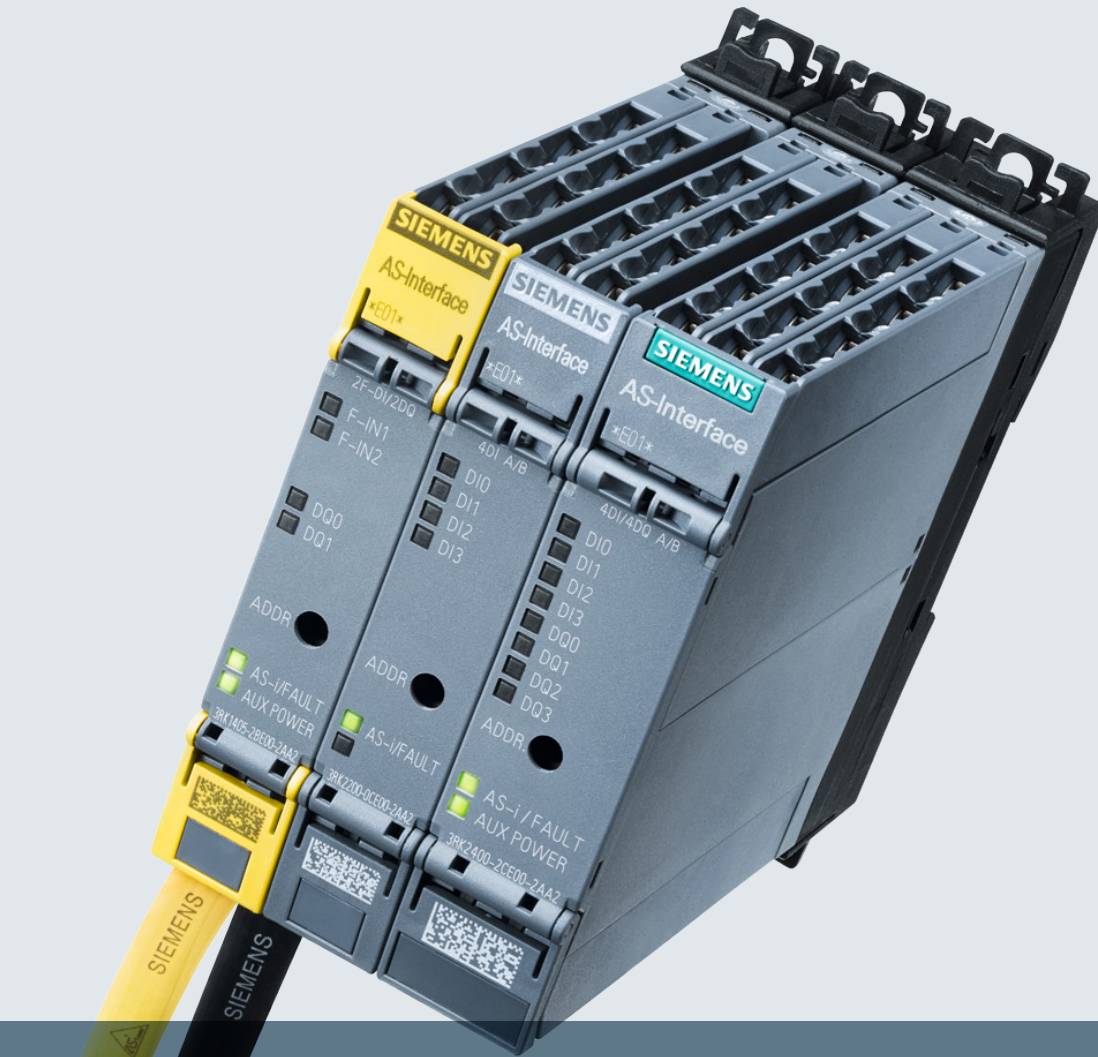


SIEMENS



AS-Interface

I/O modules for use in the control cabinet
AS-Interface SlimLine Compact Modules

Manual

Edition

10/2015

siemens.com

AS-Interface




I/O modules for use in the
control cabinet
AS-Interface SlimLine
Compact Modules
Manual

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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
 CAUTION
indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that property damage can result if proper precautions are not taken.


If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

 WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Introduction

1.1 Required basic knowledge

A general knowledge of the following areas is needed in order to understand this manual:

- Low-voltage switchgear and control gear
- Digital circuit logic
- Automation technology
- Safety technology

1.2 Service & Support

Online Support

The Online Support in the Service & Support Portal is an extensive information system for all questions relating to Siemens products and solutions. This service enables direct and central access to in-depth information concerning the products, systems and applications for industry and to a large number of programming, configuration and application examples. Its content is available via a mobile app.

The Technical Forum of the Online Support provides the opportunity for users to swap information. Support Request allows contact to be established with Siemens experts in Technical Support.

Siemens Industry Online Support ensures that users in industry are always kept up-to-date with news, software updates and announcements by means of newsletters and Twitter.

Link:

- Online Support (<https://support.industry.siemens.com/cs/de/en>)
- Service & Support Portal (<https://support.industry.siemens.com/cs/sc?lc=en-WW>)

Product Support

Are you looking for product information such as technical data, updates or FAQs? Here, the "Product Support" section of the Service & Support Portal offers an extensive collection of all information about the Siemens Industry Automation and Drive Technologies products and solutions:

- Answers to frequently asked questions (FAQs)
- Updates/upgrades, service packs and support tools for downloading
- Manuals and operating instructions
- Technical data / CAx data
- Approvals and certificates
- Test certificates and characteristic curves

All Product Support information is at your disposal free of charge and around the clock, and you always get the current version.

Link:

- Product Support (<https://support.industry.siemens.com/cs/ww/en/ps>)

CAx data

The CAx Download Manager provides you with a simple means of gaining access to up-to-date product data for your CAx or CAe system.

You configure your own download package with just a few clicks. You can choose from the following information for products:

- Product images
- 2D dimensional drawings
- 3D models
- Internal circuit diagrams
- EPLAN macro files
- Manuals
- Characteristics
- Operating instructions
- Certificates
- Product master data

Link:

- CAx Download Manager (<https://support.industry.siemens.com/my/ww/en>)

Applications & Tools

Applications & Tools supports you with various tools and examples when it comes to solving your automation tasks. Solutions are presented in interaction with several components in the system, without focusing on individual products.

- Application examples
- Function blocks & tools
- Background and system descriptions
- Performance statements
- Demonstration systems / videos

Link:

- Applications & Tools (<https://support.industry.siemens.com/cs/ww/en/ps>)

My Documentation Manager

My Documentation Manager enables you to compile your own documentation from our standard documents (manuals), which are located in the Product Support section. Under mySupport, you have the opportunity to create and manage you own compilations in a structure of their own.

Link:

- MyDocumentationManager
(<https://support.industry.siemens.com/My/de/en/documentation>)

Reference

You can find further information on structure and navigation in Online Support here (<https://support.industry.siemens.com/cs/helpcenter/en/index.htm>).

1.3 DataMatrix code

A lasered DataMatrix code is located on the lower terminal cover of all devices of this series.

The DataMatrix codes are standardized in ISO /IEC 16022. The DataMatrix codes on Siemens devices use ECC200 coding for powerful error correction.

The following device information is encoded in the DataMatrix codes as a bit stream:

- Article number
- Serial number
- If applicable, MAC address

This information is stored in the following format in the DataMatrix code:

1P	Article number	+	S serial number (+ 23S MAC address)
Data identifier	Net content	Separator	

Note

The information content is displayed without spaces.

This machine-readable information simplifies and accelerates handling of the respective devices.

Besides fast access to the serial numbers of the respective devices for unique identification, the DataMatrix codes simplify communication with Siemens Technical Support.

SIEMENS Industry Support App

In particular, the DataMatrix codes enable extremely fast and convenient access to all the device-specific information available in the SIEMENS Service & Support Portal for an article number, such as operating instructions, manuals, data sheets, FAQs, etc.

We offer the SIEMENS Industry Support App free for this purpose. It can be used on commercially available smartphones and tablet PCs.

The SIEMENS Industry Support app is available for iOS and Android-based devices and can be accessed via the following links:



Link for Android



Link for iOS

1.4 Correction sheet

The appendix to this manual contains a correction sheet for evaluation and feedback. Please use it to record your suggestions for improvements, additions and corrections, and return the sheet to us. This will help us to improve the next edition of the manual.

Thank you.

See also

Correction sheet (Page 85)

1.5 History

Release number	New features
05/2015	First edition

Safety notes

2.1 General safety notes

Note**Recycling and disposal**

Dispose of existing packing material in accordance with applicable regulations or recycle it.

The products described in the following documentation can be recycled thanks to their low-pollutant manufacturing process. For environmentally compatible recycling and disposal of your old device, contact a company certified for the disposal of electronic waste.

 WARNING**Risk of electrically conductive contamination!**

The devices must be protected against conductive contamination while taking account of the ambient conditions. One way you can do this is to install the devices in a control cabinet with the appropriate degree of protection.


You will find more detailed information in IEC 60529, for example.

 WARNING**Protection against electrostatic charge**

When handling and installing the described components, ensure that the components are protected from being electrostatically charged. Changes to the system configuration and wiring are permissible only when the supply voltage is switched off.


The connection of devices is permitted only when the supply voltage is switched off.

2.2 Intended use

 WARNING
Hazardous Voltage Can Cause Death, Serious Injury, or Property Damage. Intended Use of Hardware Products
<p>This equipment is only allowed to be used for the applications described in the catalog and in the technical description, and only in conjunction with non-Siemens equipment and components recommended by Siemens.</p> <p>Correct transport, storage, installation and assembly, as well as careful operation and maintenance, are required to ensure that the product operates safely and without faults.</p>

2.3 Current information about operational safety

Important note for maintaining operational safety of your system

 WARNING
Hazardous voltage Can Cause Death, Serious Injury, or Property Damage. Please take note of our latest information
<p>Systems with safety-related characteristics are subject to special operational safety requirements on the part of the operator. The supplier is also obliged to comply with special product monitoring measures. For this reason, we publish a special newsletter containing information on product developments and features that are (or could be) relevant to operation of safety-related systems. By subscribing to the appropriate newsletter, you will ensure that you are always up-to-date and able to make changes to your system, when necessary:</p> <p>SIEMENS Newsletter (https://www.industry.siemens.com/newsletter/public/AllNewsletters.aspx?themeID=269&lang=en) Subscribe to the following newsletter under "Products & Solutions":</p> <ul style="list-style-type: none">• Industrial Controls - SIRIUS News

2.4 Declaration of conformity

The manufacturer declares that the AS-i modules of the 3RK series in the designs marketed by us comply with the applicable basic health and safety requirements of the EC Directives* stated (including amendments) and that the stated standards were applied in their design and construction.

You can download the complete EC Declaration of Conformity from the Internet (<https://support.industry.siemens.com/cs/ww/en/ps/cert>) as a PDF.

Description

3.1 Module description

Module description

The SlimLine Compact module series comprises digital I/O modules and ASIsafe modules with safety inputs. Digital outputs are available as solid-state or relay outputs.

The SlimLine Compact AS-Interface module series with degree of protection IP20 for use in control cabinets free up space in control cabinets and in distributed on-site control boxes. At a width of just 17.5 mm or 22.5 mm, the modules maximize space savings in the control cabinet.

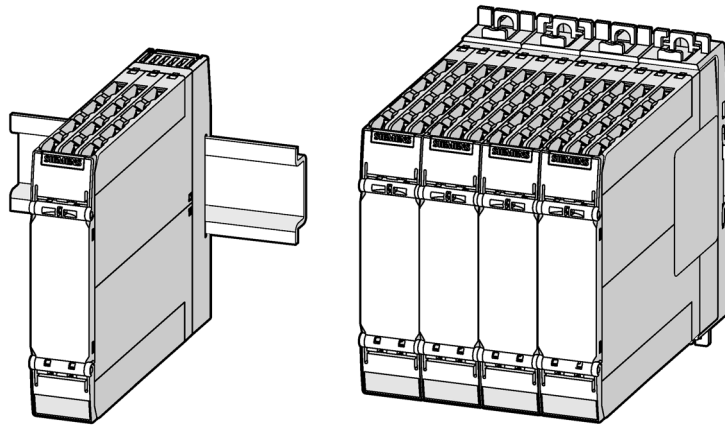
Sensors and actuators as well as the AS-Interface bus cable are connected by means of removable screw terminals or push-in spring-type terminals. Device connectors available as accessories offer the possibility of looping through the AS-Interface bus cable and the 24 V DC power supply U_{aux} from one module to additional modules. This significantly simplifies the wiring because the AS-Interface bus cable and U_{aux} only have to be connected to one device.

All devices for the connection of 3-wire sensors offer the option of supplying the sensors either from the AS-Interface bus cable or alternatively from the 24 V DC power supply U_{aux} , depending on requirements. A slide switch is used to make the selection. If supply via U_{aux} is selected, the wiring of the sensor terminals remains unchanged. This means that an external supply of the sensors is not required.

All modules have LEDs on the front that provide diagnostic information and indicate the status of the module inputs and outputs. An addressing socket integrated on the front enables addressing even in installed condition. Integrated adapters allow mounting on a standard mounting rail – either directly for the module or for the device connector. The modules can also be screwed on with an additional accessory (push-in lugs).

3.2 Overview of the new AS-i modules

Mounting variants



Properties

AS-i SlimLine Compact offers more functions at half the width.

- Simple connection of multiple modules using the device connector
- Can select between AS-i/U_{aux} sensor supply
- Extensive portfolio of digital and ASIsafe modules and solid-state and relay outputs
- Slim widths in new enclosure with 17.5 mm (4DI/2F-DI) and 22.5 mm (4DI/4DQ).

Customer benefits

The following table provides an overview of the features and functions of AS-i SlimLine Compact modules and the benefits they offer customers.

Feature / function	Benefit
Integration in the new enclosure: <ul style="list-style-type: none"> • 4DI/4DQ only 22.5 mm wide • 4DI and 2F-DI only 17.5 mm wide 	<ul style="list-style-type: none"> • Cost saving through lower space requirement in the control cabinet
Selectable sensor supply (AS-i/U _{aux})	<ul style="list-style-type: none"> • Flexible use depending on requirements • Greater energy efficiency by switching off the outputs and sensor supply
Device connector enables easy wiring of multiple modules	<ul style="list-style-type: none"> • Easy wiring saves time and reduces errors

Product data comparison

The following table shows you at a glance the most important differences between the previous module series and AS-i SlimLine Compact:

	Previous series	AS-i SlimLine Compact
Width	<ul style="list-style-type: none"> • 4DI/4DQ in 45 mm • 4DI in 22.5 mm • 2F-DI in 22.5 mm 	<ul style="list-style-type: none"> • 4DI/4DQ in 22.5 mm • 4DI in 17.5 mm • 2F-DI in 17.5 mm
Device connector	The AS-i and U_{aux} power supplies must be connected to each device individually.	Distribution of the AS+i and U_{aux} power supply using device connectors.
Sensor supply	Only two devices available with sensor supply via U_{aux} .	Supply via AS+i or U_{aux} can be selected for all devices.

