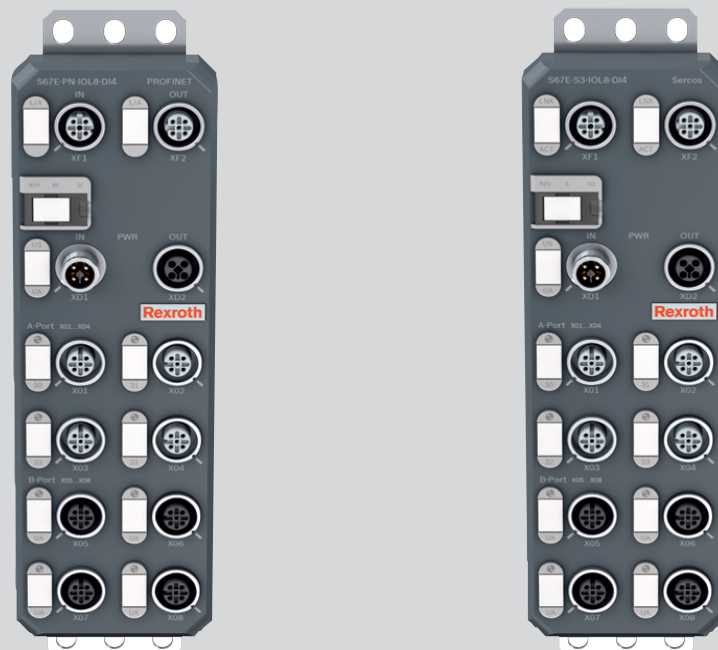


# S67E: system and installation

IO-Link master S67E

**Application Description**  
**R911379700**

Edition 02



**Title** S67E: system and installation  
IO-Link master IO-Link master

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**Editorial department** Engineering automation systems control hardware

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# 1 Use of the safety instructions

## 1.1 Structure of the safety instructions

The safety instructions are structured as follows:

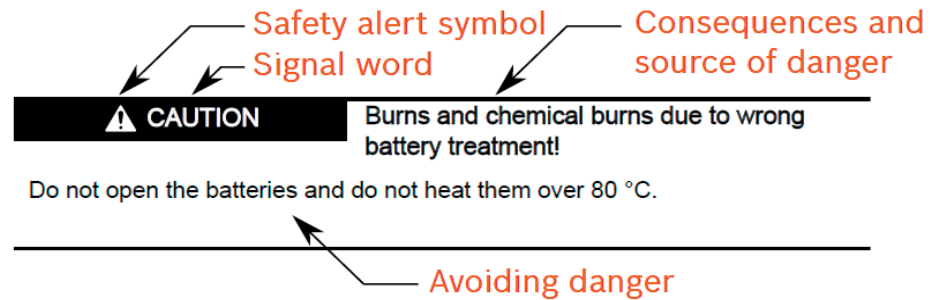


Abb. 1-1 Structure of the safety instructions

## 1.2 Explaining signal words and safety alert symbol

The safety instructions in this documentation contain specific signal words (danger, warning, caution, notice) and, if necessary, a safety alert symbol (according to ANSI Z535.6-2006).

The signal word is used to draw attention to the safety instruction and also provides information on the severity of the hazard.

The safety alert symbol (a triangle with an exclamation point), which precedes the signal words danger, warning and caution is used to alert the reader to personal injury hazards.

<b>▲ DANGER:</b>	In case of non-compliance with this safety instruction, death or serious injury <b>will</b> occur.
<b>▲ WARNING:</b>	In case of non-compliance with this safety instruction, death or serious injury <b>can</b> occur.
<b>▲ CAUTION:</b>	In case of non-compliance with this safety instruction, minor or moderate injury can occur.
<b>NOTICE</b>	In case of non-compliance with this safety instruction, material damage can occur.

Use of the safety instructions

## 1.3 Symbols used

Hints are represented as follows:



This is an information.

---

## 1.4 Signal graphic explanation on the device



Prior to the installation and commissioning of the device, refer to the device documentation.

## 2 S67E product group

### 2.1 IO-Link system

With IO-Link, you exchange data from the controller to the lowest field level. IO-Link is the first, globally standardized IO technology (IEC 61131-9) to communicate with sensors and actuators. IO-Link is a point-to-point communication.

An IO-Link system basically consists of:

- an IO-Link master
- one connecting cable (standard 3-wire sensor / actuator cable)
- an IO-Link device z. Eg: sensors, valves, motor starters, I/O devices
- an IO-Link configuration tool for configuring and parameterizing IO-Link
- an IO-Link device description file (IODD)

### 2.2 S67E IO-Link master

The input and output devices in the S67E product group are designed for distributed automation tasks in harsh environmental conditions. The devices meet the requirements for IP65/IP67 protection. They find their use in the field with high decentralization.

