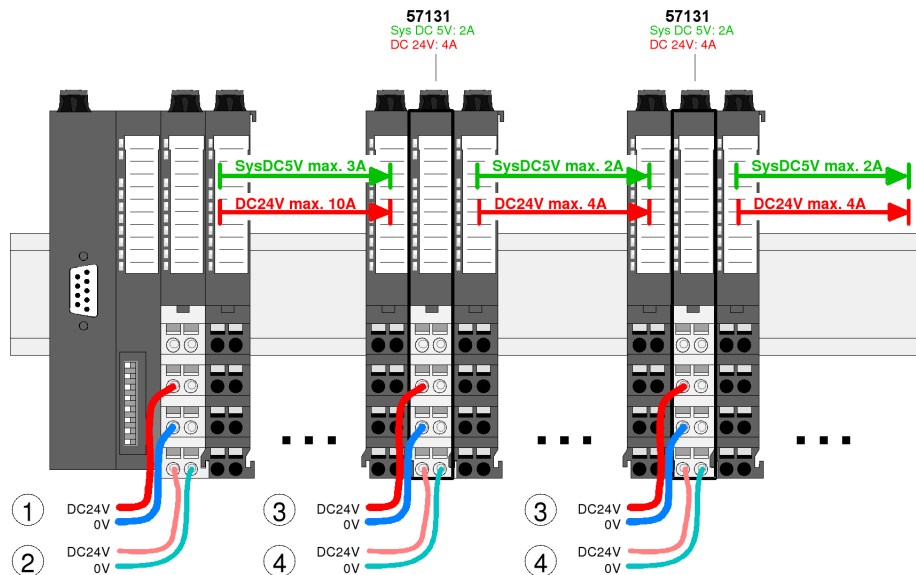
**Power module art. no. 57131**








Fig. 7-12: Power module art. no. 57131

- 1 24 V DC for power supply of I/O level (max. 10 A)
- 2 24 V DC for electronics supply, bus node and I/O level
- 3 24 V DC for power supply of I/O level (max. 4 A)
- 4 24 V DC for electronics supply, I/O level

## 8 Troubleshooting

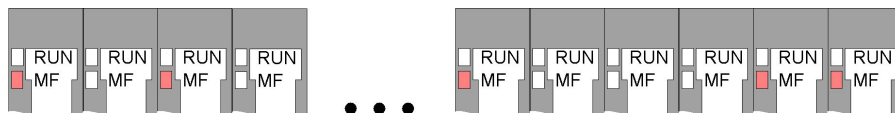
### General

Each expansion module has the LEDs **RUN** and **MF** on the front side. These LEDs help you find errors in your system or faulty modules.

| Designation | Display   | LED state              |
|-------------|---|------------------------|
| RUN LEDs    |  | Off                    |
|             |  | Green                  |
|             |  | Green, flashing (2 Hz) |
| MF LEDs     |  | Off                    |
|             |  | Red                    |
|             |  | Red, flashing (2Hz)    |

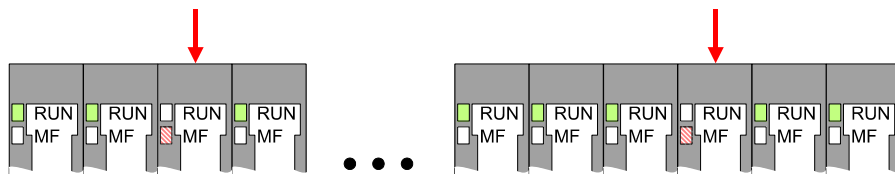
Tab. 8-1: State indications of the LEDs

### Total current of electronics supply exceeded



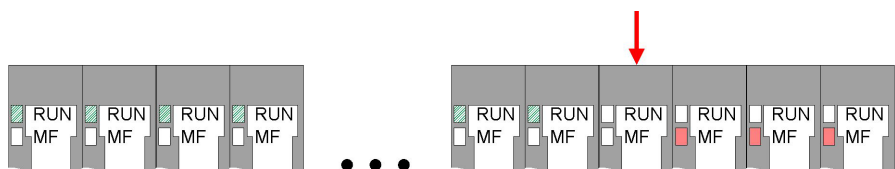
|  |   |
|--|---|
| Behavior of the LEDs after switching on: | The <b>RUN LED</b> is off on all modules.<br>The <b>MF LED</b> is only lit on some modules. |
| Cause:                                   | The total current for electronics supply exceeds the maximum current.                       |
| Remedy:                                  | Plug in the power module, Art-No. 57131 (see section 7 Installation, Seite 36).             |

### Configuration error



|  |   |
|--|---|
| Behavior of the LEDs after switching on: | The <b>RUN LED</b> is off on one or several modules.<br>The <b>MF LED</b> is flashing on these modules. |
| Cause:                                   | The module whose <b>MF LED</b> is flashing does not correspond to the current configuration.            |
| Remedy:                                  | Match configuration and hardware structure.   |

### Module failure



|  |   |
|--|---|
| Behavior of the LEDs after switching on: | The <b>RUN LEDs</b> are flashing up to the module to the left of the defective module. On the following modules, the <b>RUN LED</b> is off.<br>The <b>MF LEDs</b> are off up to the module to the left of the defective module. On the following modules, the <b>MF LED</b> is lit. |
| Cause:                                   | The module to the right of the flashing modules is defective.   |
| Remedy:                                  | Replace the defective module.   |