Product overview

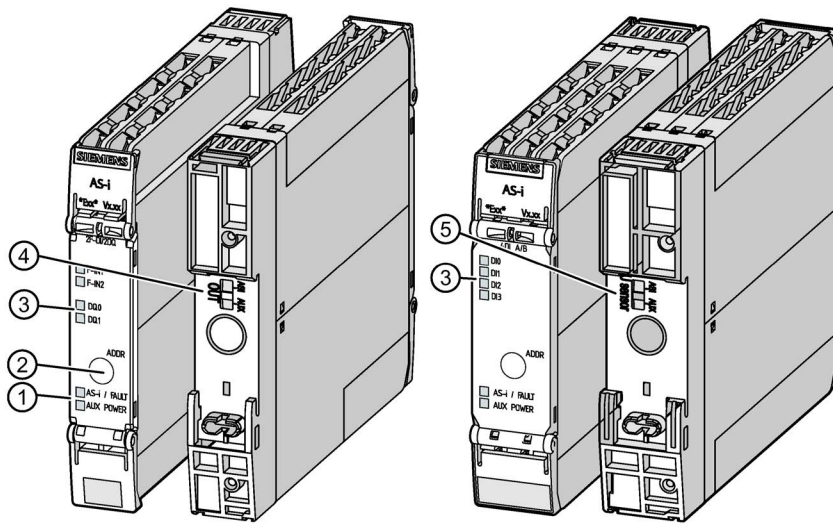
Digital SlimLine Compact modules

Inputs/outputs	Slave type	Width	Special feature
4DI 2-wire sensors	A/B slave	17.5 mm	For 2-wire sensors or mechanical contacts
4DI 3-wire sensors	A/B slave	22.5 mm	Can select between AS-i/ U_{aux} sensor supply
4DI/2RQ relays	A/B slave	22.5 mm	Can select between AS-i/ U_{aux} sensor supply. relays (CO contacts)
4DQ	A/B slave	22.5 mm	Output transistor (PNP) 2 A
4DI/4DQ	Standard slave	22.5 mm	Can select between AS+i/ U_{aux} sensor supply, output transistor (PNP) 2 A
4DI/4DQ	A/B slave	22.5 mm	Can select between AS+i/ U_{aux} sensor supply, output transistor (PNP) 2 A
4DI/4RQ relays	A/B slave	22.5 mm	Can select between AS-i/ U_{aux} sensor supply, output relays (NO contacts)

ASIsafe SlimLine Compact modules

Inputs/outputs	Slave type	Width	Special feature
2F-DI	ASIsafe	17.5 mm	Input for mechanical contacts
2F-DI/2DQ	ASIsafe	17.5 mm	Input for mechanical contacts, can select between AS+i/ U_{aux} for supply of standard outputs; output transistor (PNP)

3.3 Function overview of AS-i SlimLine Compact modules



- ① LED display for AS-i / Fault and AUX power
- ② Socket for addressing device connector
- ③ LED display for inputs/outputs
- ④ Change-over switch for output supply (on ASIsafe modules)
- ⑤ Change-over switch for sensor supply (on digital modules)

Status LEDs

The LEDs indicate the operating state of the module.

You can find the signal states here:

- Digital modules (Page 55)
- ASIsafe modules (Page 67)

Inputs, outputs

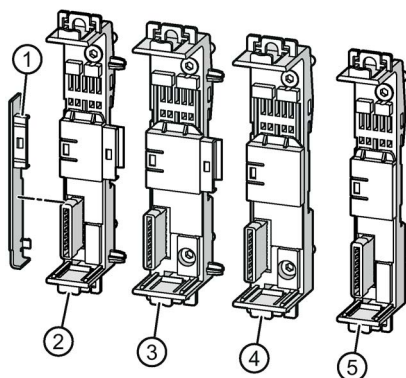
The digital modules have 4 digital inputs and/or up to 4 digital outputs. The digital outputs are available as solid-state outputs or relay outputs. Relay outputs are available with NO or CO contacts.

ASIsafe modules have two fail-safe inputs for contacting sensors (e.g. Emergency Stop). Some versions also have 2 standard outputs.

AS-i Power24V

AS-i Power24V is the option for using a separate power supply (24 V). All devices described here are suitable for AS-i Power24V.

3.4 Device connectors for AS-i SlimLine Compact modules



- ① Cover
- ② Device connector for AS-i SlimLine Compact modules 3RK, 17.5 mm width
- ③ Device connector for AS-i SlimLine Compact modules 3RK, 22.5 mm width
- ④ Device termination connector for AS-i SlimLine Compact modules 3RK, 22.5 mm width
- ⑤ Device termination connector for AS-i SlimLine Compact modules 3RK, 17.5 mm width

General information

When multiple AS-i SlimLine modules are used, the wiring can be simplified through the use of device connectors. The AS-i bus cable and the 24 V DC auxiliary voltage U_{aux} are distributed among the device connectors. The AS-i bus cable and the 24 V DC auxiliary voltage U_{aux} only have to be connected to one SlimLine Compact module.

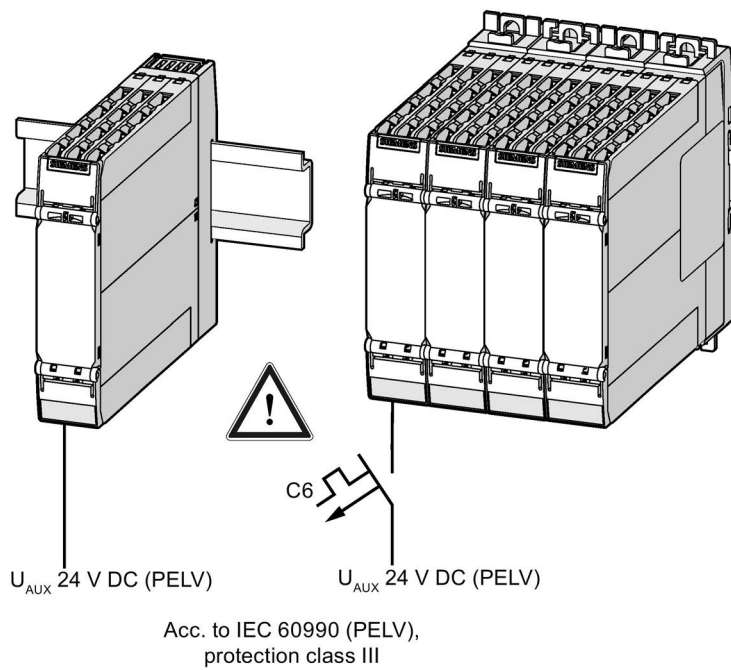
A maximum of 2 A for the AS-i bus cable or 6 A for the 24 V DC auxiliary voltage can be transmitted via the device connectors.

The device connectors are available in two different widths (17.5 mm and 22.5 mm). A device termination connector is required for the last SlimLine Compact module on the right side.

Note

To avoid exceeding the maximum current load of the device connectors, you must protect the infeed of the 24 V DC U_{aux} supply with a miniature circuit breaker 6 A Type C.

Only AS+i SlimLine Compact modules are permitted to be used on the 3RK19 device connectors!



Article number

Article number	Type of device connector
3RK1901-1YA00	Device connector for enclosure, width 17.5 mm
3RK1901-1YA10	Device connector for enclosure, width 22.5 mm
3RK1901-1YA01	Device termination connector for enclosure, width 17.5 mm
3RK1901-1YA11	Device termination connector for enclosure, width 22.5 mm

Use of device connectors

The following device connectors are required for the various enclosure widths of the devices:

Devices	Device connector for enclosure, width 17.5 mm 3RK1901-1YA00	Device connector for enclosure, width 22.5 mm 3RK1901-1YA10	Device termination connector for enclosure, width 17.5 mm 3RK1901-1YA01	Device termination connector for enclosure, width 22.5 mm 3RK1901-1YA11
Digital modules				
3RK2200-0C.00-2AA2	✓	-	✓	-
3RK2200-2C.00-2AA2	-	✓	-	✓
3RK2402-2M.00-2AA2	-	✓	-	✓
3RK2100-1C.00-2AA2	-	✓	-	✓
3RK2400-2C.00-2AA2	-	✓	-	✓
3RK1400-2C.00-2AA2	-	✓	-	✓
3RK2402-2C.00-2AA2	-	✓	-	✓
ASIsafe modules				
3RK1205-0B.00-2AA2	✓	-	✓	-
3RK1405-2B.00-2AA2	-	✓	-	✓

3.5 Article No. scheme

Note

The Article No. scheme is presented here merely for information purposes and for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the catalog in the Selection and ordering data.

Digit of the Article No.	1 ... 3	4	5	6	7	8	9	10	11		12 ... 15		
AS-i SlimLine Compact module	3 R K	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	2 A A 2
Generation		<input type="checkbox"/>											1 Standard 2 A/B
Device type			<input type="checkbox"/>										1 Output module 2 Input module 4 Input/output module
Communication interface				<input type="checkbox"/>									0 AS-Interface
Type of input/output					<input type="checkbox"/>								0 Binary input/output 2 Binary solid-state input/output 5 Safety input/output 7 Analog input/output
Auxiliary voltage						<input type="checkbox"/>							0 None (supply via BUS) 1 24 V DC 2 Can select between AS-i / U _{aux} 3 230 V AC / 115 V
Number of Inputs/outputs							<input type="checkbox"/>						B 2 In / 2 Out (2DI/2DQ) C 4 In / 4 Out (4DI/4DQ) M 4 In / 2 Out (4DI/2DQ)
Degree of protection and connection technology								<input type="checkbox"/>					E IP20 - screw terminal G IP20 - spring-type terminal
Product design									<input type="checkbox"/>	<input type="checkbox"/>			00 (Constant)
Example	3 R K	2	1	0	0	-	1	C	E	00	-	2 A A 2	Digital output module, A/B slave, 24 V DC supply, 4DQ, IP20 as well as screw terminal connection

Installing

4.1 Warning notices

Warning notices before installation, wiring, and commissioning

 WARNING
Hazardous voltage!
Causes electric shock and burns when touched.
Turn off and lock out all power supplying this device before working on this device.

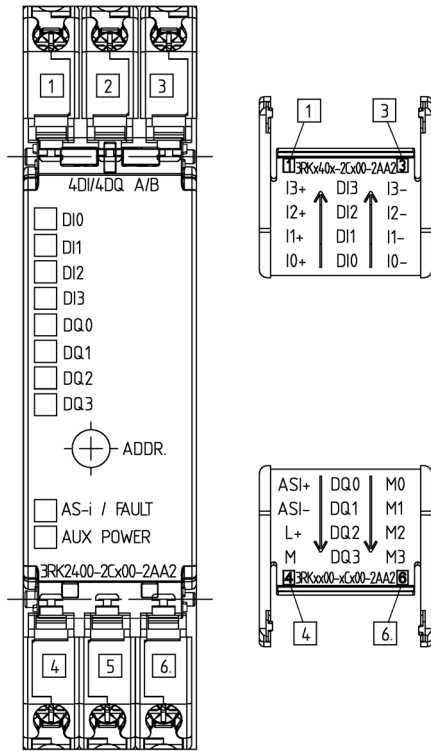
Note

The following figures are for illustrative purposes only!

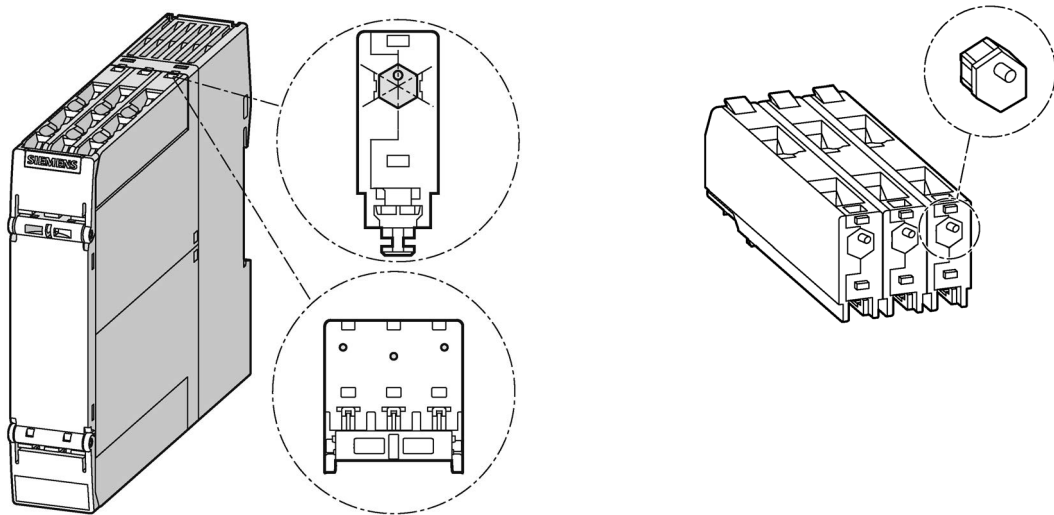
The figures below show a 22.5-mm enclosure. The width, depth, terminals (type and number of terminals) and accessories and mounted components are similar and may differ from the actual product.

4.2 Terminal position / terminal coding

To prevent mistakes when replacing terminals, they are each numbered on the front. This numbering can also be found on the inside of the upper and lower spring flaps.



You can also provide the terminals with coding pins (3ZY1440-1AA00). These also help you to prevent mistakes when replacing the terminals.

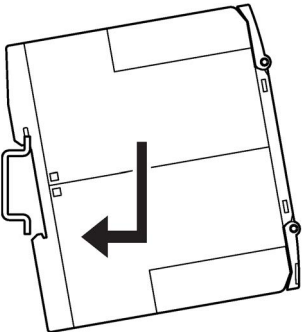


4.3 Mounting the devices on a standard mounting rail

Requirements

- A horizontal 35-mm wide mounting rail in accordance with DIN EN 60715 has been properly secured at the installation location.


Procedure

Step	Instructions	Figure
1	Place the back of the device onto the upper edge of the standard mounting rail.	
2	Press the lower half of the device against the DIN rail until the device engages.	

See also

Dimension drawings 3RK devices (Page 77)

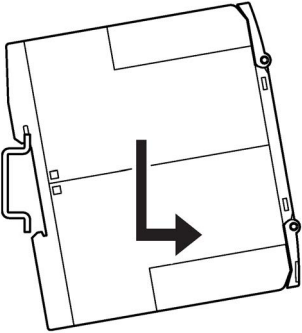
4.4 Removing devices from a standard mounting rail

 WARNING
Hazardous Voltage Can Cause Death, Serious Injury, or Property Damage.
Before starting work, therefore, disconnect the system and devices from the power supply.

Requirements

- The terminals have been removed or disconnected.