The S67E-IO-Link masters solve the customer requirements as flexibly as possible to acquire or output different digital or analog I/O signals via IO-Link. They have integrated the network interface as well as the I/O level directly. They provide the interface to the higher-level control (PLC) and control the communication with the connected IO-Link devices.

The connection of the network, I/Os and the supply is carried out via screwable M12 connectors. The S67E-IO-Link master enables the operation of up to eight IO-Link sensors/actuators and is also used to acquire digital signals.



You will find further information in the device-specific data sheets and in the network-specific application descriptions.

---

## S67E product group

By using the various operating modes of an IO-Link port, you can the IO-Link / IN1 cable (pin 4) are operated in the following operating modes:

- Digital standard signals
- Analogue signals
- IO-Link device communication for example flow sensors, valve inserts, light barriers or distance meters



Fig. 2-1 IO-Link A ports (A) und IO-Link B ports (B) of an IO-Link masters



Ensure that the voltage supply  $U_A$  and the power supply  $U_S$  are made from two independent, galvanically isolated power supplies.



When connecting an IO-Link type A sensor to an IO-Link B port, note that a voltage is applied to pin 2 and pin 5. Do not connect it to the sensor.

Use a three-wire cable between port and sensor.

## 2.3 S67E networks

The S67E devices are available for the following networks:

PROFINET



Sercos®





## 2.4 S67E- product portfolio

The following tables give an overview of the S67E product portfolio.

### S67E IO-Link master

Article designation	Order No.
<b>PROFINET</b>	
S67E-PN-IOL8-DI4-M12-6P	R911174436
<b>Sercos®</b>	
S67E-S3-IOL8-DI4-M12-6P	R911174437

## 2.5 S67E product designation

The following tables give an overview of the S67E product designation.

Product range	Product group	Network	I/O type	Network connection I/O connection	Width in cm/ housing material
S67	E	PN	IOLx DIy	M12	6P
		S3			

Example:

S67	E	PN	IOL8 DI4	M12	6P
-----	---	----	----------	-----	----

### Meaning of the product designation

Abbreviation	Meaning
S67	Name of thr product family
E	Name of thr product group
PN	PROFINET
S3	Sercos
IOLx	x IO-Link ports
DIy	y digital inputs
M12	M12 connector
6P	6 cm wide, plastic housing

S67E product group

## 2.6 S67E documentation

The documentation for the S67E devices is modular in order to meet your specific requirements, e.g., for installation or commissioning with a software to provide the best information.

**Application description** This application description is the higher - level system manual for the S67E devices.

It includes:

- Description of the S67E devices
- Functions and properties of the devices
- Mounting

**Network specific  
IO-Link application description**

For the IO-Link devices, there is a application description for each network. This describes the network/bus-specific properties of an S67E IO-Link master.

The following application description are available:

- Network-specific properties of the IO-Link master for PROFINET  
S67E-PN-IOL8-DI4-M12-6P  
Order No.: R911386379, DOK-CONTRL-S67E\*PN\*IOL-APRS-EN-P
- Network-specific properties of the IO-Link master for Sercos  
S67E-S3-IOL8-DI4-M12-6P  
Order No.: R911386382, DOK-CONTRL-S67E\*S3\*IOL-APRS-EN-P

**Packing slip** A package slip is included with the unit upon delivery. It contains the most important information about the electrical installation of a device or a group of devices.

This includes:

- Short description of the device
- Safty notes
- Drawing
- Mounting/demounting
- Connections
- Pin assignment

**Device-specific  
data sheets**

There is a data sheet for every device.

Data sheet S67E-PN-IOL8-DI4-M12-6P:  
Order No.: R911379702, DOK-CONTRL-S67E\*PN\*IOL-DARS-EN-P

Data sheet S67E-S3-IOL8-DI4-M12-6P:  
Order No.: R911379704, DOK-CONTRL-S67E\*S3\*IOL-DARS-EN-P



The data sheet describes the specific properties of an S67E device.

This includes:

- Device description
- Ordering data and technical data
- Basic circuit diagram
- Connection assignment
- Connection example
- Local diagnostics and status indicators

## 2.7 S67E Device description file

An IO-Link master is intrated into a control system via a standardized device description file. This is evaluated at runtime, thus enabling the S67E master to be operated with the specific settings.

Device description file	Network	
<b>GSDML</b> Generic Station Description Markup Language		For PROFINET devices are intrated language independent XML-based files (GSDML).
<b>SDDML</b> Sercos Device Description Markup Language		For Sercos devices the intration is via XML-based device description files (SDDML).