## 9 Terminal modules

### 9.1 Art. no. 57120 Terminal module 8X24 V DC

#### 9.1.1 Features

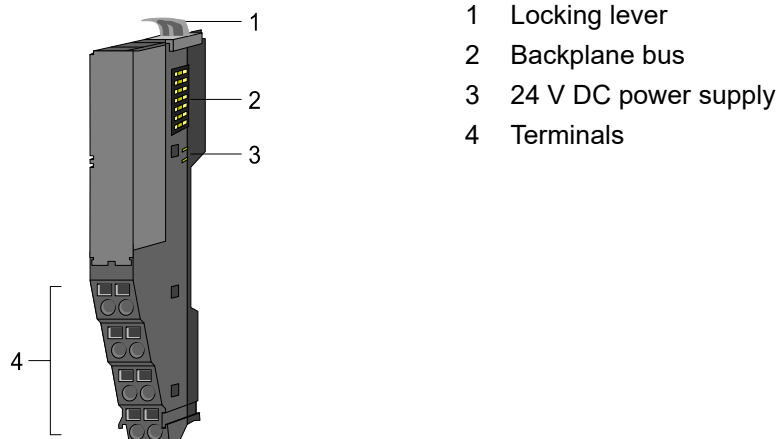
##### Description

The terminal module is a **potential distributor**. Using 8 terminals you have access to the 24 V DC power supply. The backplane bus is looped through the module. The module does not have any module identification, but it is considered in the calculation of the maximum number of the modules.

##### Properties

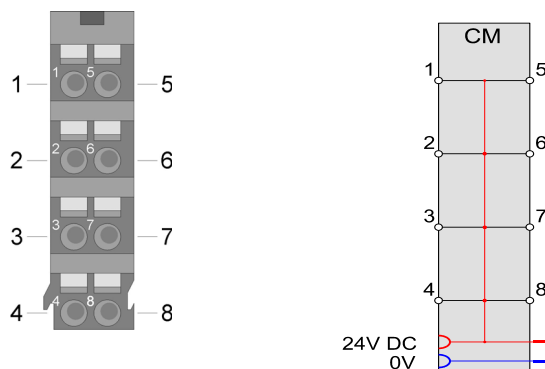
- 8 terminals 24 V DC power supply
- Maximum terminal current 10 A
- Backplane bus looped through
- Electrical isolation 500 V<sub>eff.</sub> (field voltage to the bus)

#### 9.1.2 Structure



**Connecting terminal**

Connect the wires with a cross-section of 0.08 mm<sup>2</sup> to 1.5 mm<sup>2</sup>.



| Pos. | Function | Type   | Description          |
|------|----------|--------|----------------------|
| 1    | 24 V DC  | Output | 24 V DC power supply |
| 2    | 24 V DC  | Output | 24 V DC power supply |
| 3    | 24 V DC  | Output | 24 V DC power supply |
| 4    | 24 V DC  | Output | 24 V DC power supply |
| 5    | 24 V DC  | Output | 24 V DC power supply |
| 6    | 24 V DC  | Output | 24 V DC power supply |
| 7    | 24 V DC  | Output | 24 V DC power supply |
| 8    | 24 V DC  | Output | 24 V DC power supply |

Tab. 9-1: Assignment of connecting terminals

### 9.1.3 Technical Data

| Terminal parameters |                                   |                               |
|---------------------|-----------------------------------|-------------------------------|
|                     | Terminal voltage                  | ≤30 V $\overline{\text{---}}$ |
|                     | Terminal current                  | ≤10 A                         |
|                     | Total current per module          | ≤10 A                         |
| Potential group     |                                   |                               |
|                     | Number of terminals               | 2x4                           |
|                     | Terminal color                    | Gray                          |
|                     | Potential binding (field voltage) | 24 V $\overline{\text{---}}$  |
|                     | Potential group current           | ≤10 A                         |
| Mechanical data     |                                   |                               |
| Housing             |                                   |                               |
|                     | Material                          | PPE / PPE GF10                |
|                     | Dimensions (W x H x D)            | 12.9 x 109 x 76.5 mm          |
|                     | Net weight                        | 50 g                          |



## 9.2 Art. no. 57121 Terminal module 8x 0 V DC

### 9.2.1 Features

#### Description

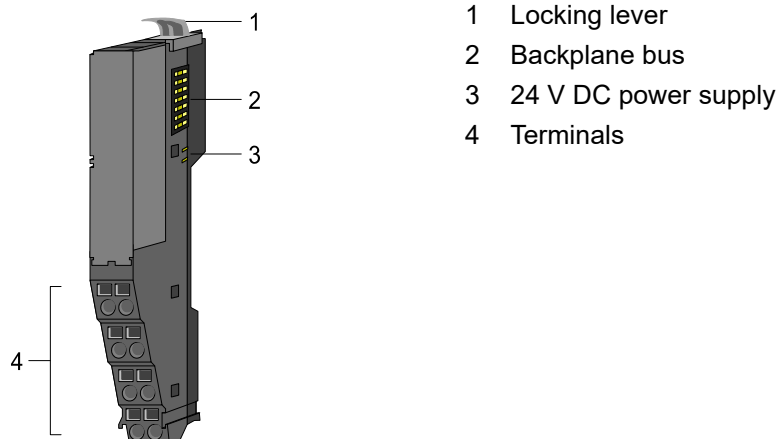
The terminal module is a **potential distributor**. Using 8 connecting terminals you have access to the ground GND of the 24 V power supply.

The backplane bus is looped through the module. The module does not have any module identification, but it is considered in the calculation of the maximum number of the modules.