Procedure

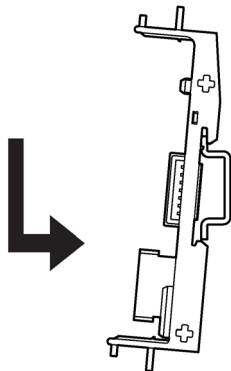
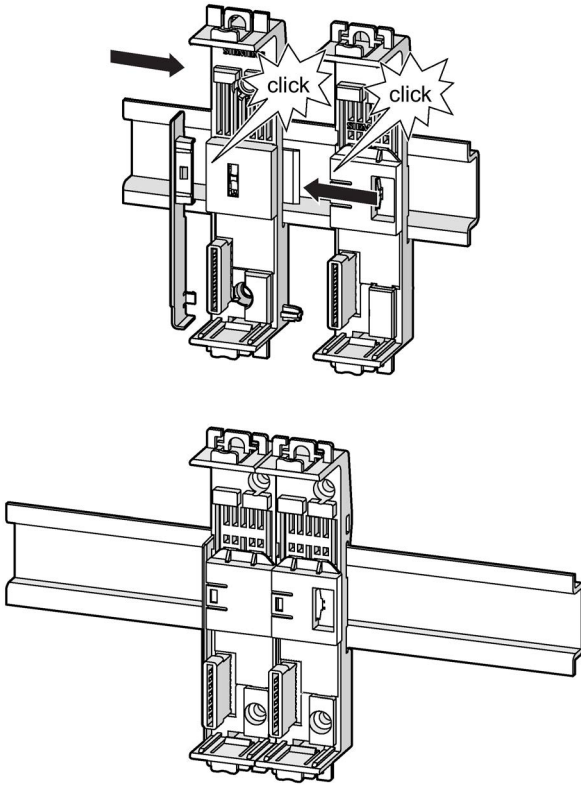
Step	Instructions	Figure
1	Press the device downwards.	
2	Pull the lower half of the device away from the standard mounting rail.	
3	Lift the device from the upper edge of the mounting rail.	

4.5 Mounting the devices with device connector on a standard mounting rail

Requirements

- A horizontal 35-mm wide mounting rail in accordance with DIN EN 60715 has been properly secured at the installation location.
- Device connector. Refer to the accessories list in section "Accessories for 3RK (Page 83)" for the relevant article number.

Procedure

Step	Instructions	Figure
1	Place the back of the device connector on the upper edge of the standard mounting rail.	
2	Press the lower half of the device connector against the standard mounting rail until the connector engages.	
3	Repeat the procedure with all the required device connectors.	
4	Push the device connectors together until they engage.	
5	Mount the cover on the left of the first device connector. The cover is included in the scope of supply of the device terminator.	

4.6 Removing the devices with device connector from a standard mounting rail

Step	Instructions	Figure
6	Mount the device on the device connector.	
7	Mount all the devices required for the system configuration on the device connectors in accordance with the respective installation guidelines.	

See also

Dimension drawings 3RK device connectors (Page 80)

4.6 Removing the devices with device connector from a standard mounting rail

WARNING

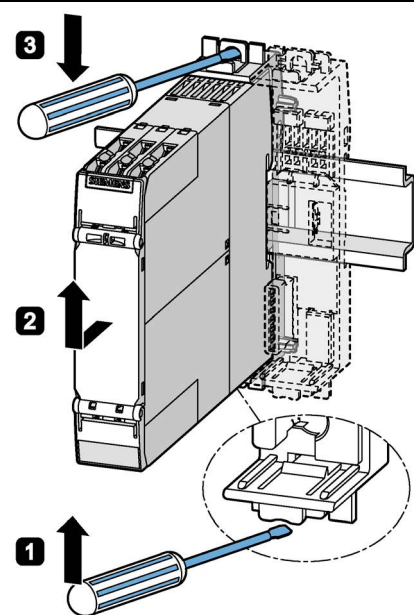
**Hazardous Voltage
Can Cause Death, Serious Injury, or Property Damage.**

Before starting work, therefore, disconnect the system and devices from the power supply.

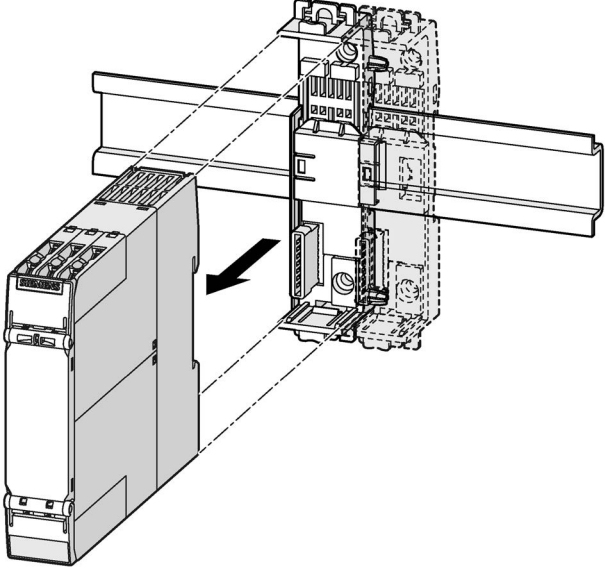
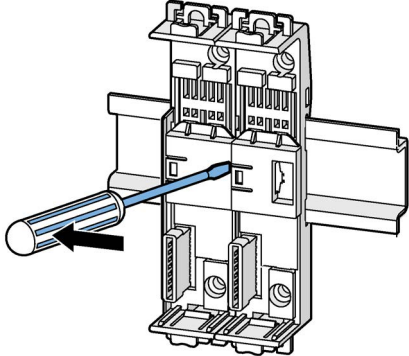
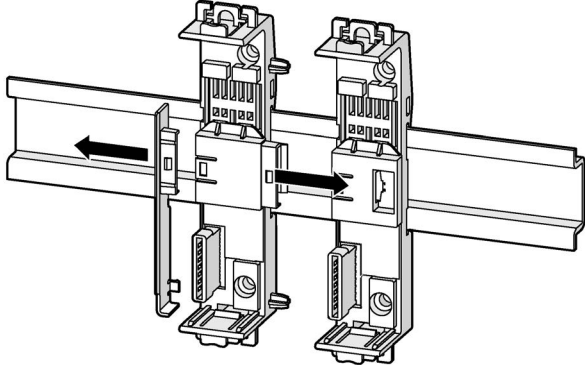
Requirements

- The terminals have been removed or disconnected.

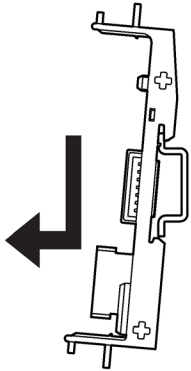
Procedure

Step	Instructions	Figure
1	Unlock the device using a screwdriver.	 <p>The diagram illustrates the removal process in three numbered steps. Step 1 shows a screwdriver being used to unlock the bottom of the device. Step 2 shows the lower half of the device being pulled away from the connector. Step 3 shows a screwdriver being used to unlock the top of the device. A circular inset provides a magnified view of the bottom locking mechanism.</p>
2	Pull the lower half of the device away from the device connector.	
3	Unlock the device using a screwdriver.	

4.6 Removing the devices with device connector from a standard mounting rail

Step	Instructions	Figure
4	Pull the device away from the device connector.	 <p>The diagram shows a perspective view of a device being pulled away from a connector mounted on a rail. A black arrow points to the left, indicating the direction of removal. Dashed lines show the internal connection points between the device and the connector.</p>
5	Separate the device connectors using a screwdriver.	 <p>The diagram shows a close-up of the connector assembly. A blue screwdriver is shown being used to pry open a component of the connector. A black arrow points to the left, indicating the direction of the screwdriver's movement.</p>
6	Remove the cover.	 <p>The diagram shows the rail with the connector assembly. Two black arrows point outwards from the rail, indicating the removal of the cover from both sides.</p>

4.6 Removing the devices with device connector from a standard mounting rail

Step	Instructions	Figure
7	Press the device connector down.	
8	Pull the lower half of the device connector away from the standard mounting rail.	
9	Lift the device connector from the upper edge of the standard mounting rail.	

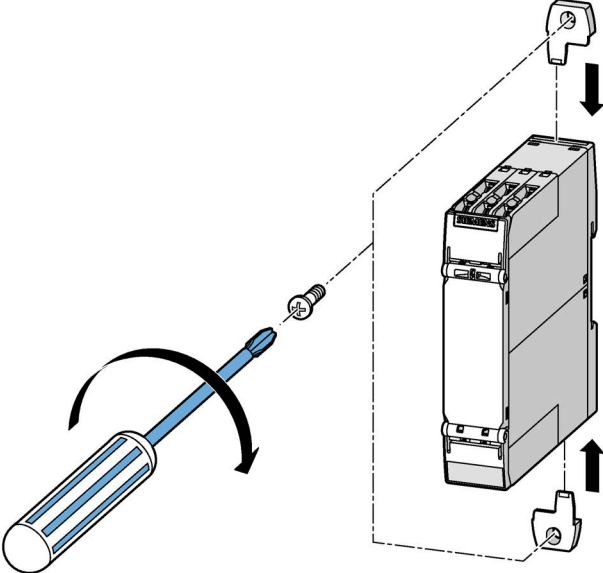
4.7 Mounting the devices on a wall

Requirements

Please note the following requirements for mounting on a level surface:

- A vertical mounting surface is recommended for the enclosure.
- Two properly executed drill holes with thread or plug on the level surface. For details of the distances between the drilled holes, refer to the relevant dimension drawings in section "Dimension drawings 3RK devices (Page 77)".
- Two cap screws M4 x 12 in accordance with DIN 784 that match the holes.
- Two fixing lugs in accordance with the article number in the accessories list in section "Spare parts/accessories (Page 83)".

Procedure

Step	Instructions	Figure
1	Insert the securing brackets into the openings provided on the device until they engage.	
2	Hold the device up to the level surface prepared for screw fastening.	
3	Insert the head screws through the corresponding elongated holes in the fixing lugs.	
4	Screw the device securely onto the level surface. Tightening torque: 1 Nm	

4.8 Removing the devices from the wall

WARNING

Hazardous Voltage

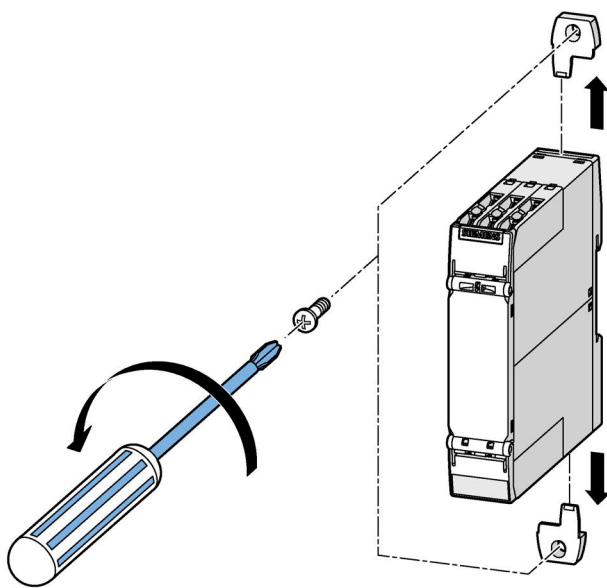
Can Cause Death, Serious Injury, or Property Damage.

Before starting work, therefore, disconnect the system and devices from the power supply.

Requirements

- The terminals have been removed or disconnected.

Procedure

Step	Instructions	Figure
1	Hold the device firmly.	
2	Unscrew the cap screws.	
3	Lift the device from the level surface.	
4	Remove the securing brackets from the device.	

4.9 Mounting the devices with device connector on a wall

Requirements

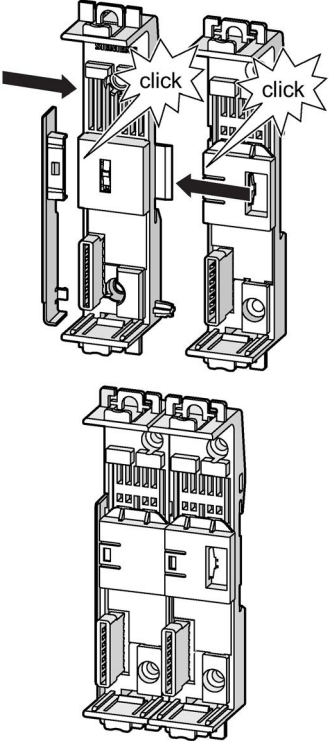
Please note the following requirements for mounting on a level surface:

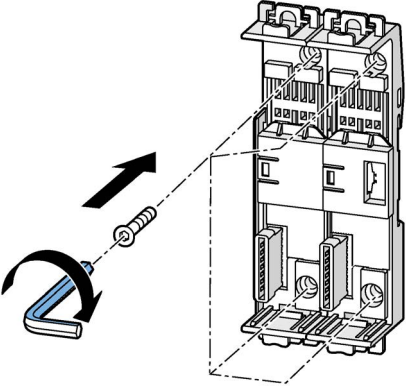
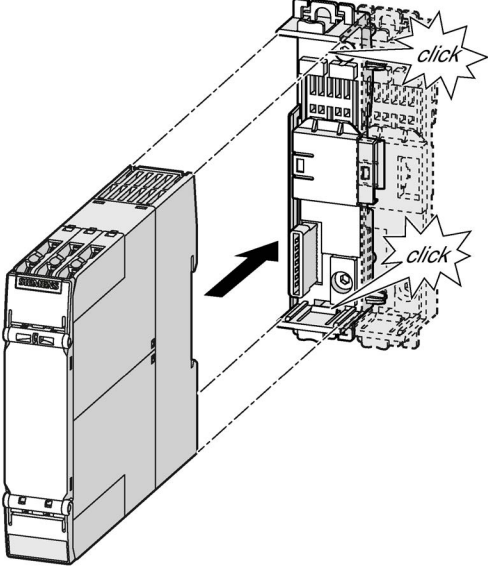
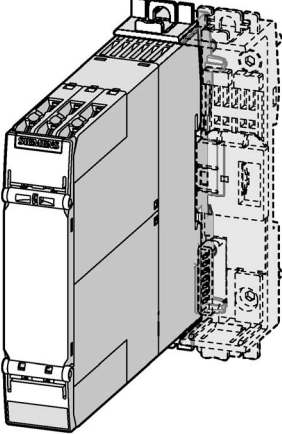
- Two properly executed drill holes (per device connector) with thread or plug on the level surface.

For details of the distances between the drilled holes, refer to the relevant dimension drawings in section "Dimension drawings 3RK device connectors (Page 80)".

- Two cap screws (per device connector) M4 x12 in accordance with IEC 784 that match the holes.
- Device connector. Refer to the accessories list in section "Accessories for 3RK (Page 83)" for the relevant article number.

Procedure for mounting on a level surface

Step	Instructions	Figure
1	Push the device connectors together until they engage.	
2	Mount the cover on the left of the first device connector. The cover is included in the scope of supply of the device terminator.	

Step	Instructions	Figure
3	Hold the device connector on the level surface prepared for screw fastening.	
4	Insert the screws through the holes in the device connectors.	
5	Screw the device connector to the level surface so that it is secure. Tightening torques: <ul style="list-style-type: none"> • Top: < 0.1 Nm • Bottom: 1 Nm 	
6	Mount the device on the device connector.	
7	Mount all the devices required for the system configuration on the device connectors in accordance with the respective installation guidelines.	

4.10 Removing the devices with device connector from the wall

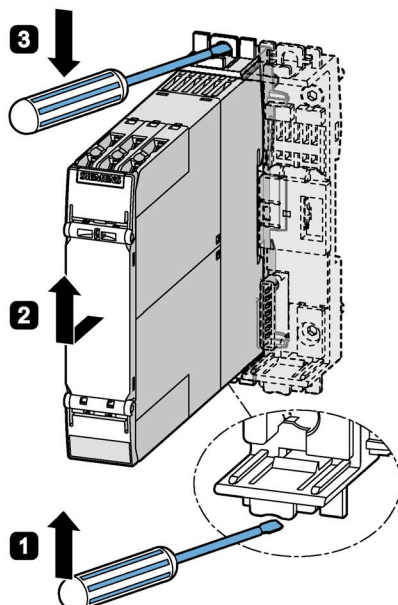
⚠ WARNING
Hazardous Voltage Can Cause Death, Serious Injury, or Property Damage.
Before starting work, therefore, disconnect the system and devices from the power supply.