### Device description file IO Device Description (IODD)

For each S67E IO-Link master, there is device-specific information in the form of a device description file. It contains information on identification, device parameters, process and diagnostic data, communication properties, and the structure of the user interface in engineering tools. The engineering tool can easily read and process this information. Both about the IODD as well as about a IO-Link master internal device ID, you can identify any IO-Link device type.

To ensure that the parameter data of an IO-Link device are not lost during the device exchange, it is possible to store them automatically directly in the S67E IO-Link master. If a new, identical replacement device is connected, the parameters of the predecessor device are automatically transferred to the new IO-Link device. Changing parameters can, for example, during operation by the PLC.

The current IODD file is available for download at the address [www.boschrexroth.com/electrics](http://www.boschrexroth.com/electrics).

S67E product group

## 2.8 For your safety

### 2.8.1 Intended use

The S67E devices are designed for use as specified in this application description and in the device-specific data sheets.

Observe the data specified in the data sheets and in the user application description. If the operating instructions and safety notes for configuration, installation, and operation given in the documentation are followed, the devices should not normally present a danger to people or property.

### 2.8.2 Rulations

During device configuration, installation, startup, and maintenance, the applicable safety and accident prevention rulations for the specific application must be observed.

### 2.8.3 Safety notes

---

**NOTICE****Device damage**

To ensure IP65/IP67 protection, seal unused connections with protective caps.

---

**NOTICE****Data corruption or loss**

Ground the devices to provide immunity to interference.

---

**NOTICE****Device damage**

Only operate the S67E devices with a maximum SELV of 30 V according to IEC 60950/EN 60950/VDE 0805.

---

### 3 Description of the S67E devices

S67E devices are designed for use without a control cabinet in systems manufacturing. They are particularly suitable for use under harsh industrial conditions. They can be used on tool platforms, directly on welding robots or in conveying technology, for example.

The fixing clips are fixed mounted.

#### 3.1 Housing dimensions of S67E devices

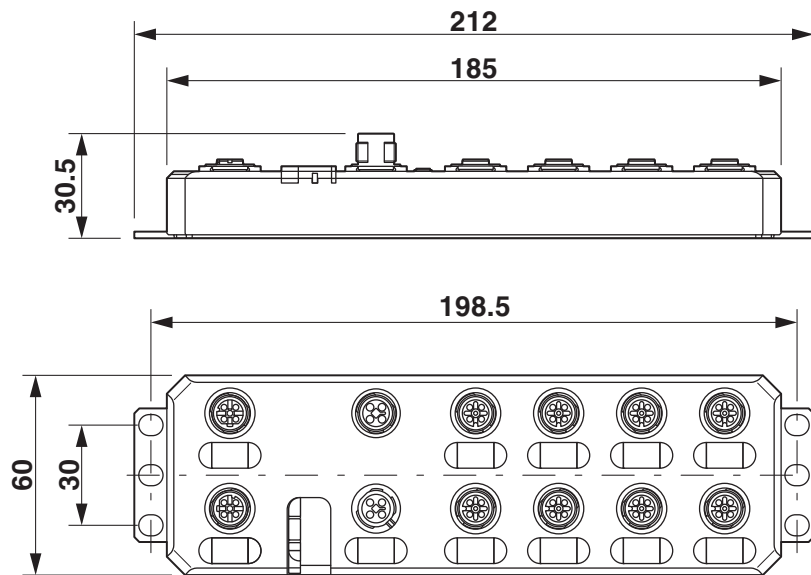


Fig. 3-1 Housing dimensions (mm)

#### 3.2 Dimensions of screw holes in the fixing clips

The drawing below shows the dimensions of the screw holes in the fixing clips.

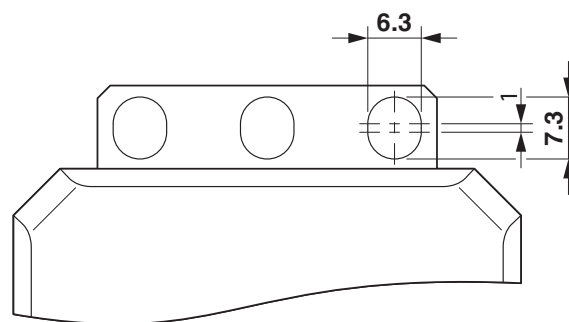


Fig. 3-2 Dimensions of the screw holes in mm

## Description of the S67E devices

### 3.3 Basic structure of the S67E devices

The figure shows the basic structure of the S67E devices.

