SDL4 Converter

User's manual

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Translation of the original documentation

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B&R Industrial Automation GmbH

B&R Strasse 1

5142 Eggelsberg

Austria

Telephone: +43 7748 6586-0

Fax: +43 7748 6586-26

office@br-automation.com

1526941028827-2.1

1 Introduction

Information:

B&R makes every effort to keep documents as current as possible. The latest versions are available for download on the B&R website (www.br-automation.com).

1.1 Manual history

Version	Date	Change
2.01	June 2021	• Updated document. • Updated "Technical data" on page 18 and "+24 VDC power supply" on page 21. • Cables are described in a separate document starting with this version.
2.00	August 2019	• Updated document.
1.01	December 2018	• Updated document.
1.00	December 2018	• First version

1.2 Information about this document

This document is not intended for end customers! The safety guidelines required for end customers must be incorporated into the operating instructions for end customers in the respective national language by the machine manufacturer or system provider.

1.2.1 Organization of notices

Safety notices

Contain **only** information that warns of dangerous functions or situations.

Signal word	Description
Danger!	Failure to observe these safety guidelines and notices will result in death, severe injury or substantial damage to property.
Warning!	Failure to observe these safety guidelines and notices can result in death, severe injury or substantial damage to property.
Caution!	Failure to observe these safety guidelines and notices can result in minor injury or damage to property.
Notice!	Failure to observe these safety guidelines and notices can result in damage to property.

Table 1: Organization of safety notices

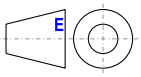
General notices

Contain **useful** information for users and instructions for avoiding malfunctions.

Signal word	Description
Information:	Useful information, application tips and instructions for avoiding malfunctions.

Table 2: Organization of general notices

1.2.2 Guidelines



European dimension standards apply to all dimension diagrams.

All dimensions in millimeters.

Unless otherwise specified, the following general tolerances apply:

Nominal dimension range	General tolerance per DIN ISO 2768 medium
Up to 6 mm	±0.1 mm
Over 6 to 30 mm	±0.2 mm
Over 30 to 120 mm	±0.3 mm
Over 120 to 400 mm	±0.5 mm
Over 400 to 1000 mm	±0.8 mm

Table 3: Nominal dimension ranges

2 General safety guidelines

2.1 Intended use

In all cases, it is necessary to observe and comply with applicable national and international standards, regulations and safety measures!

The B&R products described in this manual are intended for use in industry and industrial applications.
The intended use includes control, operation, monitoring, drive and HMI tasks as part of automation processes in machines and systems.

B&R products are only permitted to be used in their original condition. Modifications and extensions are only permitted if they are described in this manual.

B&R excludes liability for damage of any kind resulting from the use of B&R products in any intended way.

B&R products have not been designed, developed and manufactured for use that involves fatal risks or hazards that could result in death, injury, serious physical harm or other loss without the assurance of exceptionally stringent safety precautions.

B&R products are explicitly not intended for use in the following applications:

- Monitoring and control of thermonuclear processes
- Weapon systems control
- Flight and traffic control systems for passenger and freight transport
- Health monitoring and life support systems

The B&R products described in this manual are designed as "open equipment" (EN 61131-2) and "open type equipment" (UL). They are therefore designated for installation in an enclosed control cabinet.

2.2 Protection against electrostatic discharge

Electrical assemblies that can be damaged by electrostatic discharge (ESD) must be handled accordingly.

2.2.1 Packaging

- **Electrical assemblies with housing:**
  Do not require special ESD packaging but must be handled properly (see "Electrical assemblies with housing").
- **Electrical assemblies without housing:**
  Are protected by ESD-suitable packaging.

2.2.2 Regulations for proper ESD handling

Electrical assemblies with housing

- Do not touch the connector contacts of connected cables.
- Do not touch the contact tips on circuit boards.

Electrical assemblies without housing

The following applies in addition to "Electrical assemblies with housing":

- All persons handling electrical assemblies and devices in which electrical assemblies are installed must be grounded.
- Assemblies are only permitted to be touched on the narrow sides or front plate.