Requirements

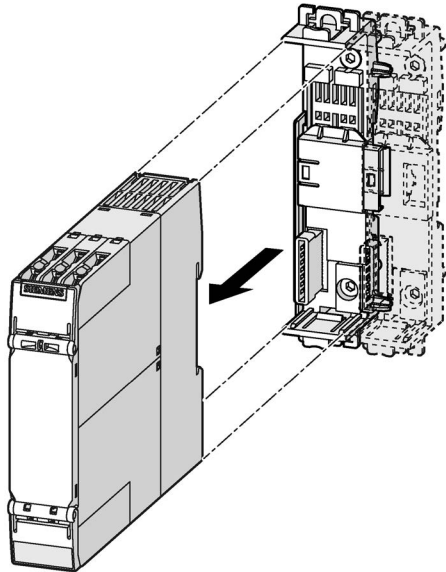
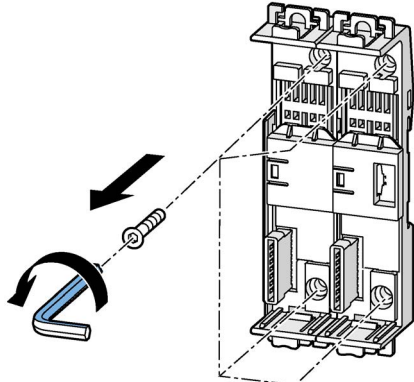
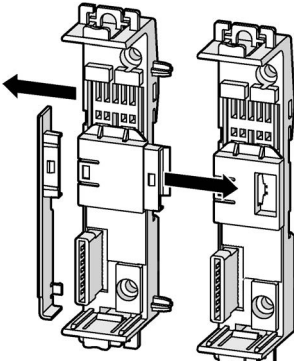
- The terminals have been removed or disconnected.

Procedure

The figures show 22.5 mm devices. The 17.5 mm devices are removed in the same manner.

Step	Instructions	Figure
1	Unlock the device (below) using a screwdriver.	
2	Pull the lower half of the device away from the device connector.	
3	Unlock the device (above) using a screwdriver.	

4.10 Removing the devices with device connector from the wall

Step	Instructions	Figure
4	Pull the device away from the device connector.	
5	Release the screws.	
6	Separate the device connectors using a screwdriver.	<p style="text-align: center;">--</p>
7	Remove the cover.	

4.10 Removing the devices with device connector from the wall

Connection

5.1 Terminal assignment

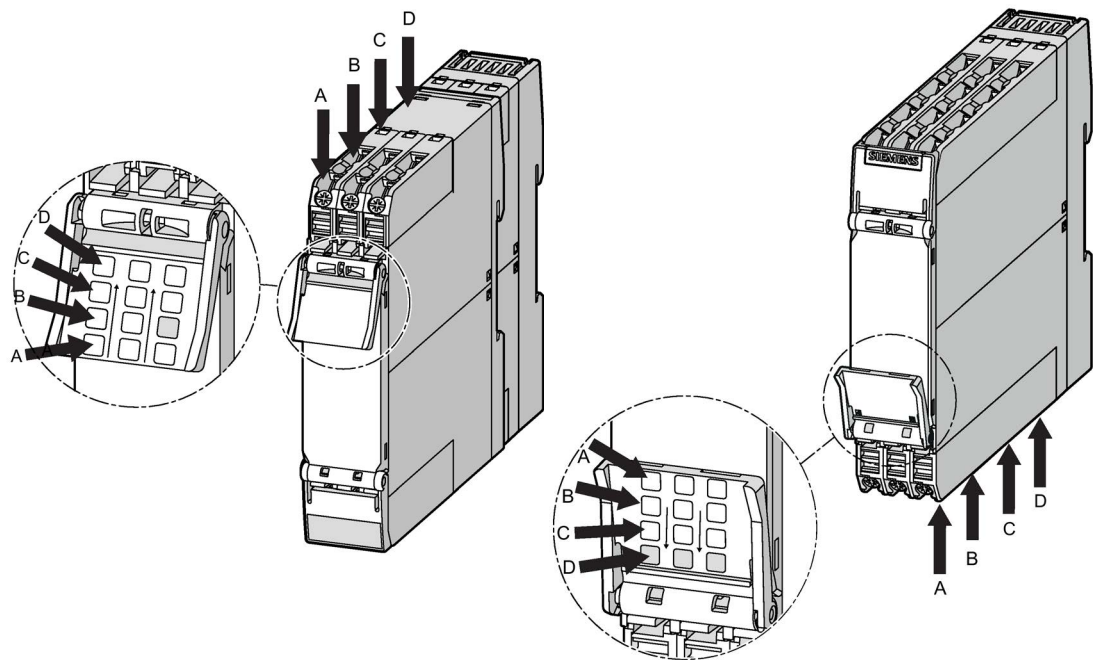
Location of the connections

The front sides of the terminals are numbered. The terminal covers are also numbered and additionally labeled with the assignment of the particular terminal and the device article number. The position of the label corresponds to the position of the respective terminal.

NOTICE

Risk of property damage

When using the terminal blocks, you must observe the correct position of the blocks (see inside of cover).



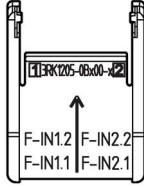

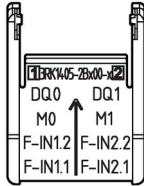
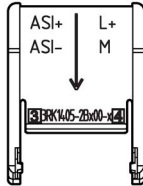
Upper terminal cover

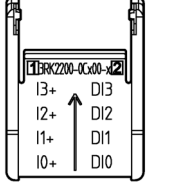

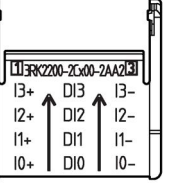

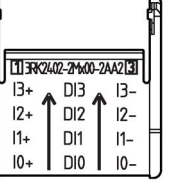
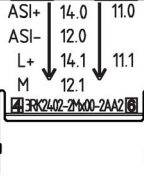
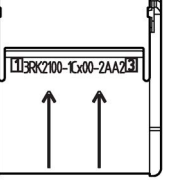
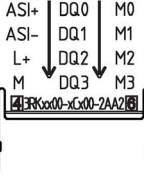
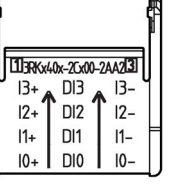
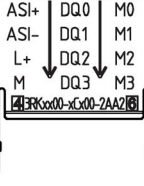
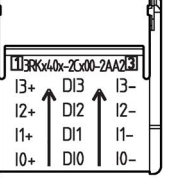
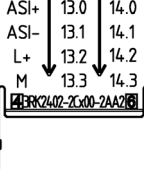
Lower terminal cover

The connecting terminals are numbered on the front to enable identification of the correct position again after removal of the terminals for device replacement. Once the flaps are opened, the corresponding numbers (1 to 4 for 17.5 mm devices; 1 to 6 for 22.5 devices) are seen inside a square frame on both the top and bottom flaps.

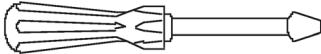
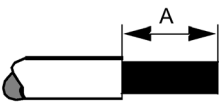
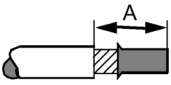
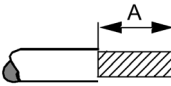
Assignment

Depending on the version of the AS-i module, the following assignments are written on the covers:

Module version		Inscription of the terminal cover	
		Assignment, top	Assignment, bottom
<p>ASIsafe module</p>	<ul style="list-style-type: none"> • 2x safety input for sensor (mechan.) • Width 17.5 mm • 3RK1205-0B.00-2AA2 		
	<ul style="list-style-type: none"> • 2x safety input for sensor (mechan.) • 2x output (supply from AS-i or U_{aux}) • Width 17.5 mm • 3RK1405-2B.00-2AA2 		

Module version	Inscription of the terminal cover	
<p>Digital modules</p> <ul style="list-style-type: none"> • 4x input for sensor (mechan., 2-wire) • Sensor supply from AS+i • Width 17.5 mm • 3RK2200-0C.00-2AA2 		
<ul style="list-style-type: none"> • 4x input for sensor (mechan., 3-wire) • Sensor supply from AS-i or U_{aux} • Width 22.5 mm • 3RK2200-2C.00-2AA2 		
<ul style="list-style-type: none"> • 4x input for sensor (mechan., 3-wire) • Sensor supply from AS-i or U_{aux} • 2x output (relays, changeover contacts) • Width 22.5 mm • 3RK2402-2M.00-2AA2 		
<ul style="list-style-type: none"> • 4x output, solid state • Width 22.5 mm • 3RK2100-1C.00-2AA2 		
<ul style="list-style-type: none"> • 4x input for sensor (mechan., 3-wire) • 4x output, solid state • Sensor supply from AS-i or U_{aux} • Width 22.5 mm • 3RK400-2C.00-2AA2 		
<ul style="list-style-type: none"> • 4x input for sensor (mechan., 3-wire) • Supply from AS-i or U_{aux} • 4x output (relays, NO contacts) • Width 22.5 mm • 3RK2402-2C.00-2AA2 		

5.2 Connection data for terminals

	Specification and value for removable terminals with screw terminals	Specification and value for removable terminals with spring-type terminals (push-in terminals)
Screwdriver 	Cross-tip screwdriver Size: PZ 1 x 80 (∅ 4.5 mm) Torque: 0.6 ... 0.8 Nm (5.2 ... 7.0 lb/inch)	Flat-bladed screwdriver (3RA2908-1A) Size: 3 mm for operating the springs DIN 5264-A; 0.5 x 3
Rigid cable 	A = 10 mm 1 x 0.5 ... 2.5 mm ² 2 x 1.0 ... 1.5 mm ²	A = 10 mm 1 x 0.5 ... 1.5 mm ² 2 x 0.5 ... 1.5 mm ²
Flexible cable with end sleeve 	A = 10 mm 1 x 0.5 ... 2.5 mm ² 2 x 0.5 ... 1.0 mm ² ¹⁾	A = 10 mm 1 x 0.5 ... 1.0 mm ² 2 x 0.5 ... 1.0 mm ²
Flexible cable 	Not permissible	A = 10 mm 1 x 0.5 ... 1.5 mm ² 2 x 0.5 ... 1.5 mm ²
AWG	1 x 20 ... 14 2 x 18 ... 16	1 x 20 ... 16 2 x 20 ... 16

¹⁾ When 2 x 1.0 mm² end sleeves with a plastic sleeve are used, space problems may arise with the sleeves; as an alternative, you are advised to use end sleeves without plastic sleeves

5.3 Protection

Reverse polarity protection

Reverse polarity protection is integrated for the connection to the AS-i bus cable and the 24 V DC auxiliary voltage U_{aux} to prevent damage to the module. However, proper functioning of the devices is only guaranteed when the connection is made correctly.

NOTICE

Short-circuit/overload protection

When multiple AS-i SlimLine Compact modules are connected using device connectors, external protection of the U_{aux} infeed from short-circuit and overload by a 6 A miniature circuit breaker Type C is required.

5.4 Connecting the screw-type terminals

WARNING

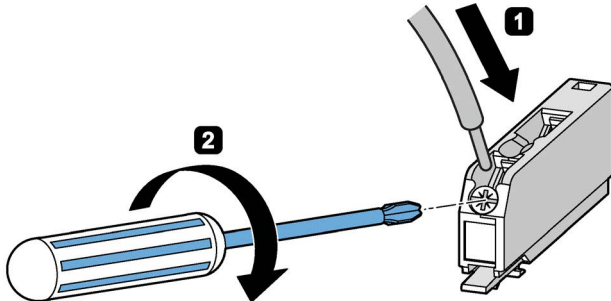
Hazardous Voltage
Can Cause Death, Serious Injury, or Property Damage.

Before starting work, therefore, disconnect the system and devices from the power supply.

Requirements

- Cross-tip screwdriver size PZ 1 x 80.
- For suitable connection cross-sections of the cables, see the chapter "Connection data for terminals (Page 42)".

Procedure

Step	Instructions	Figure
1	Insert the relevant cable into square on the screw-type terminal until it engages.	
2	Hold the cable in the screw-type terminal.	
3	Tighten the screw with a torque of 0.6 ... 0.8 Nm.	
4	Pull on the cable to ensure it is screwed tight.	

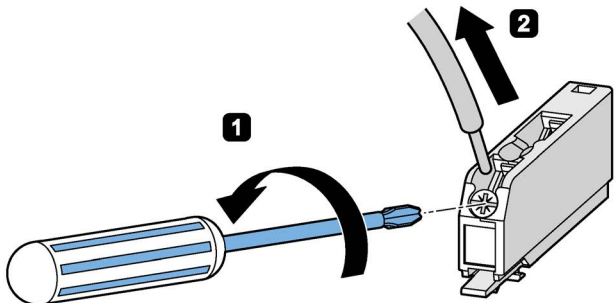
5.5 Disconnecting the screw-type terminals

⚠ WARNING
Hazardous Voltage Can Cause Death, Serious Injury, or Property Damage.
Before starting work, therefore, disconnect the system and devices from the power supply.

Requirements

- Cross-tip screwdriver size PZ 1 x 80

Procedure

Step	Instructions	Figure
1	Unscrew the screw of the screw-type terminal.	
2	Remove the cable from the unscrewed screw-type terminal.	

5.6 Wiring rules for spring-loaded terminals (with push-in technology)

Wiring rules for ...		Control current terminals
Connectable cross-sections for solid cables		2 x 0.5 ... 2 x 1.5 mm ² (AWG ¹⁾ : 20 ... 16)
Connectable cross-sections for flexible cables	Without end sleeve	2 x 0.5 ... 2 x 1.5 mm ² (AWG ¹⁾ : 20 ... 16)
	With end sleeve (with and without plastic sleeve)	2 x 0.5 ... 2 x 1.0 mm ² ²⁾ (AWG ¹⁾ : 20 ... 18)
	With TWIN end sleeve	--- ---
Cable stripping length		10 ... 11 mm
End sleeves according to DIN 46228-4 with plastic sleeve		10 mm

- 1) AWG: American Wire Gauge (AWG does not define use of end sleeves)
- 2) When 2 x 1.0 mm² end sleeves with a plastic sleeve are used, space problems may arise with the sleeves; as an alternative, you are advised to use end sleeves without plastic sleeves

Notes on handling spring-loaded terminals with push-in technology

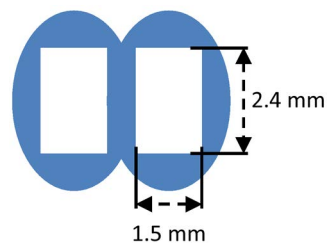
The terminal area of the spring-loaded terminals is rectangular, and the maximum overall dimensions of the conductor to be wired must not exceed 1.5 x 2.4 mm (control current terminals).

Attention must be paid to the orientation of the terminal area, which may call for vertical fitting of rectangularly crimped cables.

To make optimum use of available terminal area, you are advised to choose a form of crimping that creates a corresponding rectangular contour. Trapezoidal crimping is generally very highly suitable in this case.