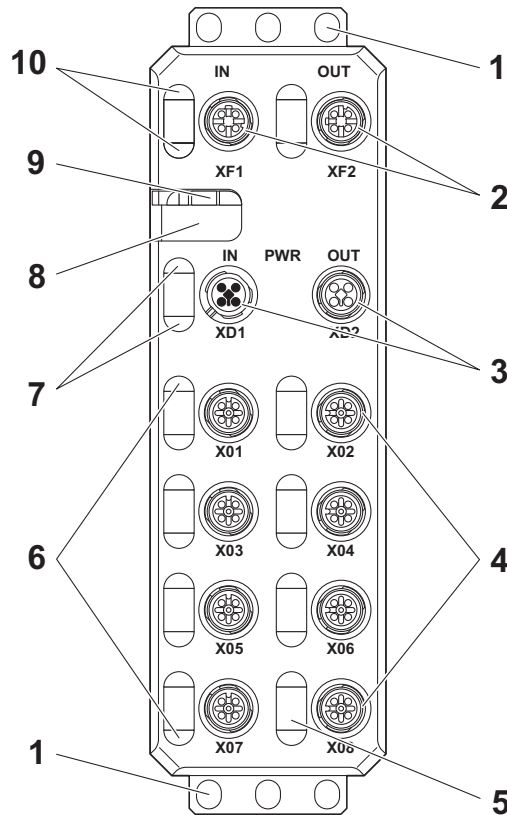


Fig. 3-3 Basic structure of the S67E devices

- |   |  |
|---|--|
| <b>1</b> Fixing clips (FE connection); optional for metal devices | <b>7</b> Diagnostics and status indicators for the supply voltages |
| <b>2</b> Network connection (IN, OUT)                             | <b>8</b> Rotary coding switch                                      |
| <b>3</b> Connections for the supply voltages                      | <b>9</b> Diagnostics and status indicators for the network         |
| <b>4</b> Connections of the IO-Link ports                         | <b>10</b> Diagnostics and status indicators for the network        |
| <b>5</b> Markers for marking                                      |  |
| <b>6</b> Status indicators of the IO-Link ports                   |  |

### 3.4 Marking the S67E devices

It is possible to mark the devices next to the connections for the network, to mark the connections for the power supply and to mark every IO-Link port (5 in Fig. 3-3).

The devices are supplied as standard with ten unprinted marking labels. If you want to swap a label, you can lift it out of the recess using a screwdriver.

### 3.5 Diagnostics and status indicators of the S67E devices

**Diagnostics** The diagnostics indicators (green/yellow/red) indicate whether an error is present or not. In the event of an error, they indicate the error type and location.

**Status** The status indicators (yellow) indicate the signal state of the corresponding input/output or of the IO-Link port. If the yellow status indicators are on, this indicates signal state “1” of the input/output signal.

The S67E devices have three main areas for diagnostics and status indicators.

- Indicators of the network (network-specific) - **data**
- Indicators of the power supplies - **power**
- Indicators of the IO-Link ports (device-specific) - **signal**

These areas are shown in the figure below.

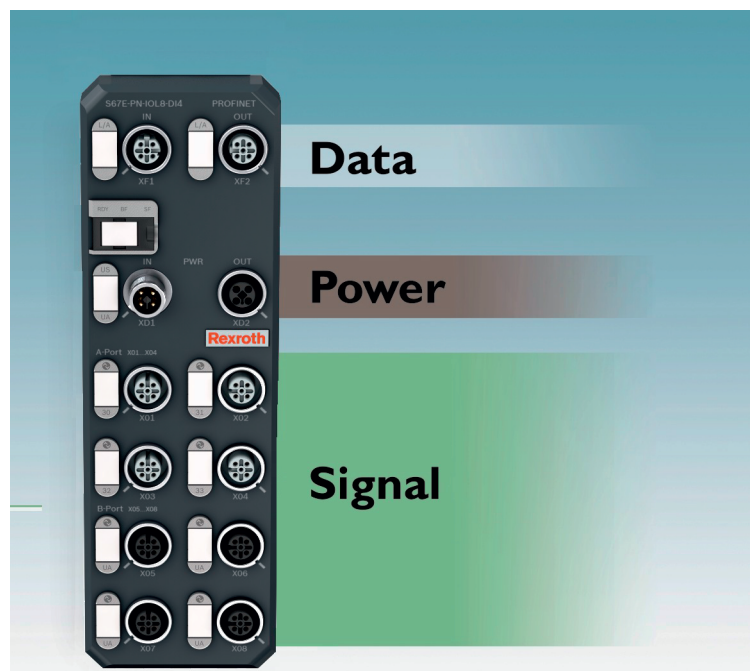


Fig. 3-4 Main diagnostics and status indicators of the S67E devices



For more detailed information on the diagnostics and status indicators, please refer to the data sheet for the respective device.