#### Properties

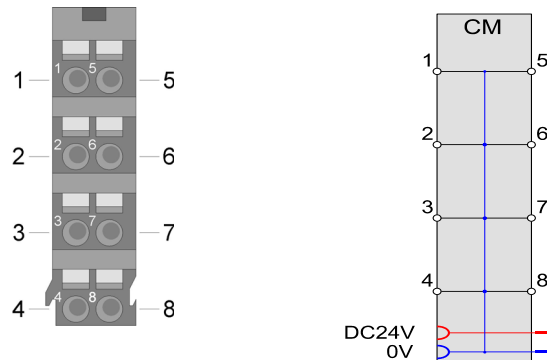
- 8 terminals of ground GND power supply
- Maximum terminal current 10 A
- Backplane bus looped through
- Electrical isolation 500 V<sub>eff.</sub> (field voltage to the bus)

### 9.2.2 Structure



**Connecting terminal**

Connect the wires with a cross-section of 0.08 mm<sup>2</sup> to 1.5 mm<sup>2</sup>.



| Pos. | Function | Type   | Description             |
|------|----------|--------|-------------------------|
| 1    | 0 V DC   | Output | Ground GND power supply |
| 2    | 0 V DC   | Output | Ground GND power supply |
| 3    | 0 V DC   | Output | Ground GND power supply |
| 4    | 0 V DC   | Output | Ground GND power supply |
| 5    | 0 V DC   | Output | Ground GND power supply |
| 6    | 0 V DC   | Output | Ground GND power supply |
| 7    | 0 V DC   | Output | Ground GND power supply |
| 8    | 0 V DC   | Output | Ground GND power supply |

Tab. 9-2: Assignment of connecting terminals

**9.2.3 Technical Data**

| Terminal parameters |                                   |                       |
|---------------------|-----------------------------------|-----------------------|
|                     | Terminal voltage                  | ≤0 V $\overline{---}$ |
|                     | Terminal current                  | ≤10 A                 |
|                     | Total current per module          | ≤10 A                 |
| Mechanical data     | Housing                           |                       |
|                     | Material                          | PPE / PPE GF10        |
|                     | Dimensions (W x H x D)            | 12.9 x 109 x 76.5 mm  |
|                     | Net weight                        | 50 g                  |
| Potential group     |                                   |                       |
|                     | Number of terminals               | 2x4                   |
|                     | Terminal color                    | Gray                  |
|                     | Potential binding (field voltage) | 24 V $\overline{---}$ |
|                     | Potential group current           | ≤10 A                 |

## 9.3 Art. no. 57122 Terminal module 4x24 VDC 4x0 VDC

### 9.3.1 Features

#### Description

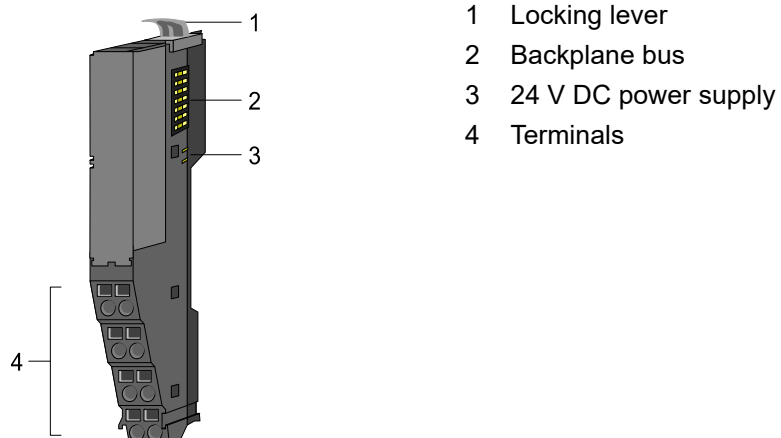
The terminal module is a **potential distributor**. Using 4 terminals respectively you have access to the 24 V DC or ground GND of the power supply.

The backplane bus is looped through the module. The module does not have any module identification, but it is considered in the calculation of the maximum number of the modules.

#### Properties

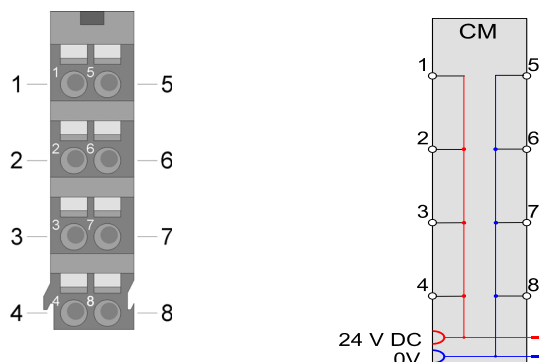
- 4 terminals of 24 V DC power supply
- 4 terminals of ground GND power supply
- Maximum terminal current 10 A
- Backplane bus looped through
- Electrical isolation 500 V<sub>eff.</sub> (field voltage to the bus)

### 9.3.2 Structure



**Connecting terminal**

Connect the wires with a cross-section of 0.08 mm<sup>2</sup> to 1.5 mm<sup>2</sup>.



| Pos. | Function | Type   | Description             |
|------|----------|--------|-------------------------|
| 1    | 24 V DC  | Output | 24 V DC power supply    |
| 2    | 24 V DC  | Output | 24 V DC power supply    |
| 3    | 24 V DC  | Output | 24 V DC power supply    |
| 4    | 24 V DC  | Output | 24 V DC power supply    |
| 5    | 0 V DC   | Output | Ground GND power supply |
| 6    | 0 V DC   | Output | Ground GND power supply |
| 7    | 0 V DC   | Output | Ground GND power supply |
| 8    | 0 V DC   | Output | Ground GND power supply |

Tab. 9-3: Assignment of connecting terminals

### 9.3.3 Technical Data

| Terminal parameters |                                   |                               |
|---------------------|-----------------------------------|-------------------------------|
|                     | Terminal voltage                  | ≤30 V $\overline{\text{---}}$ |
|                     | Terminal current                  | ≤10 A                         |
|                     | Total current per module          | ≤10 A                         |
| Potential group     |                                   |                               |
|                     | Number of terminals               | 2x4                           |
|                     | Terminal color                    | Gray                          |
|                     | Potential binding (field voltage) | 24 V $\overline{\text{---}}$  |
|                     | Potential group current           | ≤10 A                         |
| Mechanical data     |                                   |                               |
| Housing             |                                   |                               |
|                     | Material                          | PPE / PPE GF10                |
|                     | Dimensions (W x H x D)            | 12.9 x 109 x 76.5 mm          |
|                     | Net weight                        | 50 g                          |

## 10 Power modules

### 10.1 Safety instructions

#### Intended use of the power modules

The power modules are designed and manufactured:

- for installation together with Cube20S system components on a mounting rail,
- for installation in a control cabinet with sufficient ventilation,
- for industrial use.