- Always place assemblies on suitable surfaces (ESD packaging, conductive foam, etc.). Metallic surfaces are not suitable surfaces!
- Assemblies must not be subjected to electrostatic discharges (e.g. due to charged plastics).
- A minimum distance of 10 cm from monitors or television sets must be maintained.
- Measuring instruments and devices must be grounded.
- Test probes of floating potential measuring instruments must be discharged briefly on suitable grounded surfaces before measurement.

Individual components

- ESD protective measures for individual components are implemented throughout B&R (conductive floors, shoes, wrist straps, etc.).
- The increased ESD protective measures for individual components are not required for handling B&R products at customer locations.

2.3 Regulations and measures

Electronic devices are generally not failsafe. If the programmable logic controller, operating or control device or uninterruptible power supply fails, the user is responsible for ensuring that connected devices (such as motors) are brought to a safe state.

When using programmable logic controllers as well as when using operating and monitoring devices as control systems in conjunction with a Soft PLC (e.g. B&R Automation Runtime or similar product) or Slot PLC (e.g. B&R LS251 or similar product), the safety measures that apply to industrial controllers (protection by protective equipment such as emergency stops) must be observed in accordance with applicable national and international regulations. This also applies to all other connected devices, such as drives.

All work such as installation, commissioning and servicing are only permitted to be carried out by qualified personnel. Qualified personnel are persons who are familiar with the transport, installation, assembly, commissioning and operation of the product and have the appropriate qualifications for their job (e.g. IEC 60364). National accident prevention regulations must be observed.
The safety guidelines, information about connection conditions (nameplate and documentation) and limit values specified in the technical data must be read carefully before installation and commissioning and must be strictly observed.

2.4 Transport and storage

During transport and storage, devices must be protected against undue stress (mechanical stress, temperature, humidity, aggressive atmosphere).

2.5 Installation

- The devices are not ready for use and must be installed and wired according to the requirements of this documentation in order to comply with EMC limit values.
- Installation must be carried out according to the documentation using suitable equipment and tools.
- Devices are only permitted to be installed in a voltage-free state and by qualified personnel. The control cabinet must first be disconnected from the power supply and secured against being switched on again.
- General safety regulations and national accident prevention regulations must be observed.
- The electrical installation must be carried out in accordance with relevant regulations (e.g. line cross section, fuse protection, protective ground connection).

2.6 Operation

2.6.1 Protection against contact with electrical parts

In order to operate programmable logic controllers, operating and monitoring devices and uninterruptible power supplies, it is necessary for certain components to carry dangerous voltages over 42 VDC. Touching one of these components can result in a life-threatening electric shock. There is a risk of death, serious injury or damage to property.

Before switching on programmable logic controllers, operating and monitoring devices and uninterruptible power supplies, it must be ensured that the housing is properly connected to ground potential (PE rail). Ground connections must also be made if the operating and monitoring device and uninterruptible power supply are only connected for testing purposes or only operated for a short time!

Before switching on, live parts must be securely covered. All covers must be kept closed during operation.

2.6.2 Ambient conditions - Dust, moisture, aggressive gases

The use of operating and monitoring devices (e.g. industrial PCs, Power Panels, Mobile Panels) and uninterruptible power supplies in dusty environments must be avoided. This can otherwise result in dust deposits that affect the functionality of the device, especially in systems with active cooling (fans), which may no longer ensure sufficient cooling.

The presence of aggressive gases in the environment can also result in malfunctions. In combination with high temperature and relative humidity, aggressive gases – for example with sulfur, nitrogen and chlorine components – trigger chemical processes that can very quickly impair or damage electronic components. Blackened copper surfaces and cable ends in existing installations are indicators of aggressive gases.

When operated in rooms with dust and condensation that can endanger functionality, operating and monitoring devices such as Automation Panels or Power Panels are protected on the front against the ingress of dust and moisture when installed correctly (e.g. cutout installation). The back of all devices must be protected against the ingress of dust and moisture, however, or the dust deposits must be removed at suitable intervals.