Description of the S67E devices



## 4 Mounting S67E devices and connecting cables

### 4.1 General information on installation

When preparing for cable installation, the local conditions and the corresponding mounting regulations are very important. Cables can be installed, for example, in cable ducts or on cable bridges.

---

**NOTICE****Data corruption and loss**

A minimum distance between the cabling and possible sources of interference (e.g., machines, welding equipment, power lines) is defined in the applicable regulations and standards. During system planning and installation, these regulations and standards must be taken into account and observed.

---

**NOTICE****Data corruption and loss**

Protect the network cables from sources of electric/magnetic interference and mechanical strain.

---

**NOTICE****Data corruption and loss**

Observe the following guidelines regarding “electromagnetic compatibility” (EMC) to keep mechanical risks and interference to a minimum:

**Mechanical strain**

- Choose the correct cable type for the respective application (e.g., indoor or outdoor installation, drag chains).
- Observe the minimum bending radius.
- Make sure that cables do not enter the shear area of moving machine parts.
- Do not install bus cables at right angles to driving routes and machine movements.
- Use cable ducts and cable bridges.



Observe the specification of the cable used.

---

## Mounting S67E devices and connecting cables

- Sources of interference**
  - Signal cables and power supply lines should not be installed in parallel. If necessary, metal isolating elements should be placed between the power supply lines and signal cables.
  - Only use connectors with metal housing and connect as much of the shielding as possible to the housing.
  - For outdoor cables between buildings, make sure that grounding is carried out in accordance with on [“Installing network cables between buildings” on page 19](#).
  - During installation, all connector locking mechanisms (screws, union nuts) must be firmly tightened in order to ensure the best possible contact between shielding and ground. Before initial startup, the ground or shielding connection of cables must be checked for low-resistance continuity.
  - Install network cables in separate cable ducts or separate cable bundles.
  - Where possible, do not install network cables parallel to power supply lines.
  - Install network/bus cables at least 10 cm away from power lines.
- Cable routing in buildings**
  - Where possible, use metal cable hangers.
  - Do not install network cables together with or parallel to power supply lines.
  - Separate network cables on cable bridges or in cable ducts from power supply lines using isolating elements.
  - Install network cables as far away as possible from sources of interference, such as motors and welding equipment.
  - For long cable connections, install an additional equipotential bonding line between the terminal points.
- Cable routing outside buildings**
  - Install network cables in metal pipes that are grounded on both sides or in concrete cable ducts with continuous reinforcement.
  - For long cable connections, install an additional equipotential bonding line between the terminal points.

### 4.1.1 Installing network cables between buildings

**Causes of surge voltages** Surge voltages occur as a result of switching operations, electrostatic discharge, and lightning discharge. Surge voltages can be inductively, capacitively or galvanically coupled into electrical cables for mains supply, measured value transmission, and data transmission. In this way, surge voltages reach the power supply units and the interfaces of systems and termination devices.

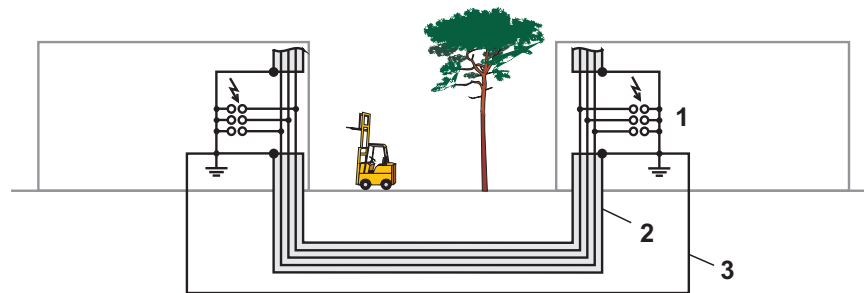
**Equipotential bonding line** Install an additional equipotential bonding line between the grounding points of buildings (3 in Fig. 4-1), which is preferably in the form of:

- A metal-reinforced concrete channel
- An additional grounding cable
- A metal pipe

**Surge protective devices** Bosch Rexroth recommends wiring all the wires of the cable to surge protective devices (1 in Fig. 4-1) in order to protect the devices against surge voltages.



For information on surge protective devices, please refer to the Bosch Rexroth catalogs. Observe all national and international regulations when installing surge protective devices.



6651A041

Fig. 4-1 Surge protection measures

- 1 Surge protective devices
- 2 Cable shielding
- 3 Equipotential bonding line

## Mounting S67E devices and connecting cables

## 4.1.2 Interference suppression measures

Bosch Rexroth recommends wiring relay coils or motor coils to an RC element in order to protect the devices against interference. Depending on the application, the delay time of the relay can be increased by approximately 1 ms.