#### Safety instructions for power modules

- Power modules must exclusively be installed in areas which are only accessible to the maintenance personnel!
- Power modules are not approved for use in hazardous areas (EX zone)!
- De-energize the power modules prior to starting installation and maintenance work, i.e., prior to starting work on a power supply or a supply line, de-energize the voltage supply (pull the power plug or, in case of a permanent connection, disconnect the respective fuse)!
- Electrical connection and modifications must be performed by trained electricians only!
- Due to the compact design and in order to guarantee sufficient cooling, touch and fire protection cannot be complied with. For this reason, fire protection must be guaranteed through the design of the environment of the integrated power supply unit (e.g. by installation in a control cabinet that fulfils the fire protection regulations)!
- Observe the national regulations and directives in the country where the device is used (installation, protective measures, EMC, ...).

### 10.2 Art. no. 57130 Power module 24 V DC

#### 10.2.1 Features

##### Description

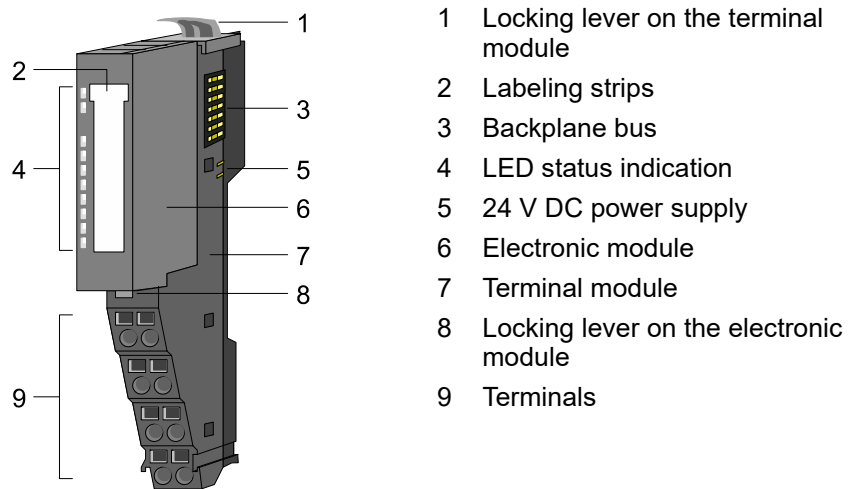
The power module is used if the 10 A are no longer sufficient for the power supply of the I/O level.

You can also use power modules to create groups of different potentials. The power module must be supplied externally with 24 V DC.

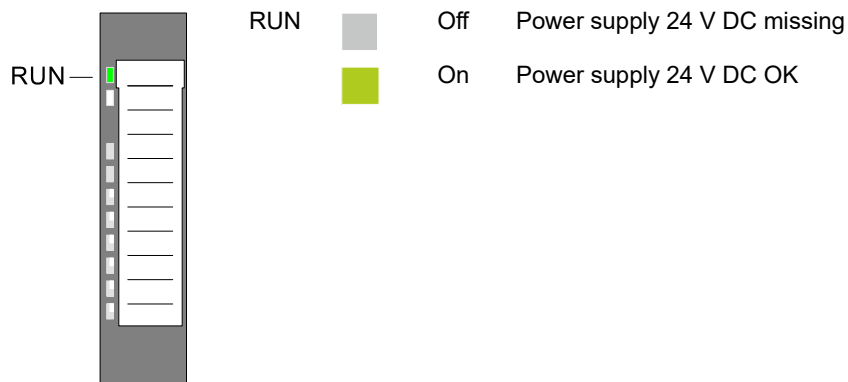
##### Properties

- 10 A supply for 24 V DC power supply I/O level
- Overvoltage protection
- Reverse polarity protection

## 10.2.2 Structure

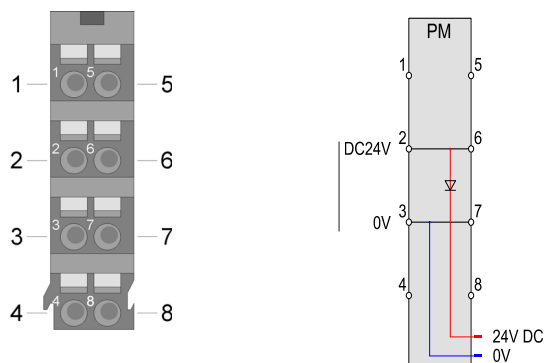


## Status indication



## Terminal

➔ Connect the wires with a cross section of 0.08 mm<sup>2</sup> to 1.5 mm<sup>2</sup>.



| Pos. | Function | Type   | Description                       |
|------|----------|--------|-----------------------------------|
| 1    | ---      | ---    | not used                          |
| 2    | 24 V DC  | Input  | Supply of 24 V DC power supply    |
| 3    | 0 V      | Input  | Supply of ground GND power supply |
| 4    | ---      | ---    | not used                          |
| 5    | ---      | ---    | not used                          |
| 6    | 24 V DC  | Output | 24 V DC power supply of I/Os      |
| 7    | 0 V      | Output | Ground GND power supply of I/Os   |
| 8    | ---      | ---    | not used                          |

Tab. 10-1: Terminal assignment

## Fuse protection of the power supply



### CAUTION!

**The power supply of the power module is not internally fuse-protected**  
Without protection, the power modules can be destroyed.

- ➔ The power supply must be fuse-protected externally according to the corresponding maximum current!
- ➔ For up to 10 A use a 10 A fuse (fast) or a 10 A circuit breaker of characteristic Z!

### 10.2.3 Supply



#### WARNING!

The power supply is not protected internally.