When use is made of a cable that utilizes the full overall height, the terminal's spring is deflected to the maximum. Therefore, removal of this cable may become a problem because it requires further deflection of the spring.

Control current terminals



Terminal area of control current terminals

5.7 Connecting the push-in terminals

⚠ WARNING

**Hazardous Voltage
Can Cause Death, Serious Injury, or Property Damage.**

Before starting work, therefore, disconnect the system and devices from the power supply.

Push-in connections are a form of spring-loaded terminals allowing wiring without tools for rigid conductors or conductors equipped with end sleeves.

For wiring finely-stranded or stranded conductors without end sleeves on push-in connections, a screwdriver is required.

Requirements

- 0.5 x 3 mm screwdriver DIN 5264 (for finely-stranded conductors only).
- For suitable connection cross-sections of the cables, see the chapter "Connection data for terminals (Page 42)".

Procedure

Table 5- 1 Rigid conductors or conductors equipped with end sleeves

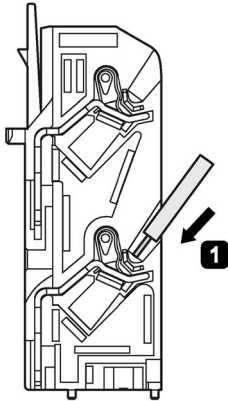
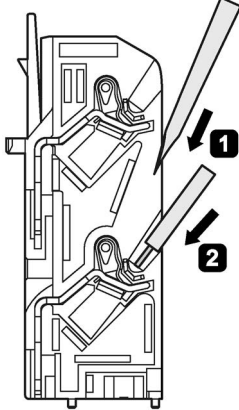

Step	Instructions	Figure
1	Insert the cable into the oval opening as far as it will go.	
2	Pull on the cable to ensure it is tight.	

Table 5- 2 Finely-stranded conductors

Step	Instructions	Figure
1	Insert the screwdriver in the rectangular opening to open the terminal (oval opening).	 <p>The diagram illustrates the process of connecting a cable to a terminal. It shows a vertical terminal block with two terminals. A screwdriver is shown inserted into a rectangular opening on the right side of the terminal block, which is used to open the terminal. The cable is then inserted into the oval opening of the terminal. The diagram is labeled with '1' and '2' to indicate the steps: '1' points to the screwdriver being inserted into the rectangular opening, and '2' points to the cable being inserted into the oval opening.</p>
2	Insert the cable as far as it will go into the oval opening and remove the screwdriver.	
3	Pull on the cable to ensure it is tight.	

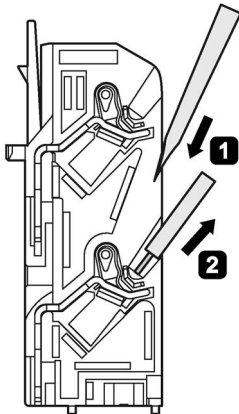
5.8 Disconnecting the push-in terminals

 WARNING
Hazardous Voltage Can Cause Death, Serious Injury, or Property Damage.
Before starting work, therefore, disconnect the system and devices from the power supply.

Requirements

- Screwdriver DIN 5264 of the size 0.5 x 3 mm

Procedure

Step	Instructions	Figure
1	Insert the screwdriver into the rectangular opening of the spring-loaded terminal until it engages.	
2	Remove the cable from the oval opening.	
3	Remove the screwdriver.	

5.9 Attaching the terminals

⚠ WARNING
<p>Hazardous voltage</p> <p>Can Cause Death, Serious Injury, or Property Damage.</p> <p>Before starting work, therefore, disconnect the system and devices from the power supply.</p>

Requirements

You must have removed the terminals, for the purpose of replacing a device, for example.

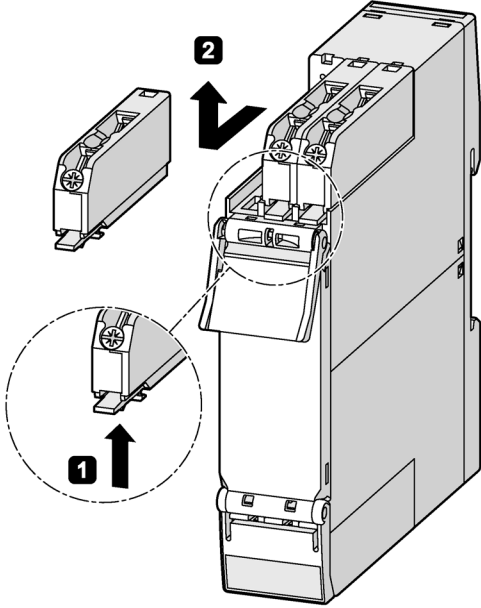
Procedure when plugging in the terminals

Step	Instructions	Figure
1	Insert the detachable terminals into the guide rail of the device.	<p>The diagram illustrates the process of attaching a terminal to a device's guide rail. It shows a side view of the device with a terminal being inserted into a rail. Step 1 is indicated by a downward arrow pointing to the terminal being inserted. Step 2 is indicated by a starburst labeled 'click' pointing to the terminal being pushed back into the rail.</p>
2	Slide the detachable terminals back until they audibly engage.	

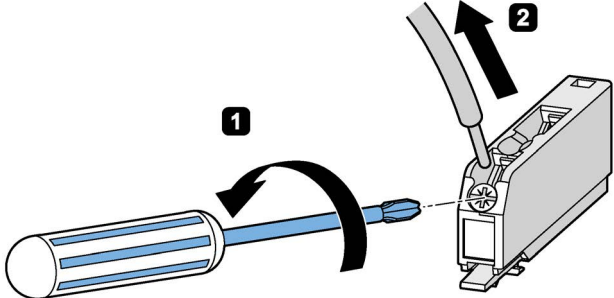
5.10 Disconnecting

⚠ WARNING
Hazardous Voltage
Can Cause Death, Serious Injury, or Property Damage.
Before starting work, therefore, disconnect the system and devices from the power supply.

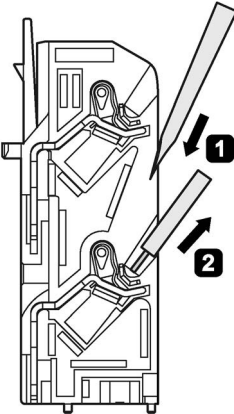
Removing terminals from the device

Step	Instructions	Figure
1	Press the clip of the terminals upwards.	
2	Pull the terminals out to the front.	
3	Lift the terminals out of the guide rail of the device.	

Screw terminals: Disconnecting the conductor

Step	Instructions	Figure
1	Unscrew the screw of the screw-type terminal.	
2	Remove the cable from the unscrewed screw-type terminal.	

Push-in terminals: Disconnecting the conductor

Step	Instructions	Figure
1	Insert the screwdriver into the rectangular opening of the push-in terminal until it engages. Please observe a 10° horizontal angular deviation of the screwdriver to the oval opening.	
2	Remove the cable from the oval opening.	
3	Remove the screwdriver.	

Addressing

6.1 Addressing AS-i SlimLine Compact modules

Each module must be assigned **one** individual address on the AS-Interface. Each address may be used only once per AS-i master. The address is stored in the slave. The address of a slave is programmed with the addressing device.

Addressing the modules

The address can be assigned through the "ADDR" socket with the help of the AS-i addressing device.

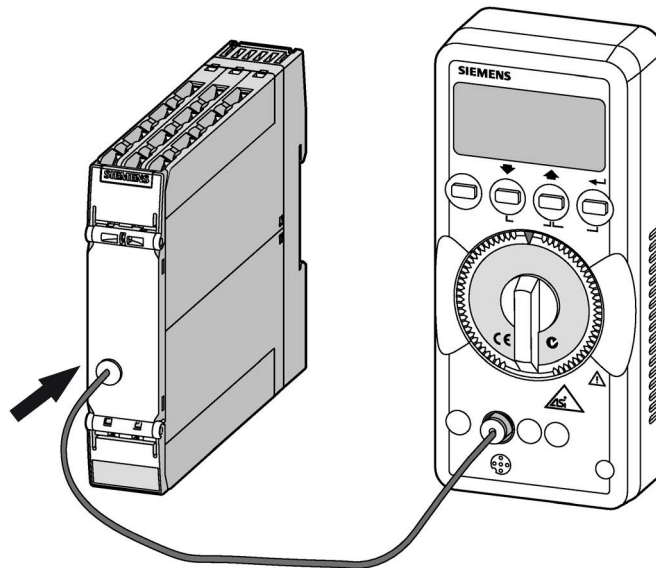
When the addressing device is connected, the module is disconnected from the AS-i bus.

For addressing the digital and ASIsafe modules, the following is needed:

- An addressing device
- or
- Programming and service device (PSG) via yellow cable and connected AS-i power supply
- A connecting cable for connecting the addressing device and AS-i module

The addressing socket is located on the front of the SlimLine Compact module.

The following figure shows the location of the addressing device with the connecting cable and the addressing device.



For the addressing operation itself, refer to the corresponding instructions (for the addressing device or programming and service device).

Plug connector

The AS-i bus connection and the AUX power voltage can be connected to each module directly via the terminals. In addition there is also the option of connecting the AS-i and AUX Power voltages via the device connector.

Communication functions

In the event of an overload of one or more digital or analog outputs, the I/O error bit is set. The I/O error bit is reset immediately when all outputs operate in normal mode again. In the event of a short-circuit at an output, a corresponding minimum time prevents multiple I/O errors. In the event of an overload of the sensor supply of the digital module, the I/O bit is set. This requires no additional effort. In the event of an overload of the sensor supply, the module does not stop communicating. During the sensor overload, the value "0" is transmitted for each input for digital inputs.

Digital modules

7.1 Module overview

Overview / terminal assignment

①	②	③	④
3RK2200-0C.00-2AA2	3RK2200-2C.00-2AA2	3RK2402-2M.00-2AA2	3RK2100-1C.00-2AA2

⑤	⑥																																																								
<table border="1"> <tr><td>I3+</td><td>DI3</td><td>I3-</td></tr> <tr><td>I2+</td><td>DI2</td><td>I2-</td></tr> <tr><td>I1+</td><td>DI1</td><td>I1-</td></tr> <tr><td>I0+</td><td>DI0</td><td>I0-</td></tr> <tr><td colspan="3" style="text-align: center;"> </td></tr> <tr><td>ASI+</td><td>DQ0</td><td>M0</td></tr> <tr><td>ASI-</td><td>DQ1</td><td>M1</td></tr> <tr><td>L+</td><td>DQ2</td><td>M2</td></tr> <tr><td>M</td><td>DQ3</td><td>M3</td></tr> </table>	I3+	DI3	I3-	I2+	DI2	I2-	I1+	DI1	I1-	I0+	DI0	I0-				ASI+	DQ0	M0	ASI-	DQ1	M1	L+	DQ2	M2	M	DQ3	M3	<table border="1"> <tr><td>I3+</td><td>DI3</td><td>I3-</td></tr> <tr><td>I2+</td><td>DI2</td><td>I2-</td></tr> <tr><td>I1+</td><td>DI1</td><td>I1-</td></tr> <tr><td>I0+</td><td>DI0</td><td>I0-</td></tr> <tr><td colspan="3" style="text-align: center;"> </td></tr> <tr><td>ASI+</td><td>13.0</td><td>14.0</td></tr> <tr><td>ASI-</td><td>13.1</td><td>14.1</td></tr> <tr><td>L+</td><td>13.2</td><td>14.2</td></tr> <tr><td>M</td><td>13.3</td><td>14.3</td></tr> </table>	I3+	DI3	I3-	I2+	DI2	I2-	I1+	DI1	I1-	I0+	DI0	I0-				ASI+	13.0	14.0	ASI-	13.1	14.1	L+	13.2	14.2	M	13.3	14.3		
I3+	DI3	I3-																																																							
I2+	DI2	I2-																																																							
I1+	DI1	I1-																																																							
I0+	DI0	I0-																																																							
ASI+	DQ0	M0																																																							
ASI-	DQ1	M1																																																							
L+	DQ2	M2																																																							
M	DQ3	M3																																																							
I3+	DI3	I3-																																																							
I2+	DI2	I2-																																																							
I1+	DI1	I1-																																																							
I0+	DI0	I0-																																																							
ASI+	13.0	14.0																																																							
ASI-	13.1	14.1																																																							
L+	13.2	14.2																																																							
M	13.3	14.3																																																							
<p>3RK2400-2C.00-2AA2 3RK1400-2C.00-2AA2</p>	<p>3RK2402-2C.00-2AA2</p>																																																								

Overview of article numbers

	Article number	Type of connection	Inputs	Outputs	Sensor type	Sensor supply	Slave profile	Slave type	Width in mm
①	3RK2200-0CE00-2AA2	Screw terminal	4 digital	---	2-wire sensors Mechanical contacts	AS-i	0.A.0	A/B slave	17.5
	3RK2200-0CG00-2AA2	Spring-type terminal							
②	3RK2200-2CE00-2AA2	Screw terminal	4 digital	---	2-wire sensors 3-wire sensors Mechanical contacts	AS-i or U_{aux} can be selected	0.A.0	A/B slave	22.5
	3RK2200-2CG00-2AA2	Spring-type terminal							
③	3RK2402-2ME00-2AA2	Screw terminal	4 digital	2 relays	2-wire sensors 3-wire sensors Mechanical contacts	AS-i or U_{aux} can be selected	7.A.0	A/B slave	22.5
	3RK2402-2MG00-2AA2	Spring-type terminal							
④	3RK2100-1CE00-2AA2	Screw terminal	---	4 semiconductor	Not available	---	7.A.7	A/B slave Spec. 3.0	22.5
	3RK2100-1CG00-2AA2	Spring-type terminal							
⑤	3RK2400-2CE00-2AA2	Screw terminal	4 digital	4 semiconductor	2-wire sensors 3-wire sensors Mechanical contacts	AS-i or U_{aux} can be selected	7.A.7	A/B slave Spec. 3.0	22.5
	3RK2400-2CG00-2AA2	Spring-type terminal							
	3RK1400-2CE00-2AA2	Screw terminal	4 digital	4 semiconductor	2-wire sensors 3-wire sensors Mechanical contacts	AS-i or U_{aux} can be selected	7.0.F	Standard	22.5
	3RK1400-2CG00-2AA2	Spring-type terminal							
⑥	3RK2402-2CE00-2AA2	Screw terminal	4 digital	4 relays	2-wire sensors 3-wire sensors Mechanical contacts	AS-i or U_{aux} can be selected	7.A.7	A/B slave Spec. 3.0	22.5
	3RK2402-2CG00-2AA2	Spring-type terminal							

7.2 Module properties

Assignment of the data bits

4 digital inputs:

Data bit	D0	D1	D2	D3
Input	DI0	DI1	DI2	DI3
Output				

4 digital outputs:

Data bit	D0	D1	D2	D3
Input				
Output	DQ0	DQ1	DQ2	DQ3

4 digital inputs / 2 digital outputs:

Data bit	D0	D1	D2	D3
Input	DI0	DI1	DI2	DI3
Output	DQ0	DQ1		

4 digital inputs / 4 digital outputs

Data bit	D0	D1	D2	D3
Input	DI0	DI1	DI2	DI3
Output	DQ0	DQ1	DQ2	DQ3

Parameters

No parameters are used for digital modules.

7.3 Sensor supply

Digital inputs

A switch allows you to select between sensor supply from the AS-i voltage and from AUX power. When supplied, the switch is in position $U_{\text{sens}} = \text{AS-i}$.