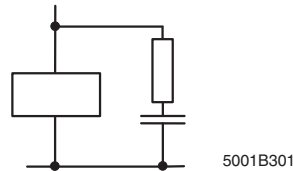


Fig. 4-2 Relay coil with RC element

The following values are recommended for the purpose of dimensioning the RC element:  $R = 100\ \Omega$  to  $200\ \Omega$ ;  $C = 220\ \text{nF}$  to  $470\ \text{nF}$ .

## 4.1.3 Grounding concept

S67E IO-Link master operate in the low-level signal voltage range. In the case of low-level signal devices, interference is discharged via functional earth ground (FE). Functional earth ground (FE) is only used to discharge interference. It does not provide shock protection for people. Functional earth grounding is crucial for interference-free operation!

The S67E devices are designed to be screwed onto on a flat mounting surface.

Ground the master by means of the mounting screws of the fixing clips, see page 30.

## 4.2 Installation instructions

---

**NOTICE****Damage to the electronics**

The device contains components that can be damaged or destroyed by electrostatic discharge. When handling the device, observe the necessary safety precautions against electrostatic discharge (ESD) according to EN 61340-5-1 and IEC 61340-5-1.

---

---

**NOTICE****Damage to the electronics**

The device may only be installed and removed by qualified electricians in accordance with the ESD regulations.

---

---

**NOTICE****Data corruption or loss**

Implement the FE connection via mounting screws in order to ensure noise immunity.

---

---

**NOTICE****Damage to the electronics**

To ensure IP65/IP67 protection, seal unused connections with protective caps.

---

---

**NOTICE****Damage to the electronics**

Only supply the sensors with voltage  $U_S$  which is provided at the terminal points.

---

---

**NOTICE****Damage to the electronics**

Avoid polarity reversal of supply voltages  $U_S$  and  $U_A$ .

---

## 4.3 Mounting distances

No specific distances are required between devices or between a device and a cabinet door or cover. Mounting distances are determined solely by the plugs used and the bending radii of the cables.

Mounting S67E devices and connecting cables

## 4.4 Mounting S67E IO-Link master

- Screw the device directly onto the flat mounting surface using the drill holes (1) of the fixing clips.

Drill hole spacing

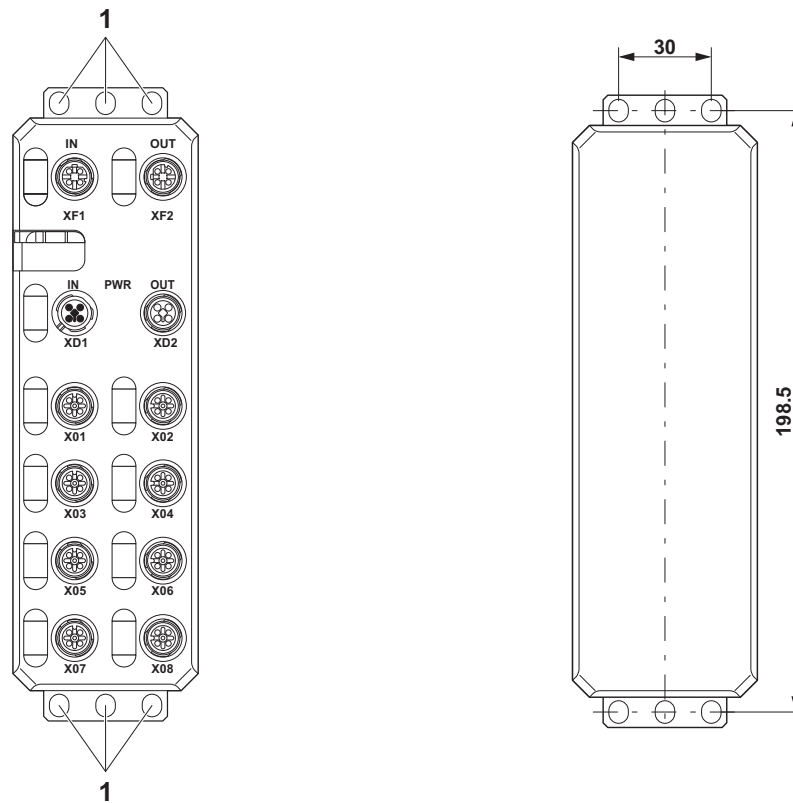


Fig. 4-3 Mounting



Use standard M5 screws with toothed lock washer and self-locking nuts. Observe the maximum torque of the screws.

Functional earth  
grounding

### NOTICE

### Data corruption or lose

Functional earth grounding is crucial for interference-free operation. Ground the device by means of the mounting screws of the fixing clips.

## 4.5 Configuration via rotary coding switches

The S67E devices have rotary coding switches, which are located below a cover, see figure.