It can get destroyed by too high currents.

→ Protect the power supply externally using a fuse or line circuit breaker!

#### External fuse

To protect the power supply, Murrelektronik provides a number of circuit breakers. They can be found under the product name **MICO** on the internet [www.murrelektronik.com](http://www.murrelektronik.com).

### 10.2.4 Using

#### Use

The standard wiring of the power supply in combination with the bus node is given in Fig. 10-1: .

#### Standard wiring

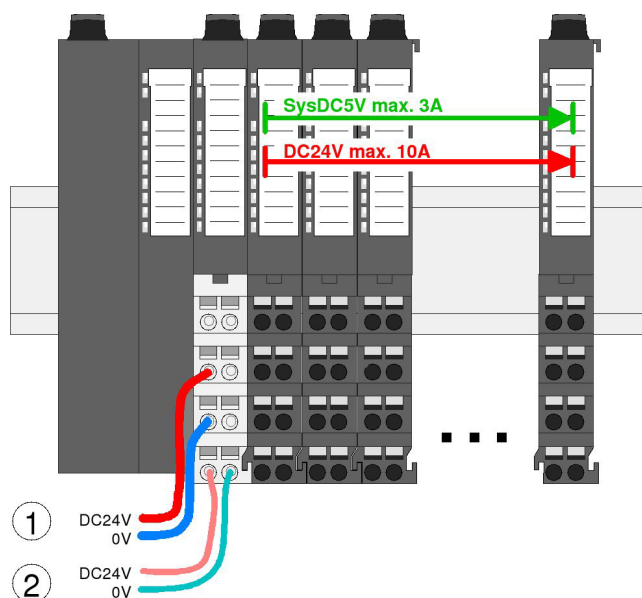


Fig. 10-1: Standard wiring

- 1 24 V DC for power supply of I/O level (max. 10 A)
- 2 24 V DC for electronics supply, bus node and I/O level



## Standard wiring of the power modules

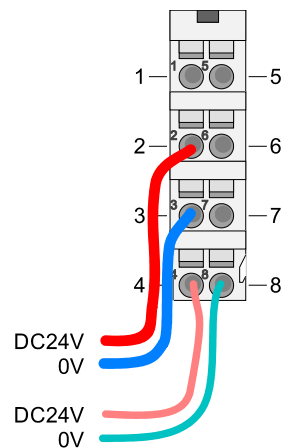


Fig. 10-2: Standard wiring

For wires with a cross-section of 0.08 mm<sup>2</sup> to 1.5 mm<sup>2</sup>.

| Pos. | Function    | Type  | Description                     |
|------|-------------|-------|---------------------------------|
| 1    | -           | -     | not used                        |
| 2    | 24 V DC     | Input | <b>24 V DC for power supply</b> |
| 3    | 0 V         | Input | GND for power supply            |
| 4    | Sys 24 V DC | Input | 24 V DC for electronics supply  |
| 5    | -           | -     | not used                        |
| 6    | 24 V DC     | Input | 24 V DC for power supply        |
| 7    | 0 V         | Input | GND for power supply            |
| 8    | Sys 0 V     | Input | GND for electronics supply      |

### Use the power module art. no. 57130:

- ➔ If 10 A is no longer sufficient for the power supply.
- ➔ If you want to have groups of different voltages.

If the power module is installed, further modules whose power supply does not exceed the total current of 10 A can be installed on the backplane bus.

This allows you to extend the Cube20S system to the maximum number of 64 modules.



### NOTE

The current for the electronic supply must not exceed the maximum current of 3 A.

If the total current exceeds 3 A, the LEDs are no longer activated.

- ➔ In this case, use the power module, Art.-No. 57131.

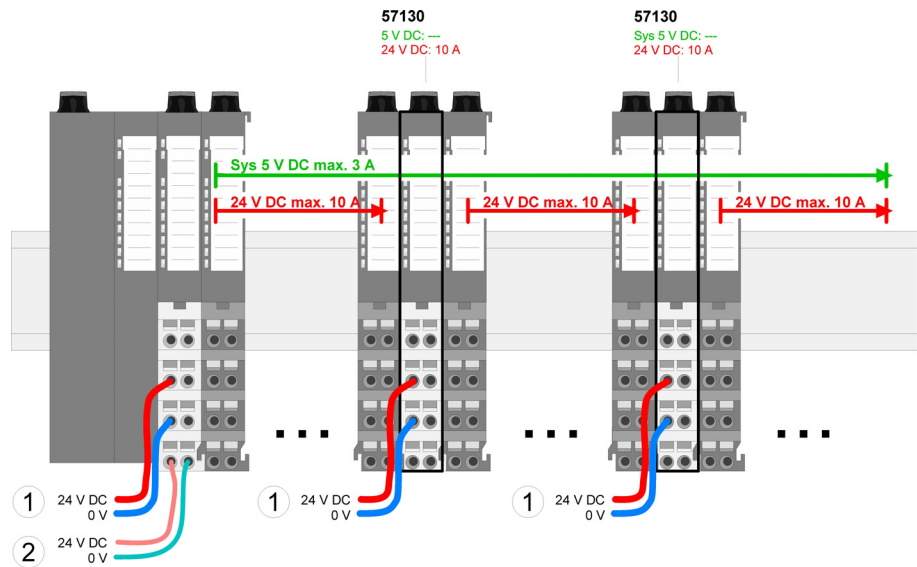
**Power module  
Art.-No. 57130**

Fig. 10-3: Power module Art.-No. 57130

- 1 24 V DC for power supply of I/O level (max. 10 A)
- 2 24 V DC for electronics supply, bus node and I/O level