2.6.3 Programs, viruses and malicious programs

Any data exchange or installation of software using data storage media (e.g. floppy disk, CD-ROM, USB flash drive) or via networks or the Internet poses a potential threat to the system. It is the direct responsibility of the user to avert these dangers and to take appropriate measures such as virus protection programs and firewalls to protect against them and to use only software from trustworthy sources.

2.7 Cybersecurity disclaimer for products

B&R products communicate via a network interface and were developed for secure connection with internal and, if necessary, other networks such as the Internet.

> **Information:**
>
> **In the following, B&R products are referred to as "product" and all types of networks (e.g. internal networks and the Internet) are referred to as "network".**

It is the sole responsibility of the customer to establish and continuously ensure a secure connection between the product and the network. In addition, appropriate security measures must be implemented and maintained to protect the product and entire network from any security breaches, unauthorized access, interference, digital intrusion, data leakage and/or theft of data or information.

B&R Industrial Automation GmbH and its subsidiaries are not liable for damages and/or losses in connection with security breaches, unauthorized access, interference, digital intrusion, data leakage and/or theft of data or information.

The aforementioned appropriate security measures include, for example:

- Segmentation of the network (e.g. separation of the IT network from the control network[1)])
- Use of firewalls
- Use of authentication mechanisms
- Encryption of data
- Use of anti-malware software

Before B&R releases products or updates, they are subjected to appropriate functional testing. Independently of this, we recommend that our customers develop their own test processes in order to be able to check the effects of changes in advance. Such changes include, for example:

- Installation of product updates
- Significant system modifications such as configuration changes

[1)] The term "control network" refers to computer networks used to connect control systems. The control network can be divided into zones, and there can be several separate control networks within a company or site. The term "control systems" refers to all types of B&R products such as controllers (e.g. X20), HMI systems (e.g. Power Panel T30), process control systems (e.g. APROL) and supporting systems such as engineering workstations with Automation Studio.

- Deployment of updates or patches for third-party software (non-B&R software)
- Hardware replacement

These tests should ensure that implemented security measures remain effective and that systems in the customer's environment behave as expected.

3 System overview

3.1 Information about this user's manual

This user's manual contains all necessary information about the SDL4 Converter. For information about SDL4 link modules and SDL4 transmitters, see the Automation Panel and Automation PC user's manuals.

Information:

All specifications in dimension diagrams and associated tables are in millimeters [mm].

3.2 1-port SDL4 Converter[2] for Automation PCs.

The SDL4 Converter makes operation via SDL4 with Automation Panels possible for B&R industrial PCs that are not equipped with an SDL4 interface or SDL4 slot. This makes it easy to upgrade systems to SDL4 as part of retrofit measures and conversions.

When combined with an SDL4 interface integrated on a B&R industrial PC, two Automation Panels can be connected in dual-independent display mode.

3.3 3-port SDL4 Converter[3] for Automation PCs.

The SDL4 Converter makes operation via SDL4 with Automation Panels possible for B&R industrial PCs that are not equipped with an SDL4 interface or SDL4 slot. In addition, up to 3 Automation Panels can be connected to the 3-port SDL4 Converter in clone mode.

When combined with an SDL4 interface integrated on a B&R industrial PC, an additional Automation Panel can be connected in dual-independent display mode.

[2] Sometimes shortened to "1x" in this document.
[3] Sometimes shortened to "3x" in this document.

3.4 Connection options

3.4.1 SDL4 operation

Smart Display Link 4 (SDL4) technology transfers all communication channels between a B&R industrial PC and panel up to 100 m over a standard Ethernet cable (min. Cat 6a). An RJ45 connector is used for the device connection, which is ideal for confined spaces in feed-throughs and swing arm systems.

Up to 3 Automation Panels can be connected to the 3-port SDL4 Converter with the same resolution in clone mode.

3.4.1.1 SDL4 operation with SDL4 Converter via SDL

When operating SDL4 with an SDL4 Converter (5COSD4.1000-00, 5COSD4.1001-00) via SDL, communication between a B&R industrial PC and the SDL4 Converter is handled using an SDL cable and an optional USB type A/B cable. The Automation Panel is connected to the SDL4 Converter using an SDL3/SDL4 cable; the maximum SDL4 cable length is 100 m.