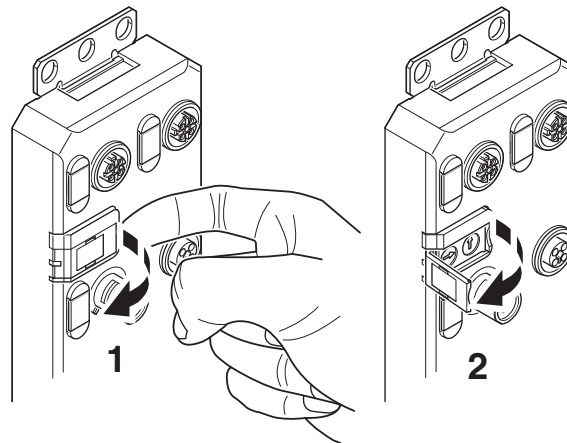


Fig. 4-4 Opening the rotary coding switch cover



Adjust the rotary coding switches using a suitable screwdriver (according to DIN 5264: blade width 3.0 mm or 2.5 mm). Using an unsuitable tool may damage the rotary coding switches.



After modifying the switch position, restart the device, as the modification to the switch position does not take effect during operation.



Further information on the rotary coding switches can be found in the device-specific data sheet.

Mounting S67E devices and connecting cables

## 4.6 Connecting power supplies

For S67E devices, a distinction is made between two voltages:

- $U_S$  to supply the communications power and the sensors (always required)
- $U_A$  for supplying the actuators, only required for devices with fixed outputs or for additional devices

**Connection** All supply voltages are connected via M12 connectors.

**Current carrying capacity**

---

**NOTICE****Damage to the electronics**

Connect both supply voltages completely (to +24 V and GND). Do not connect several supply voltages via one GND, as this will exceed the current carrying capacity of the contacts.

---

### 4.6.1 Power supplies $U_S$ and $U_A$

Voltages  $U_S$  and  $U_A$  are fed in at connection XD1.

Power supply  $U_S$  is required to supply the communications power of the device electronics and to supply the sensors. It must be connected to every device. If this supply voltage is disconnected, the device will not work.

Install the power supply for the device electronics independently of the power supply for the actuators. Protect the power supplies independently. This means that the bus can continue running even if some I/O devices are switched off.



Mounting S67E devices and connecting cables

**Power supply  $U_S$  for S67E devices**

Connect power supply  $U_S$  for the logic and sensors to socket XD1. To supply additional devices, connect the cable for the outgoing supply voltage to socket XD2.

**NOTICE**

**Damage to the electronics**

The current carrying capacity of the M12 connectors is 12 A per contact. Make sure that this value is not exceeded. Please note that the connection for the outgoing supply voltage is not monitored for overload. If the permissible current carrying capacity is exceeded, this may result in damage to the connectors.



Bosch Rexroth recommends using pre-assembled cables.

**Power supply  $U_A$  for S67E devices**

Power supply  $U_A$  is required to supply the actuators. It is only connected to devices with outputs or is required for additional devices.

When determining the load for a supply voltage, take into account the number of outputs, the nominal current, and the simultaneity.

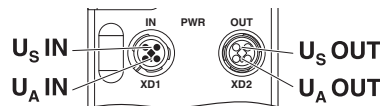


Fig. 4-5 Connections  $U_S$  and  $U_A$

**Pin assignment of power supplies  $U_S$  and  $U_A$**

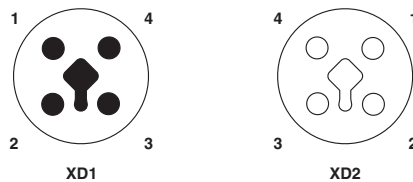


Fig. 4-6 Power supplies  $U_S$  and  $U_A$

Pin	IN	OUT	Wire colors
1	+24 V DC ( $U_S$ )	+24 V DC ( $U_S$ )	Brown
2	GND ( $U_A$ )	GND ( $U_A$ )	White
3	GND ( $U_S$ )	GND ( $U_S$ )	Blue
4	+24 V DC ( $U_A$ )	+24 V DC ( $U_A$ )	Black

**NOTICE**

**Damage to the electronics**

Power supplies  $U_S$  and  $U_A$  should only be supplied with SELV.

Mounting S67E devices and connecting cables

### 4.6.2 Power supply for sensors, actuators and IO-Link ports of individual devices



The following diagram provides an **example** of which inputs or outputs are supplied by which supply voltage.

For the actual assignment for your device, please refer to the device-specific data sheet.