## 10.2.5 Technical Data

| Power supply               |  |                                       |
|----------------------------|--|---------------------------------------|
|                            | Input voltage (nominal value)          | 24 V $\overline{\text{---}}$          |
|                            | Input voltage (admissible range)       | 20.4...28.8 V $\overline{\text{---}}$ |
|                            | Output voltage (nominal value)         | 24 V                                  |
|                            | Output current (nominal value)         | 10 A                                  |
|                            | Reverse-polarity protection            | Yes                                   |
|                            | Overvoltage protection                 | 36 V                                  |
| Status, alarm, diagnostics |  |                                       |
|                            | Status indication                      | Yes                                   |
|                            | Alarms                                 | No                                    |
|                            | Process interrupt                      | No                                    |
|                            | Diagnostic interrupt                   | No                                    |
|                            | Diagnostic function                    | No                                    |
|                            | Diagnostic information can be read out | None                                  |
|                            | Display of the supply voltage          | Green LED                             |
|                            | Collective error indication            | Red LED                               |
|                            | Channel error display                  | None                                  |
| Mechanical data            | Housing                                |                                       |
|                            | Material                               | PPE / PPE GF10                        |
|                            | Dimensions (W x H x D)                 | 12.9 x 109 x 76.5 mm                  |
|                            | Net weight                             | 60 g                                  |
|                            | Weight incl. accessories               | 60 g                                  |
|                            | Gross weight                           | 75 g                                  |

## 10.3 Art. no. 57131 Power module 24 VDC + 5 VDC/2A

### 10.3.1 Features

#### Description

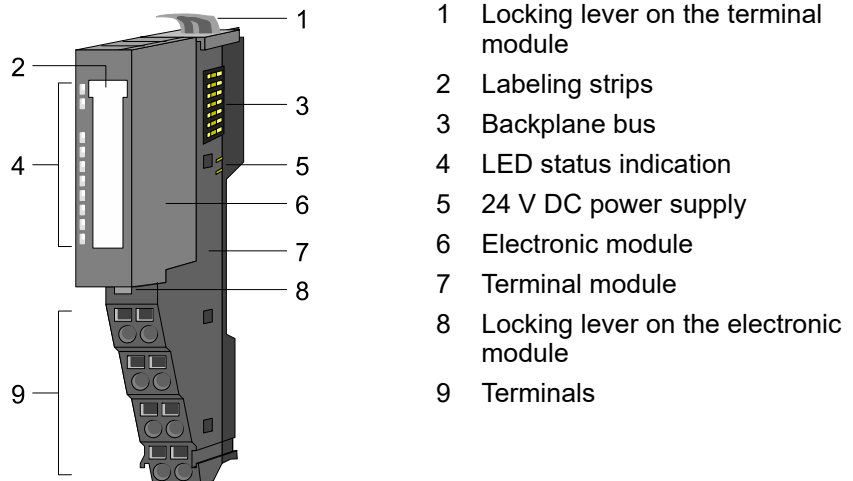
Use this power module if 3 A are not enough for electronics supply on the backplane bus. In addition, you will have a new group of potential for 24 V DC power supply with max. 4 A.

The power module must be supplied with 24 V DC externally via 2 inputs.

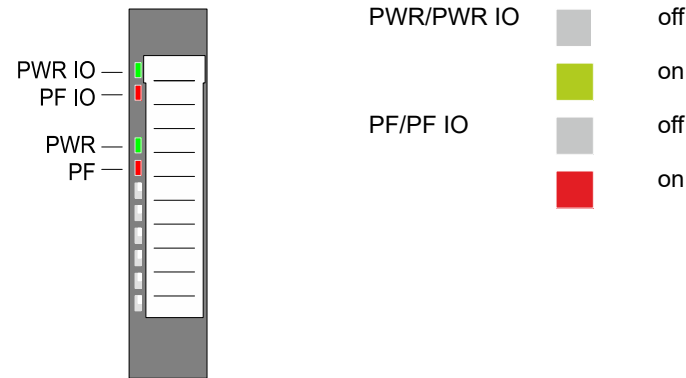
#### Properties

- 2 A supply for 24 V DC electronics supply, I/O level
- 4 A supply for 24 V DC power supply I/O level
- Overvoltage protection
- Reverse polarity protection

### 10.3.2 Structure



Status indication



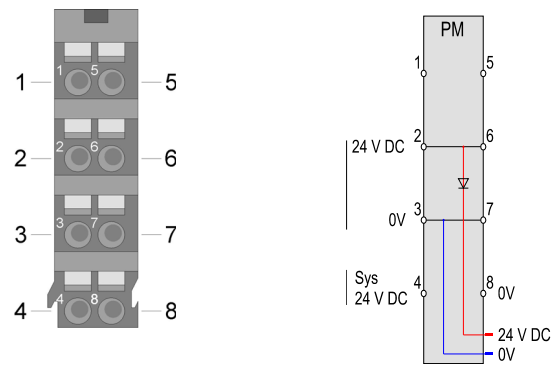
| <br>PWR IO<br>Green | <br>PF IO<br>Red | <br>PWR<br>Green | <br>PF<br>Red | Description                                  |
|---------------------|------------------|------------------|---------------|--|
|                     |                  |                  |               | Both voltages are absent.                    |
|                     |                  | X                |               | Power supply is OK.                          |
| X                   |                  |                  |               | Electronics supply is OK.                    |
| X                   |                  | X                | X             | Fuse of power supply defective (Power fail). |
| X                   | X                | X                |               | Fuse of electronics supply defective.        |

Tab. 10-2: State indications of the LEDs

X = not relevant

Connecting terminal

➔ Connect the wires with a cross-section of 0.08 mm<sup>2</sup> to 1.5 mm<sup>2</sup>.



| Pos. | Function    | Type   | Description                             |
|------|-------------|--------|---|
| 1    | ---         | ---    | not used                                |
| 2    | 24 V DC     | Input  | Supply of 24 V DC power supply          |
| 3    | 0 V         | Input  | Supply of ground GND power supply       |
| 4    | Sys 24 V DC | Input  | Supply of 24 V DC electronics supply    |
| 5    | ---         | ---    | not used                                |
| 6    | 24 V DC     | Output | 24 V DC power supply of I/Os            |
| 7    | 0 V         | Output | Ground GND power supply of I/Os         |
| 8    | 0V          | Input  | Supply of ground GND electronics supply |

Tab. 10-3: Assignment of connecting terminals

### 10.3.3 Supply



#### NOTE

Power and electronics supply are protected internally by fuses against high voltages. The fuses are located inside the power module.