In addition to the display data, information from the touch screen, matrix keys, LEDs and service/diagnostic data is transferred.

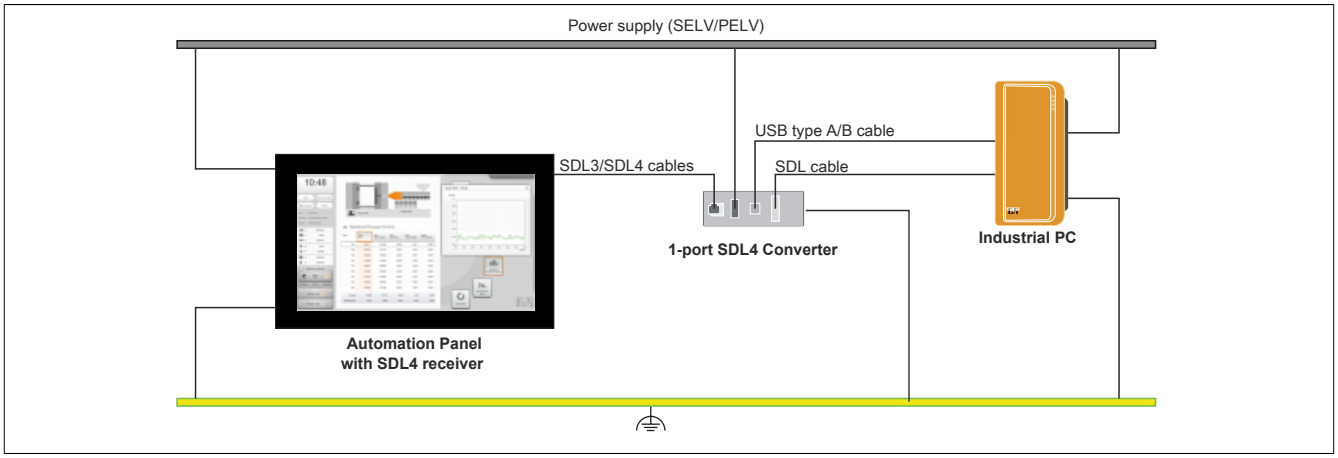
If the B&R industrial PC is equipped with an SDL4 transmitter, then an additional SDL4 graphics line can also be implemented.

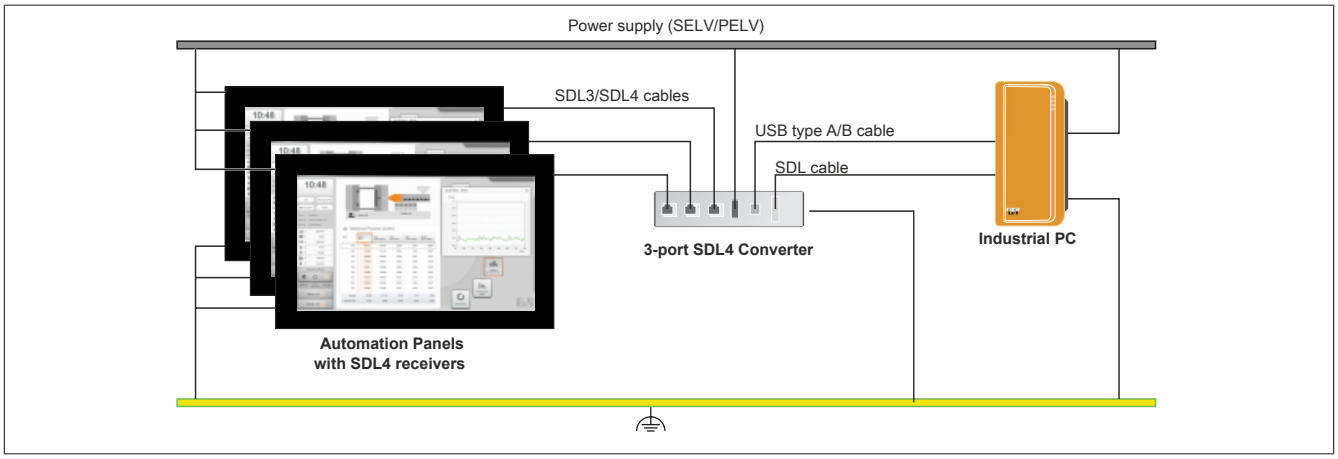
The brightness of the display can be set via the ADI Control Center.