The switch for selecting the sensor supply is located on the back the device and may only be actuated in the de-energized state.

The sensor supply is protected against short circuit and overload. At an overload or short-circuit of the sensor supply, the module is not damaged.

Rated current of the sensor supply at 40 °C ambient temperature:

- Supply via AS-i voltage: 200 mA for all inputs of a module
- Supply via AUX Power voltage: 500 mA for all inputs of a module

The sensor supply voltage is $> U_{\text{AS-i}} - 8.5 \text{ V}$ in the case of supply from AS-i

The sensor supply voltage is $> U_{\text{aux}} - 1.0 \text{ V}$ in the case of supply from AUX power

The sensors are supplied via terminals I+ and I- irrespective of the selected sensor supply. This means that the sensors are connected to the module in exactly the same manner when supplied from AUX Power as when supplied from AS-i.

7.4 Inputs

Digital inputs

Digital inputs are designed for PNP Type 2 sensors according to EN 61131-2:2007

Level:

- low: IIN: $\leq 1.5 \text{ mA}$
- high: UIN: $\geq 10 \text{ V}$
IIN: $\geq 6 \text{ mA}$

7.5 Outputs

Digital outputs

After communication errors (e.g. master error), the outputs are reset after approx. 40 to 100 ms (cycle-time monitoring).

Supply of the outputs

The outputs are supplied by the 24 V DC auxiliary voltage U_{aux} .

The auxiliary voltage must conform to IEC 60990 (PELV) protection class III.

7.6 Diagnostics

Status display

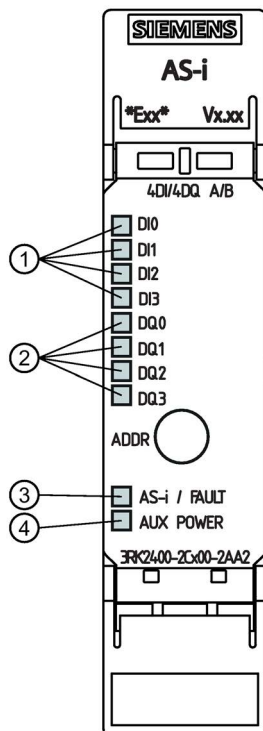
The status of a module is indicated by LEDs with continuous or flashing light. This enables diagnostics at a glance:

- for AS-i communication via a dual green/red LED
- for the auxiliary voltage U_{AUX} with a green LED
- for the switching state of the inputs with a yellow LED
- for the switching state of the outputs with a dual yellow/red LED

The following sections provide an overview of the LED status displays for the input/output modules.

LED position

For the position of the LED, see the diagram below:



- ① Status display for inputs
- ② Status display for outputs
- ③ Communication AS-i / FAULT
- ④ AUX POWER operating state

Status display for inputs/outputs

Each input has a yellow LED with the designation "DIx".

Each semiconductor output has a dual red/yellow LED with the designation "DQx".

Each relay output has a yellow LED with the designation "RQx".

For the functions, see the table below:

Table 7- 1 Diagnostics of the inputs via LED

DI x	Meaning
Yellow	Signal activated
OFF	Signal deactivated

Table 7- 2 Diagnostics of the semiconductor outputs via LEDs

DQ x	Meaning
Yellow	Output activated
Red	Overload of the output
OFF	Output deactivated

The output LED (for transistor outputs) indicates an overload for each channel by changing its color to red.

Table 7- 3 Diagnostics of the relay outputs via LEDs

RQ x	Meaning
Yellow	Output activated
OFF	Output deactivated

Status display AS-i / FAULT

All modules have a dual LED (green/red) for the "AS-i / FAULT" status display. For the functions and remedies, see the table below:

Table 7- 4 Diagnostics of the AS+i status via LEDs

AS-i / FAULT (green/yellow/red)	Possible cause	Possible remedial measures
Green	Normal operation, AS+i communication OK	—
Red	No AS+i communication: <ul style="list-style-type: none"> • Master is switched off or offline 	Ensure AS+i communication: <ul style="list-style-type: none"> • Switch on the master or switch it to online mode
	<ul style="list-style-type: none"> • Slave is not configured in the master 	<ul style="list-style-type: none"> • Reconfigure the master
	<ul style="list-style-type: none"> • Incorrect slave type is connected 	<ul style="list-style-type: none"> • Connect the correct module
	<ul style="list-style-type: none"> • Slave has the wrong address 	<ul style="list-style-type: none"> • Check/correct the slave address
Flashing red	Communication is interrupted by: <ul style="list-style-type: none"> • Overload of the sensor supply 	<ul style="list-style-type: none"> • Disconnect sensor cables from input sockets • Use sensors with a lower overall current consumption • Check sensors and cables
Flashing yellow/red	Module has slave address "0" (delivery condition)	Assign an address other than "0"
Flashing green/red	Overload of the outputs	Disconnect actuator cables from output sockets Check actuators and cables
OFF	No AS+i voltage	Switch on AS+i voltage
	AS-i voltage has been connected with reverse polarity	Connect it correctly
	AS+i voltage too low	Measure the AS-i voltage (approx. 30 V DC)

AUX POWER operating state

All modules have a green LED for the "AUX POWER" operating state. For the functions and remedies, see the table below:

Table 7- 5 Diagnostics of the operating state via LED

AUX POWER	Possible cause	Possible remedial measures
Green	Normal operation, 24 V DC auxiliary voltage OK	—
OFF	<ul style="list-style-type: none"> No auxiliary voltage Auxiliary voltage connected with incorrect polarity Auxiliary voltage too low 	<ul style="list-style-type: none"> Switch on auxiliary voltage 24 V DC Connect it properly Measure the auxiliary voltage (approx. 24 V DC)

Sensor supply display

There is not an additional LED for indicating the selected sensor supply source. The current source is selected using a switch on the back of the device and is indicated by the switch.

I/O error bit

In the event of an overload of the outputs, the I/O error bit is transmitted to the AS-i master in addition to the local LED diagnostics. All modules designed as an A/B slave support this function (3RK24* and 3RK21*).

For modules designed as a standard slave (3RK14*), an I/O error bit is not transmitted.

7.7 Wiring

Examples

3RK2200-0Cx00-2AA2

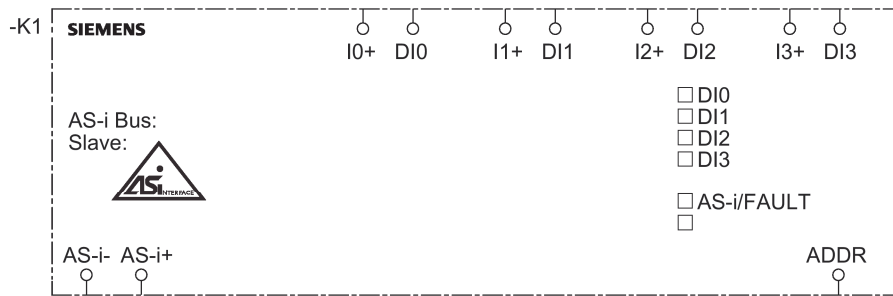


Figure 7-1 Inputs: Connection of mechanical contacts or 2-wire sensors

3RK2200-2Cx00-2AA2

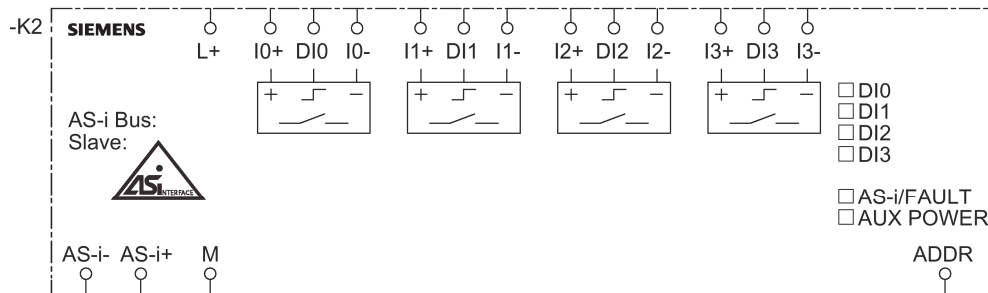


Figure 7-2 Inputs: Connection of mechanical contacts or 2-wire sensors

3RK2402-2Mx00-2AA2

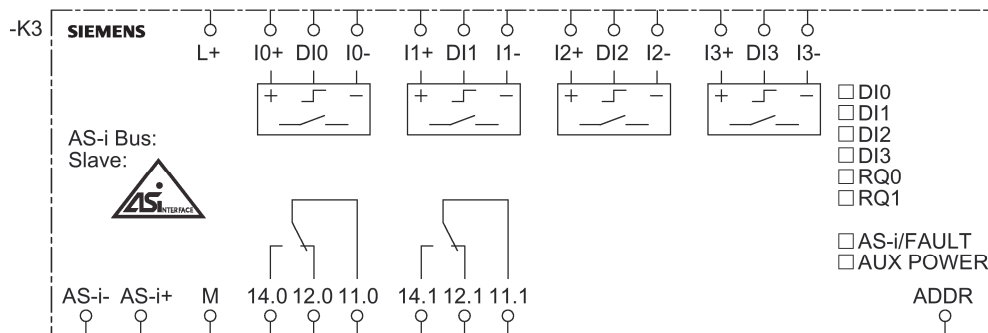


Figure 7-3 Inputs: Connection of mechanical contacts, 2-wire or 3-wire sensors; outputs: Relay CO contacts

3RK2100-1Cx00-2AA2

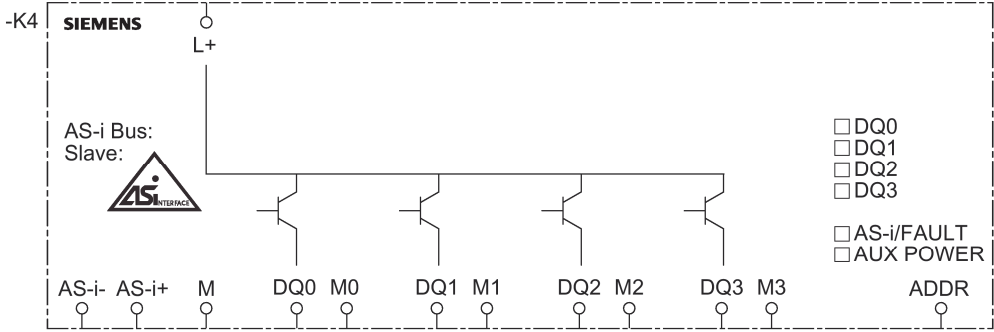


Figure 7-4 Outputs: Solid-state

3RKx400-2Cx00-2AA2

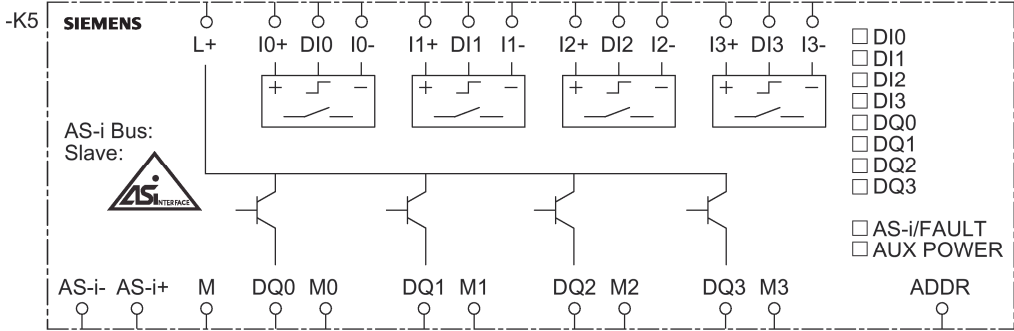


Figure 7-5 Inputs: Connection of mechanical contacts, 2-wire or 3-wire sensors; outputs: Solid-state

3RK2402-2Cx00-2AA2

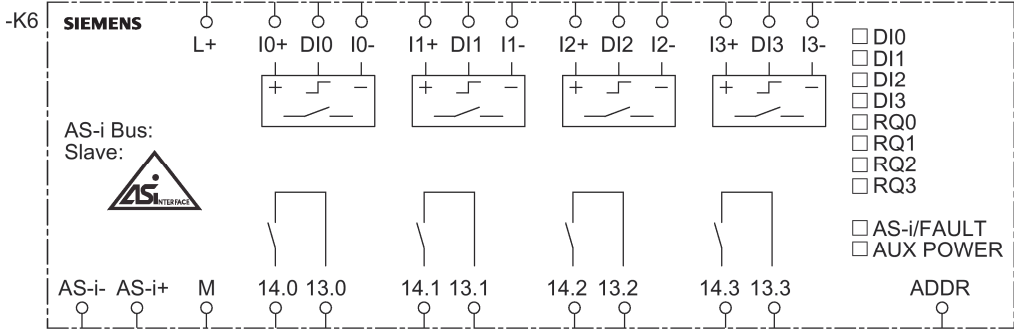


Figure 7-6 Inputs: Connection of mechanical contacts, 2-wire or 3-wire sensors; outputs: Relay NO contacts

ASIsafe modules

8.1 Module overview

Overview / terminal assignment

①	②		
3RK1205-0B.00-2AA2	3RK1405-2B.00-2AA2		

Table of article numbers

	Article number	Type of connection	Inputs	Outputs	Sensor type	Sensor supply	Slave profile	Slave type	Width in mm
①	3RK1205-0BE00-2AA2	Screw terminal	2 fail-safe	---	Mechanical contacts	AS-i	0.B.F	Standard	17.5
	3RK1205-0BG00-2AA2	Spring-type terminal							
②	3RK1405-2BE00-2AA2	Screw terminal	2 fail-safe	2 standard outputs	Mechanical contacts	AS-i	7.B.F	Standard	17.5
	3RK1405-2BG00-2AA2	Spring-type terminal							

8.2 Module properties

Assignment of the data bits

2 fail-safe inputs:

Data bit	D0	D1	D2	D3
Input	F-IN1	F-IN1	F-IN2	F-IN2
Output				

2 fail-safe inputs / 2 standard outputs:

Data bit	D0	D1	D2	D3
Input	F-IN1	F-IN1	F-IN2	F-IN2
Output	DQ0	DQ1		

Parameters

No parameters are used for ASIsafe modules.

Safety-related specifications

PL	up to PL e
Cat	up to Category 4
SIL	up to SIL 3
PFH _D	< 4.5 x 10 ⁻⁹ [1/h]
PFD _{avg}	< 5.0 x 10 ⁻⁶
SFF	> 99 %
DC _{avg}	> 99 %

8.3 Fail-safe inputs

ASIsafe inputs

ASIsafe inputs are designed for mechanical switching contacts.

8.4 Standard outputs

Digital standard outputs

After communication errors (e.g. master error), the standard outputs are reset after approx. 40 to 100 ms (cycle-time monitoring).

Supply of the standard outputs

The standard outputs can be supplied selectively using the AS-i bus cable or the 24 V DC auxiliary voltage U_{aux} . The supply is selected using a switch on the back of the device and the selection is indicated by the switch. The switch may only be actuated in the de-energized state.

When power demand is low, it is advantageous to select the supply via AS-i. The module then does not have to be connected to U_{aux} . For higher power demand, the outputs are supplied from U_{aux} .