➔ After a fuse has tripped, the electronic module of the power module has to be replaced!

Power module art. no.  
57131

#### Fuse protection of the power module electronics supply of the I/O level

➔ Fuse-protect the electronics supply externally!

➔ Use:

- A 1 A fuse (fast)  
or
- a 1 A circuit breaker of characteristic Z  
or
- MICO load circuit monitoring,  
e.g. MICO 4.4, Art.-No. 9000-41034-0100400

#### External fuse

To protect the power supply, Murrelektronik provides a number of circuit breakers. They can be found under the product name **MICO** on the internet [www.murrelektronik.com](http://www.murrelektronik.com).

#### NOTICE

##### Voltage supply interruptions!

The module does not have any internal buffer to bridge voltage supply interruption according to the standard EN 61131-2.

➔ For power supply use a power supply unit which is capable of bridging voltage supply interruptions of at least 10 ms!

#### NOTICE

##### Exceeding of the maximum current load!

The contacts can be loaded with maximum 10 A.

➔ Observe the maximum current load!

### 10.3.4 Using

#### Use

The standard wiring of the power supply in combination with the bus node is given in Fig. 10-4: .

## Standard wiring

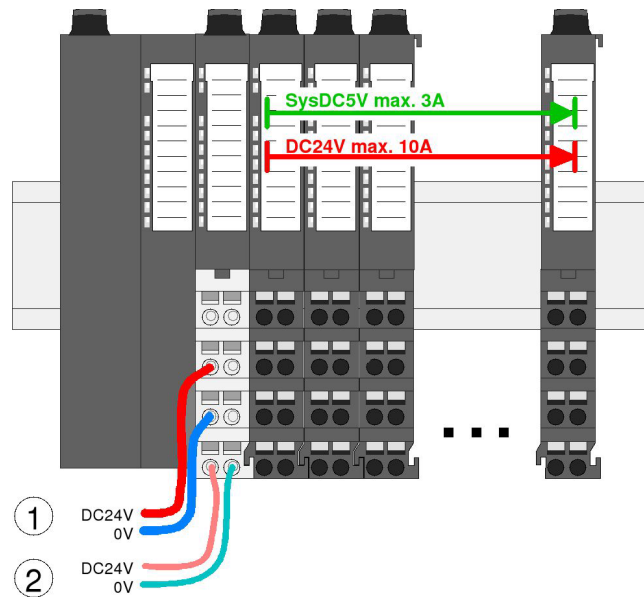


Fig. 10-4: Standard wiring

- 1 24 V DC for power supply of I/O level (max. 10 A)
- 2 24 V DC for electronics supply, bus node and I/O level

## Standard wiring of the power modules

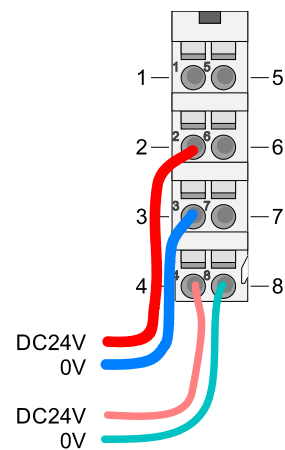


Fig. 10-5: Standard wiring

For wires with a cross-section of 0.08 mm<sup>2</sup> to 1.5 mm<sup>2</sup>.

| Pos. | Function    | Type  | Description                     |
|------|-------------|-------|---------------------------------|
| 1    | -           | -     | not used                        |
| 2    | 24 V DC     | Input | <b>24 V DC for power supply</b> |
| 3    | 0 V         | Input | GND for power supply            |
| 4    | Sys 24 V DC | Input | 24 V DC for electronics supply  |
| 5    | -           | -     | not used                        |
| 6    | 24 V DC     | Input | 24 V DC for power supply        |
| 7    | 0 V         | Input | GND for power supply            |
| 8    | Sys 0 V     | Input | GND for electronics supply      |

**Using power module Art.-No. 57131:**

- If 3 A are not enough for the electronics supply on the backplane bus.
  - If you want to have groups of different potentials.
- In addition, you will get a new voltage group for 24 V DC power supply with max. 4 A.

**Connecting power module Art.-No. 57130**

- ➔ Plug in a power module.
- ➔ Then, plug in modules with a maximum total current of 2 A in the backplane bus.
- ➔ Afterwards, you have to plug in another power module.