Operation with a USB type A/B cable

The Automation Panel can be up to 100 m away from the SDL4 Converter; USB 2.0 is fully integrated in SDL4 and transferred over this distance.

The maximum distance for transferring data between the B&R industrial PC and SDL4 Converter (5COSD4.1000-00, 5COSD4.1001-00) is 5 m; USB 2.0 is transferred via an external USB type A/B cable.





Availability of interfaces on the Automation Panel with SDL4 receiver:

SDL4 interface	✓	USB1, USB2	✓ USB 2.0	Power supply	✓	Grounding	✓

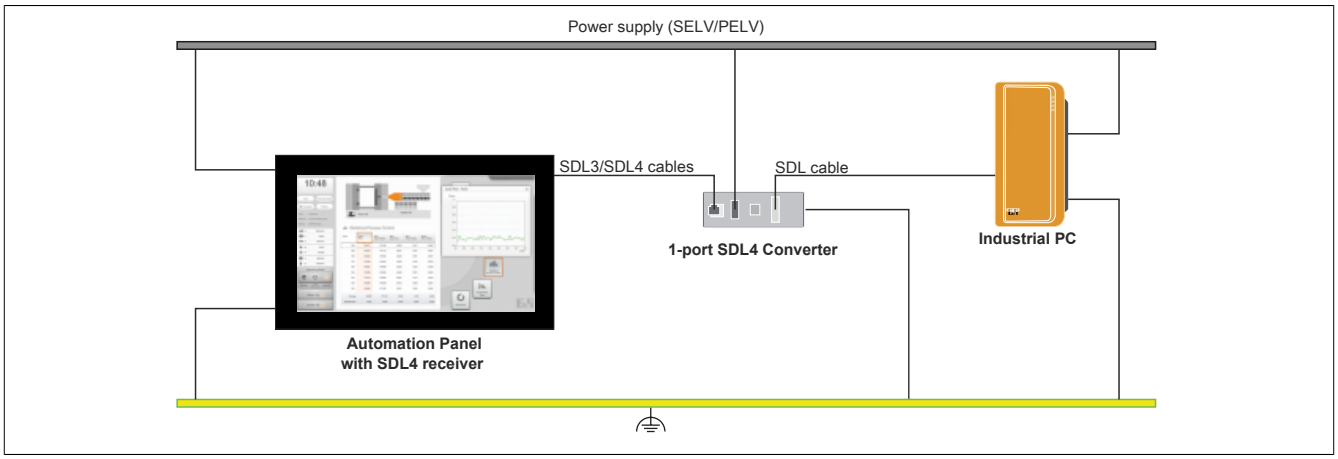
Maximum cable length for SDL4: 100 m
Maximum cable length of SDL and USB: 5 m