Current carrying capacity of the standard outputs:

- DC-12 / DC-13: 0.5 A per output when supplied from U_{aux} .
- DC-12 / DC-13: 0.15 A per output, max. 0.2 A per module when supplied from AS-i

The following output voltages result depending on the supply of the outputs:

- Output voltage $> U_{AS-i} - 8.5$ V in the case of supply from AS-i
- Output voltage $> U_{aux} - 1.0$ V in the case of supply from U_{aux}

8.5 Diagnostics

Status display

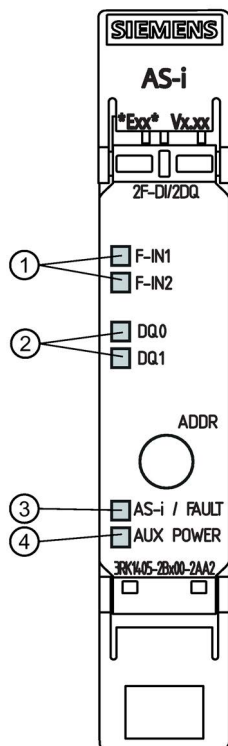
The status of a module is indicated by LEDs with continuous or flashing light. This enables diagnostics at a glance:

- for AS-i communication via a dual LED
- for the auxiliary voltage U_{AUX} with a green LED
- for the switching state of the inputs and outputs with yellow LEDs
- for the switching state of the outputs with a dual yellow/red LEDs

The following sections provide an overview of the LED status displays for the input/output modules.

LED position

For the position of the LED, see the diagram below:



- ① Status display for fail-safe inputs
- ② Status display for standard outputs
- ③ Communication AS-i / FAULT
- ④ AUX POWER supply

Inputs/outputs

Each input has a yellow LED with designation "F-INx". Each semiconductor output has a dual red/yellow LED with the designation "DQx". For the functions, see the table below:

Table 8- 1 Diagnostics of the inputs via LED

F-IN x	Meaning
Yellow	Signal activated
OFF	Signal deactivated

Table 8- 2 Diagnostics of the outputs via LEDs

DQ x	Meaning
Yellow	Output activated
Red	Overload of the output
OFF	Output deactivated

Note

The output LED indicates the overload for each channel by changing its color to red. This diagnostic function is only available when the outputs are supplied from U_{aux} . When the outputs are supplied via AS-i, the module switches off communication at an overload of the outputs.

Status display AS-i / FAULT

All modules have a dual LED (green/red) for the "AS-i / FAULT" status display. For the functions and remedies, see the table below:

Table 8- 3 Diagnostics of the AS+i status via LEDs

AS-i / FAULT (green / red)	Possible cause	Possible remedial measures
Green	Normal operation, AS+i communication OK	—
Red	No AS+i communication:	Ensure AS+i communication:
	• Master is switched off or offline	• Switch on the master or switch it to online mode
	• Slave is not configured in the master	• Reconfigure the master
	• Incorrect slave type is connected	• Connect the correct module
	• Slave has the wrong address	• Check/correct the slave address
Flashing yellow/red	Module has slave address "0" (delivery condition)	Assign an address other than "0"
Flashing green/red	Overload of the outputs	Disconnect actuator cables from output sockets Check actuators and cables
OFF	No AS+i voltage	Switch on AS+i voltage
	AS-i voltage has been connected with reverse polarity	Connect it correctly
	AS+i voltage too low	Measure the AS-i voltage (approx. 30 V DC)

Note

The overload of the outputs is indicated by green/red flashing of the AS-i / Fault LED only if the outputs are being supplied from U_{aux} . When the outputs are supplied via AS-i, the communication is switched off at an overload of the outputs. The Fault LED then lights up red.

AUX POWER operating state

All modules have a green LED for the "AUX POWER" operating state. For the functions and remedies, see the table below:

Table 8- 4 Diagnostics of the operating state via LED

AUX POWER	Possible cause	Possible remedial measures
Green	Normal operation, 24 V DC auxiliary voltage OK	—
OFF	<ul style="list-style-type: none"> • No auxiliary voltage • Auxiliary voltage connected with incorrect polarity • Auxiliary voltage too low 	<ul style="list-style-type: none"> • Switch on auxiliary voltage 24 V DC • Connect it properly • Measure the auxiliary voltage approx. 24 V DC)

Display for supply of the outputs

The standard outputs can be supplied selectively using the AS-i bus cable or the 24 V DC auxiliary voltage U_{aux} . The supply is selected using a switch on the back of the device and the selection is indicated by the switch. The switch may only be actuated in the de-energized state.

I/O error bit

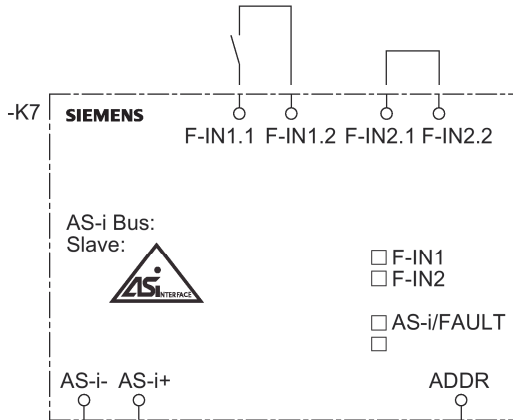
The I/O error bit function is not supported by the ASIsafe modules.

8.6 Wiring

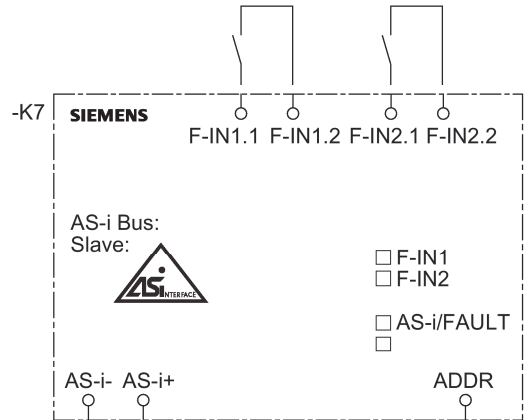
Examples

3RK1205-0Bx00-2AA2

Wiring up to SIL1, PLc, Category 2



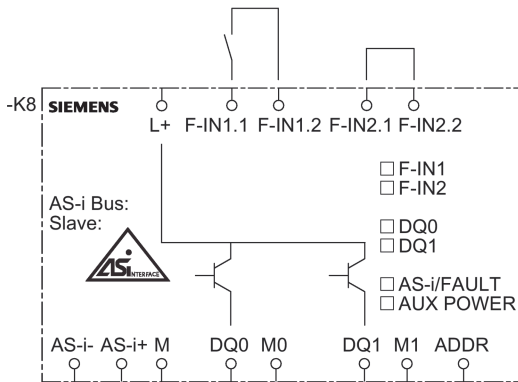
Wiring up to SIL3, PLc, Category 4



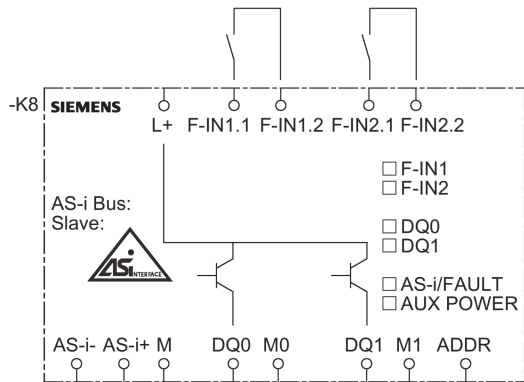
Safety inputs Connection of mechanical contacts

3RK1405-0Bx00-2AA2

Wiring up to SIL1, PLc, Category 2



Wiring up to SIL3, PLc, Category 4



Safety inputs Connection of mechanical contacts; standard outputs: Solid-state

Technical data

9.1 Product data sheet

You can find the technical data of the devices at Siemens Industry Online Support (<https://support.industry.siemens.com/cs/de/en/ps>).

Enter the article number of the desired device in the "Product" field to search for it. A view of the device appears with the link to the technical data.

> Home > Product Support Product Support | Services | Forum | mySupport

Filter criteria for entries

In Product tree: All

Product: Entry type: All Date: From -- To

> Search product

3RK2100-1CE00-2AA2

AS-INTERFACE COMPACT MODULE, SC20 S, 5P, DIGITAL, AS-BUSLINE, 400, 4 X ADDRESSING, SCHRAUBKLEMMEN, BAUGRÖÖE 22.5 MM

> Product details **Technical data** > CAx data

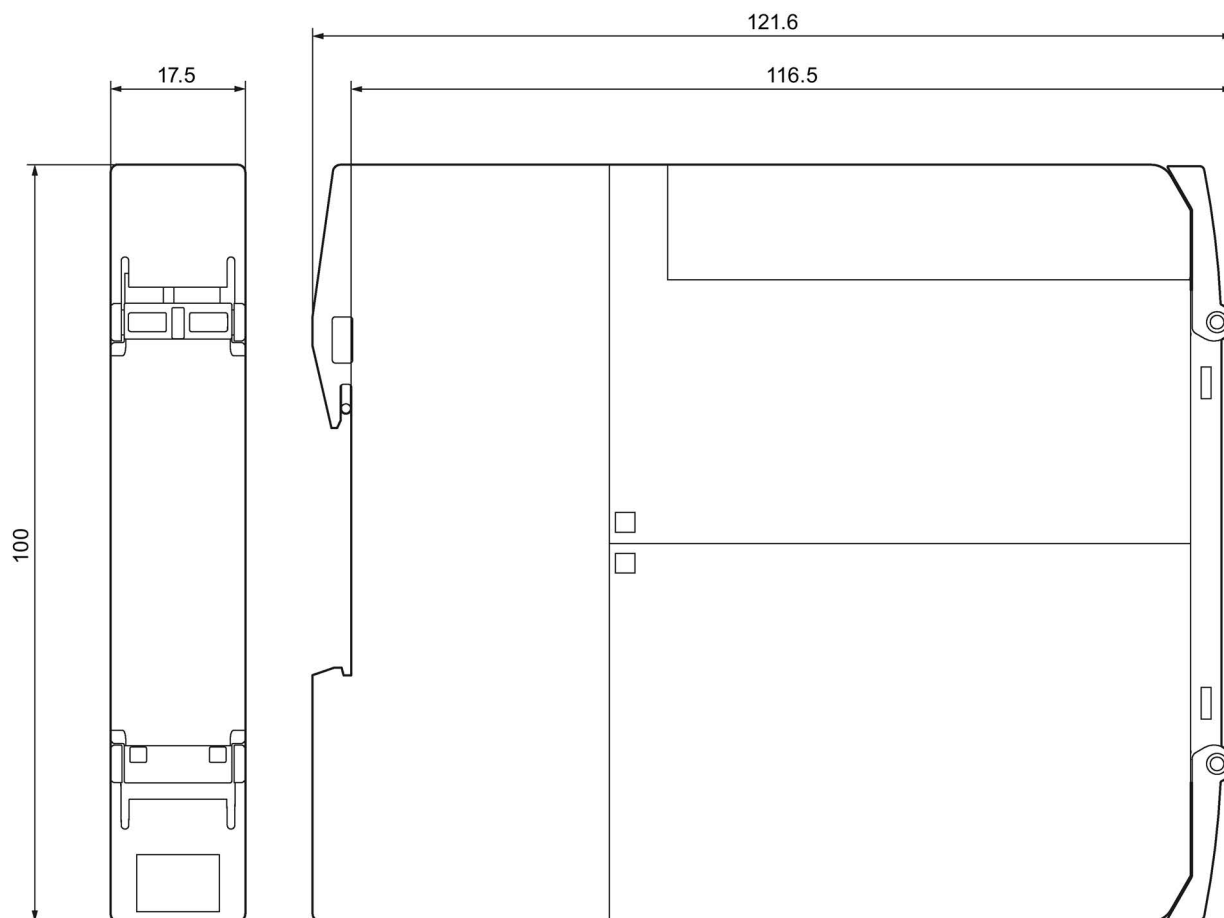
Save filter | Load filter | Email on update

All available data, product details, and CAx data can be selected for the chosen product on the "Technical specifications" page.

Dimension drawings

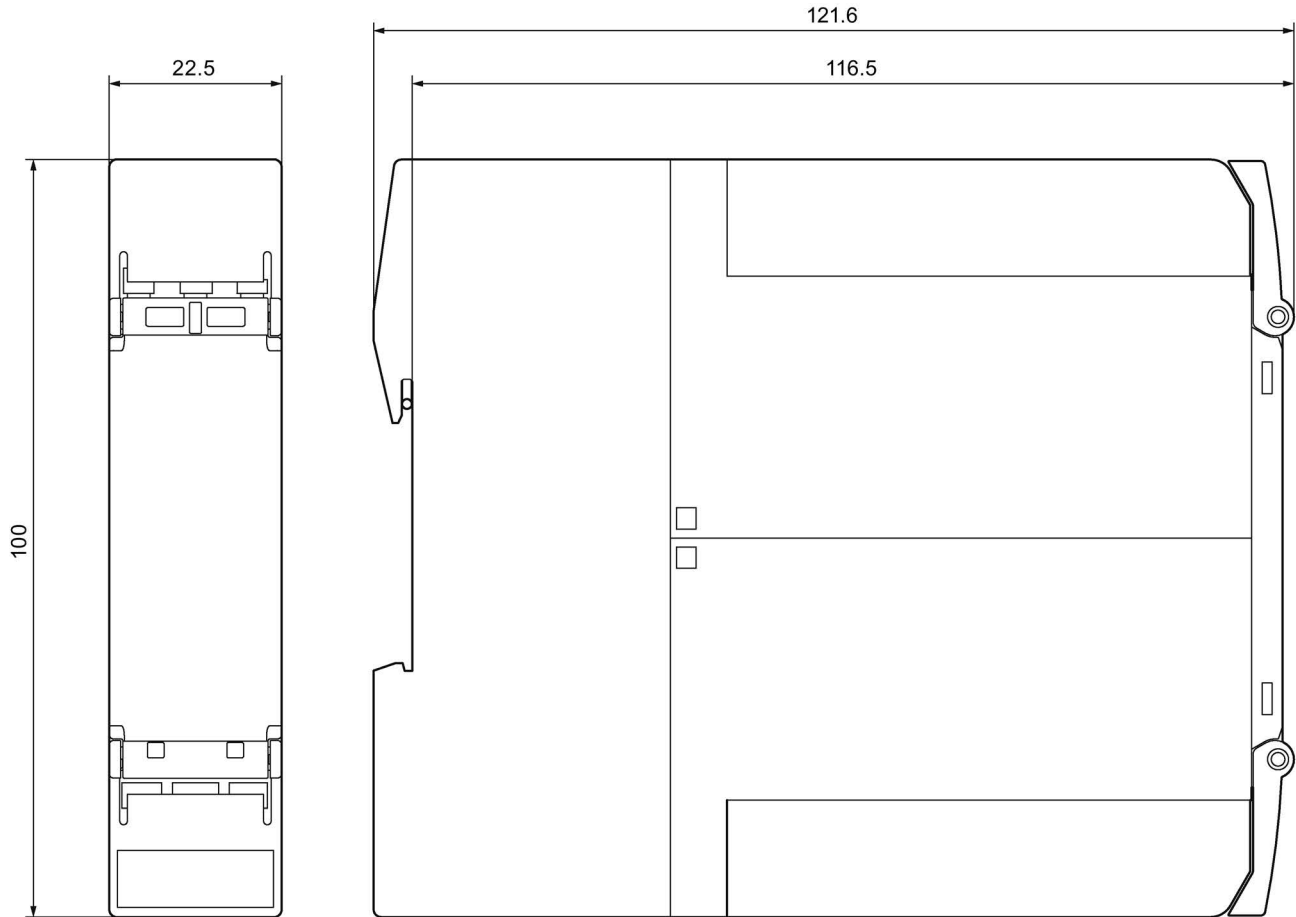
10.1 Dimension drawings 3RK devices

Enclosure 17.5 mm for AS-i modules



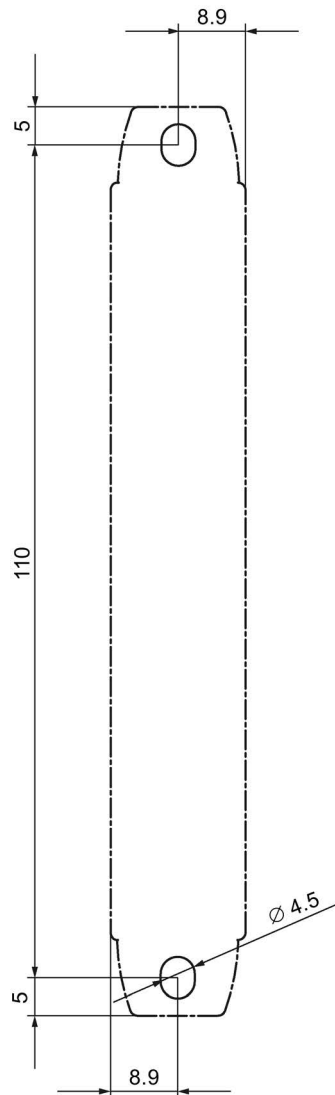
- 3RK2200-0C.00-2AA2
- 3RK1205-0B.00-2AA2
- 3RK1405-2B.00-2AA2