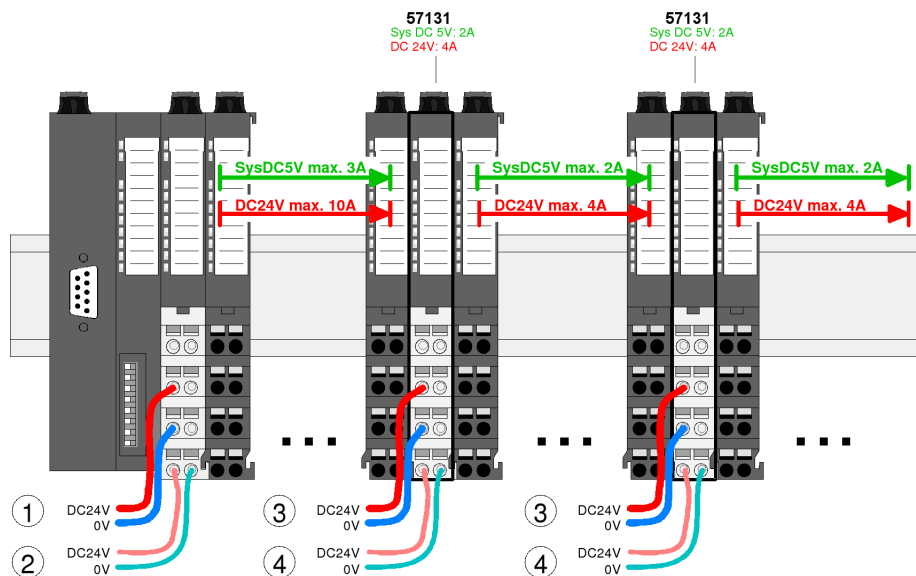
**Power module art. no. 57131**


Fig. 10-6: Power module art. no. 57131

- 1 24 V DC for power supply of I/O level (max. 10 A)
- 2 24 V DC for electronics supply, bus node and I/O level
- 3 24 V DC for power supply of I/O level (max. 4 A)
- 4 24 V DC for electronics supply, I/O level

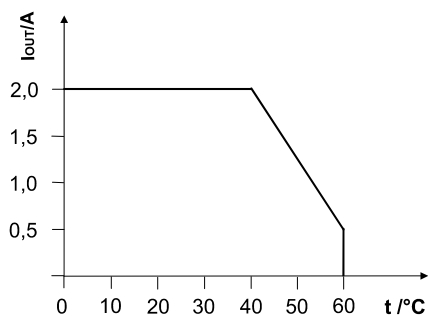


### 10.3.5 Technical Data

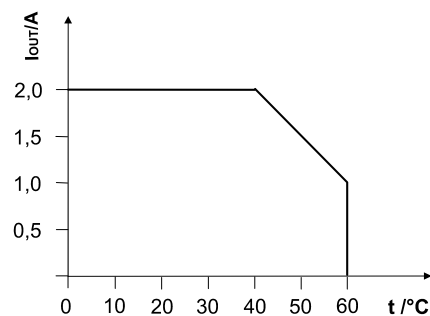
| Power supply               |  |                                       |
|----------------------------|--|---------------------------------------|
|                            | Input voltage (nominal value)          | 24 V $\overline{\text{---}}$          |
|                            | Input voltage (admissible range)       | 20.4...28.8 V $\overline{\text{---}}$ |
|                            | Output voltage (nominal value)         | 24 V                                  |
|                            | Output current (nominal value)         | 4 A                                   |
|                            | Reverse-polarity protection            | yes                                   |
|                            | Overvoltage protection                 | 36 V                                  |
|                            | Efficiency rating                      | 89 %                                  |
|                            | Power dissipation                      | 1.4 W                                 |
| Status, alarm, diagnostics |  |                                       |
|                            | Status indication                      | Yes                                   |
|                            | Alarms                                 | No                                    |
|                            | Process interrupt                      | No                                    |
|                            | Diagnostic interrupt                   | No                                    |
|                            | Diagnostic function                    | No                                    |
|                            | Diagnostic information can be read out | None                                  |
|                            | Display of the supply voltage          | Green LED                             |
|                            | Collective error indication            | Red LED                               |
|                            | Channel error display                  | None                                  |
| Mechanical data            | Housing                                |                                       |
|                            | Material                               | PPE / PPE GF10                        |
|                            | Dimensions (W x H x D)                 | 12.9 x 109 x 76.5 mm                  |
|                            | Net weight                             | 60 g                                  |
|                            | Weight incl. accessories               | 60 g                                  |
|                            | Gross weight                           | 75 g                                  |

#### Derating diagrams of electronics supply

Convection



Air circulation 0.5 m/s

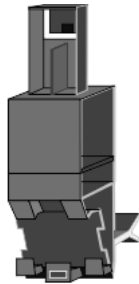


## 11 Appendix

### 11.1 Accessories

#### Carrier for shield busses art. no. 57191

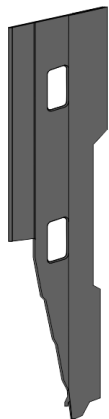
The shield busses (10 mm x 3 mm) for connection of cable shields are fastened to the carrier.



#### NOTE

Carriers for shield busses, shield busses and cable shield fasteners are not included in the scope of delivery.

#### Bus cover Art.-No. 57190



### 11.2 Glossary

#### General terms:

| Term                    | Meaning  |
|-------------------------|--|
| Intended purpose        | Use of a product, process, or feature according to the specifications, instructions, and information supplied by the MANUFACTURER. |
| Bit                     | Binary digit   |
| Byte                    | 1 byte corresponds to 8 bits   |
| DI                      | Digital inputs   |
| DIN                     | Deutsches Institut für Normung (German Institute for Standardization)  |
| I/O                     | Input/Output   |
| EU Directive 2014/30/EU | EMC Directive  |
| EMC                     | Electromagnetic compatibility  |

| Term  | Meaning  |
|-------|--|
| EN    | European standard  |
| ESD   | Electrostatic discharges   |
| FE    | Functional earth   |
| I     | Current  |
| IEC   | International Electrotechnical Commission, international standardization institute   |
| IN    | Input  |
| IP20  | Ingress Protection, protection class according to DIN EN 60529<br>1st code digit = Protection against accidental contact and solid foreign objects<br>2nd code digit = Protection against ingress of water<br>2: protected against: solid foreign objects with diameter starting from 12.5 mm and contact with a finger.<br>0: No protection |
| IP67  | 6: Dustproof, protection against contact with a wire<br>7: Protection against the effects of temporary submersion in water   |
| ISO   | International Standard Organization  |
| LED   | Light Emitting Diode   |
| n. c. | not connected  |
| OUT   | Output   |
| PELV  | Protective Extra Low Voltage   |
| SELV  | Safety Extra Low Voltage   |
| U     | Voltage  |
| U/I   | Voltage / current  |

## 11.3 Legal notes

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