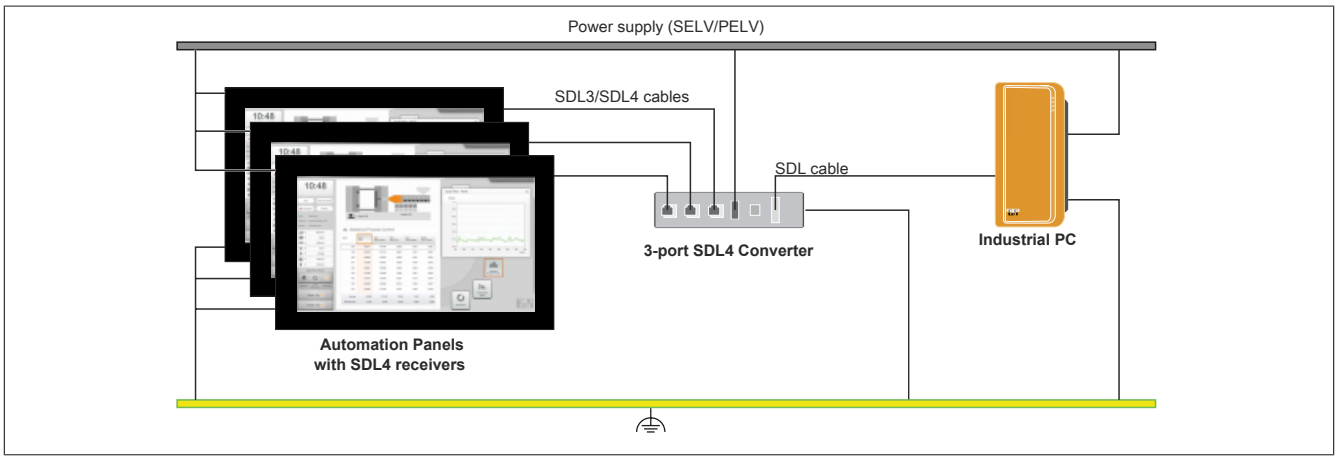
Requirements

- Automation Panel with SDL4 receiver
- B&R industrial PC with SDL interface
- SDL4 Converter
- SDL cable, USB type A/B cable, SDL3/SDL4 cable

Operation without a USB type A/B cable

The maximum distance for transferring data between the B&R industrial PC and SDL4 Converter (5COSD4.1000-00, 5COSD4.1001-00) is 10 m; USB 1.1 is fully integrated in the SDL transfer and transferred over this distance.





Availability of interfaces on the Automation Panel with SDL4 receiver:

SDL4 interface	✓	USB1, USB2	✓	USB 1.1	Power supply	✓	Grounding ✓

Maximum cable length for SDL4: 100 m
Maximum cable length of SDL: 10 m

Requirements

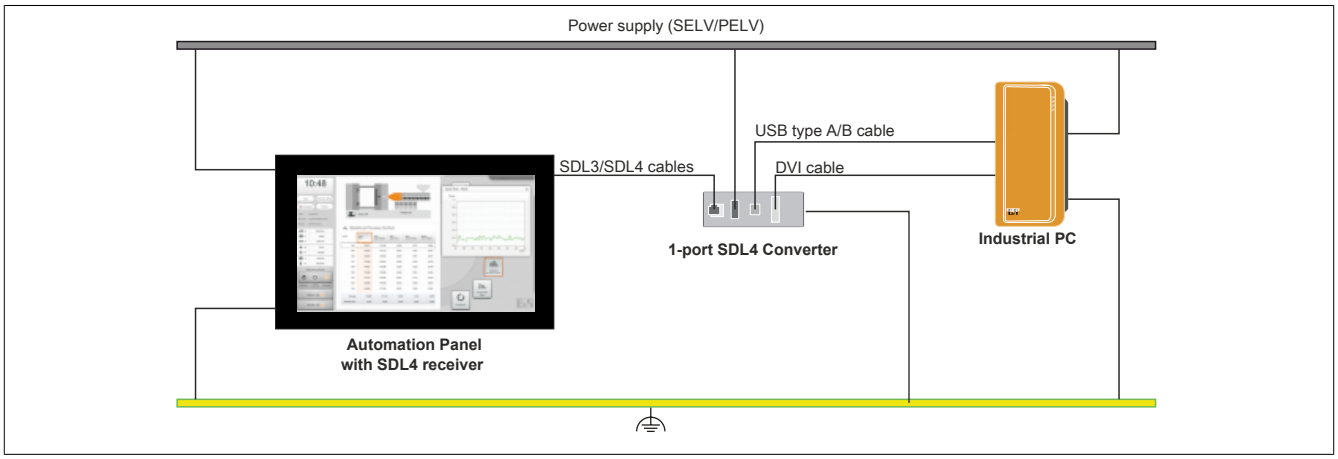
- Automation Panel with SDL4 receiver
- B&R industrial PC with SDL interface
- SDL4 Converter
- SDL cable, SDL3/SDL4 cable