Enclosure 22.5 mm for AS-i modules

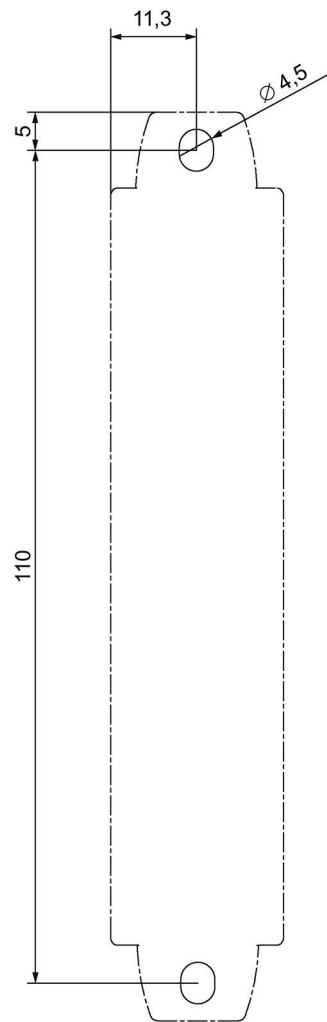


- 3RK2200-2C.00-2AA2
- 3RK2402-2C.00-2AA2
- 3RK2402-2M.00-2AA2
- 3RK2100-1C.00-2AA2
- 3RK1400-2C.00-2AA2
- 3RK2400-2C.00-2AA2
- 3RK1207-0C.00-2AA2
- 3RK1207-3C.00-2AA2
- 3RK1107-0B.00-2AA2

Drilling diagram, enclosure 17.5 mm



Drilling diagram, enclosure 22.5 mm



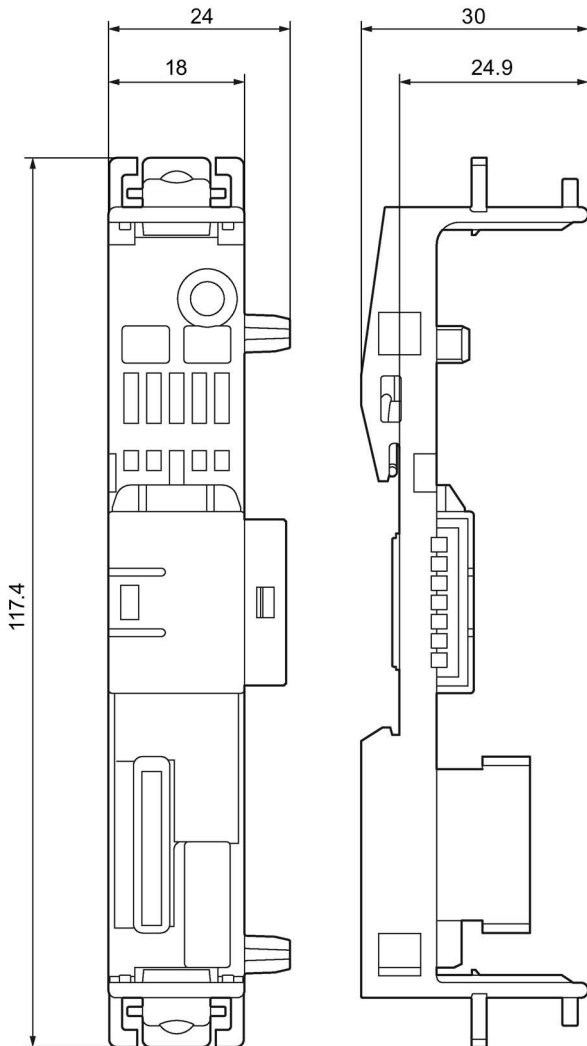
See also

Mounting the devices on a wall (Page 32)

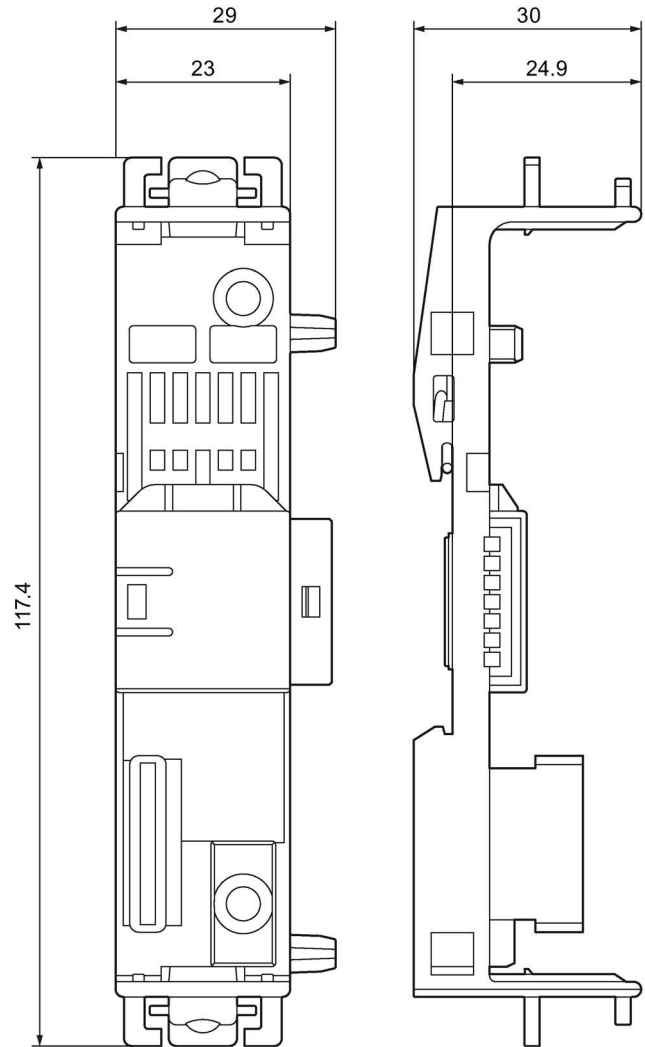
10.2 Dimension drawings 3RK device connectors

Dimension drawing of device connectors for 3RK AS-I modules

Device connector for 17.5 mm devices

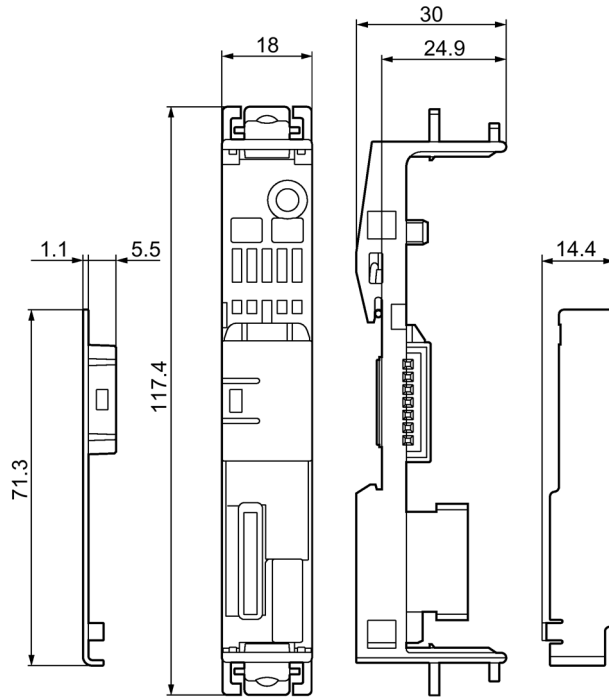


Device connector for 22.5 mm devices

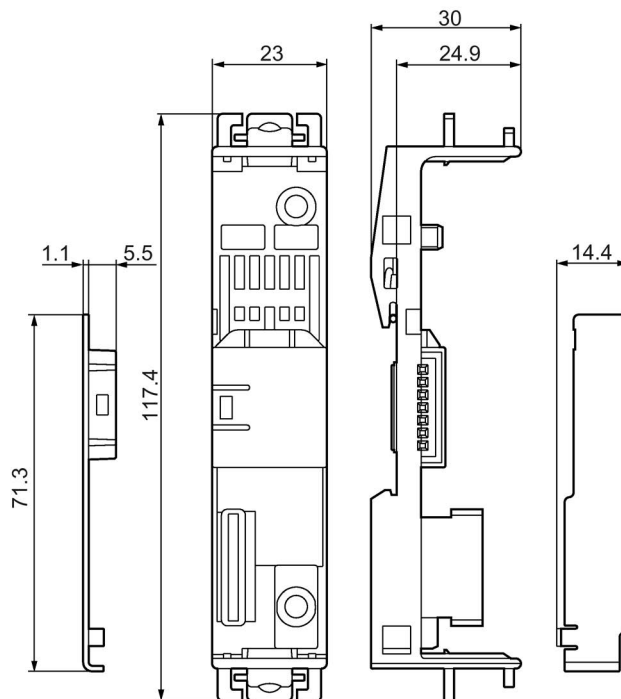


Dimension drawing for device termination connectors for 3RK AS-i modules

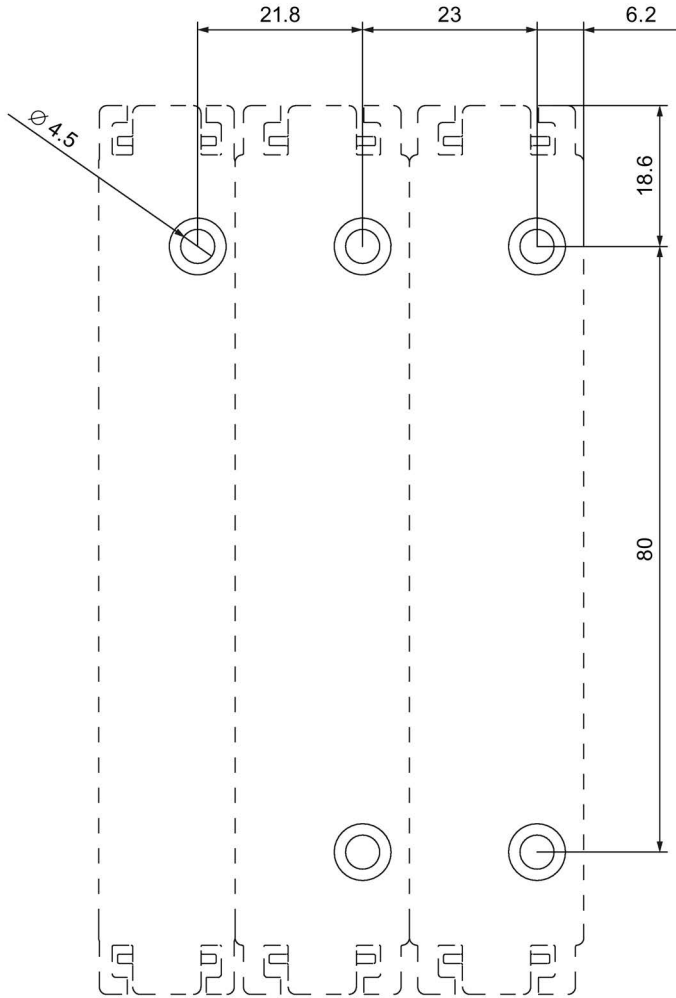
Device termination connector for 17.5 mm devices



Device termination connector for 22.5 mm devices



Drilling diagram for device connectors with 18 mm and 23 mm widths



See also

Mounting the devices with device connector on a wall (Page 34)

Mounting the devices with device connector on a standard mounting rail (Page 27)

Spare parts/accessories

11.1 Accessories for 3RK

The following accessories are available for the 3RK control cabinet modules.

Designation	Article number
SIRIUS terminal, 2-pole, screw-type, 1 x 2.5 mm ² / 2 x 1.5 mm ²	3ZY1121-1BA00
SIRIUS terminal, 4-pole, screw-type, 1 x 2.5 mm ² / 2 x 1.5 mm ²	3ZY1141-1BA00
SIRIUS terminal, 2-pole, push-in, 2 x 1.5 mm ²	3ZY1121-2BA00
SIRIUS terminal, 4-pole, push-in, 2 x 1.5 mm ²	3ZY1141-2BA00
SIRIUS device connector for enclosure, 17.5 mm wide	3RK1901-1YA00
SIRIUS device connector for enclosure, 22.5 mm wide	3RK1901-1YA10
SIRIUS device termination connector for devices, 17.5 mm wide	3RK1901-1YA01
SIRIUS device termination connector for devices, 22.5 mm wide	3RK1901-1YA11
SIRIUS push-in lugs for wall mounting (Contents: 12 units)	3ZY1311-0AA00
SIRIUS device identification label 17 sheets with 48 labels each; size 10 x 7 mm	3RT2900-1SB10
SIRIUS device identification label 17 sheets with 20 labels each; size 20 x 7 mm	3RT2900-1SB20
Screwdriver 3.0 x 0.5 mm; l = 200 mm; titanium gray/black; partially insulated	3RA2908-1A

See also

Mounting the devices with device connector on a standard mounting rail (Page 27)

Mounting the devices with device connector on a wall (Page 34)

Appendix

A.1 Correction sheet

Correction sheet

Have you noticed any errors while reading this manual? If so, please use this form to tell us about them. We welcome comments and suggestions for improvement.

Fax response

To:	From (please complete):
SIEMENS AG	Name
DF CP PRM IM 2	Company/Department
92220 Amberg/Germany	Address

Fax: +49 (0)9621-80-3337

Manual title:

Errors, comments, and suggestions for improvements

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