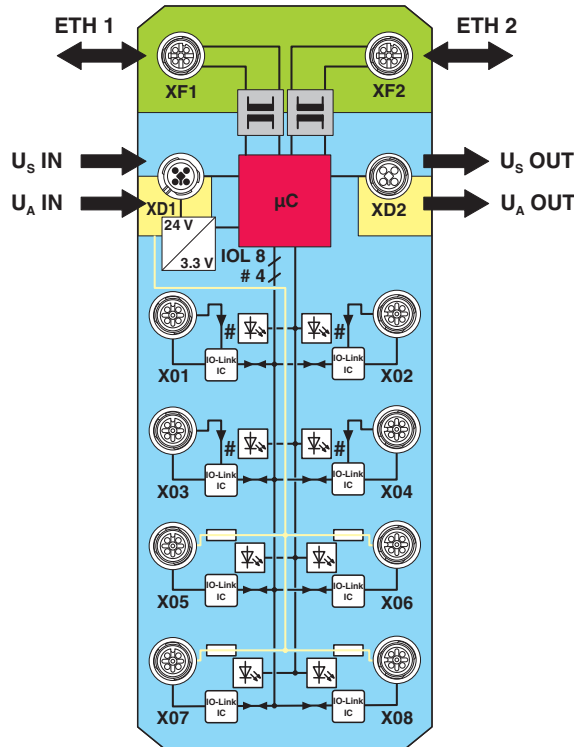


Fig. 4-7 Supply of periphery, e.g., S67E-PN-IOL8-DI4-M12-6P

Key:

Green area: network

Blue area:  $U_S$

Yellow area:  $U_A$

### 4.6.3 Supply line and power supply (M12)

For M12 connectors in S67E devices, a maximum of **12 A per contact** is permitted.

To ensure that this condition is met, the following factors must be considered:

1. Current consumption of the S67E devices (see data sheets)
2. Current consumption of the connected sensors
3. Current consumption of the connected IO-Link ports
4. Length of the cables and losses on these cables



It is particularly important that these factors are observed when forwarding the supply voltage.

## 4.7 Connecting sensors and actuators

Connect the sensors and actuators using M12 connectors.

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**NOTICE****Damage to the electronics**

In general, the maximum current load of 4 A per contact must not be exceeded.

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For the pin assignment of inputs and IO-Link ports, please refer to the device-specific data sheet.

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Bosch Rexroth recommends using pre-assembled cables.

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Mounting S67E devices and connecting cables

## 5 Disposal

### 5.1 General information

Dispose the products according to the respective valid national standard.

### 5.2 Return

For disposal, our products can be returned free of charge. However, the products must be free of remains like oil and grease or other impurities.

Furthermore, the products returned for disposal must not contain any undue foreign substances or components.

Send the products free of charge to the following address:

Bosch Rexroth AG  
Electric Drives and Controls  
Bürgermeister-Dr.-Nebel-Straße 2  
D-97816 Lohr am Main, Germany

### 5.3 Packaging

The packaging material consists of cardboard, plastics, wood or styrofoam. Packaging material can be recycled anywhere.

For ecological reasons, please do not return empty packages.

### 5.4 Batteries and accumulators

Batteries and accumulators can be labelled with this symbol.



The symbol indicating "separate collection" for all batteries and accumulators is the crossed-out wheeled bin.

The end user within the EU is legally obligated to return used batteries. Outside the validity of the EU Directive 2006/66/EC keep the stipulated directives.

Used batteries can contain hazardous substances, which can harm the environment or the health of the individual when they are stored incorrectly or disposed of.

After use, the batteries or accumulators contained in Rexroth products have to be disposed of according to the country-specific collection system.

Disposal

## 6 Service and support

Our worldwide service network provides an optimized and efficient support. Our experts offer you advice and assistance should you have any queries. You can contact us **24/7**.

**Service Germany** Our technology-oriented Competence Center in Lohr, Germany, is responsible for all your service-related queries for electric drive and controls.

Contact the **Service Hotline** and **Service Helpdesk** under:

Phone:	<b>+49 9352 40 5060</b>
Fax:	<b>+49 9352 18 4941</b>
E-mail:	<a href="mailto:service.svc@boschrexroth.de">service.svc@boschrexroth.de</a>
Internet:	<a href="http://www.boschrexroth.com">http://www.boschrexroth.com</a>

Additional information on service, repair (e.g. delivery addresses) and training can be found on our internet sites.

**Service worldwide** Outside Germany, please contact your local service office first. For hotline numbers, refer to the sales office addresses on the internet.

**Preparing information** To be able to help you more quickly and efficiently, please have the following information ready:

- Detailed description of malfunction and circumstances
- Type plate specifications of the affected products, in particular type codes and serial numbers
- Your contact data (phone and fax number as well as your e-mail address)

Service and support



Notes

**Bosch Rexroth AG**

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