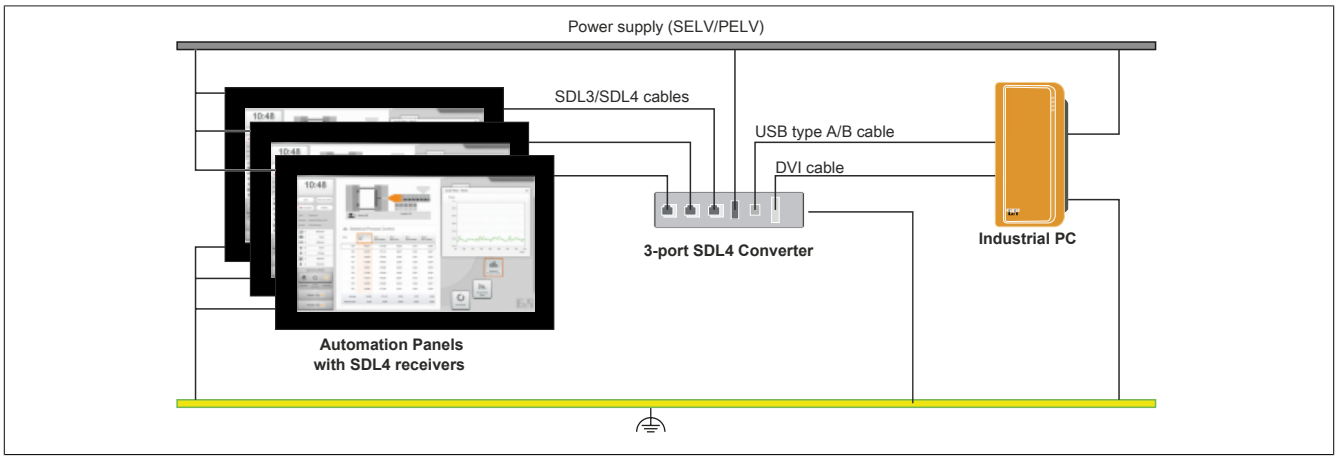
3.4.1.2 SDL4 operation with SDL4 Converter via DVI

When operating SDL4 with an SDL4 Converter (5COSD4.1000-00, 5COSD4.1001-00) via DVI, communication between an industrial PC and the SDL4 Converter is handled using a DVI cable and USB type A/B cable. The Automation Panel is connected to the SDL4 Converter using an SDL3/SDL4 cable. The touch screen data from the multi-touch screen is transferred via the USB type A/B cable.

The Automation Panel can be up to 100 m away from the SDL4 Converter; USB 2.0 is fully integrated in SDL4 and transferred over this distance.

The maximum distance for transferring data between the industrial PC and SDL4 Converter (5COSD4.1000-00, 5COSD4.1001-00) is 5 m; USB 2.0 is transferred via an external USB type A/B cable.





Availability of the interfaces on the Automation Panel with SDL4 receiver:

SDL4 interface	✓	USB1, USB2	✓ USB 2.0	Power supply	✓	Grounding	✓

Maximum cable length for SDL4: 100 m
Maximum cable length for DVI and USB: 5 m

Requirements

- Automation Panel with SDL4 receiver
- Industrial PC with DVI interface
- SDL4 Converter
- DVI cable, USB type A/B cable, SDL3/SDL4 cable

Limitations

- Key and LED data is not transferred.
- Service and diagnostic data is not transferred.
- Resistive touch screens are not supported.
- Firmware updates are not possible.
- Adjusting the display brightness is not possible.

3.4.2 General limitations/characteristics

- USB 2.0 transfer is limited to 150 Mbit/s with SDL4.
- Only Automation Panels with the same resolution (same timing) can be operated with 3-port SDL4 Converter 5COSD4.1001-00.
- If fewer than 3 Automation Panels are operated with 3-port SDL4 Converter 5COSD4.1001-00, one Automation Panel must be connected on SDL4 Out 0.
- The numbering of the Automation Panels on the SDL4 Converter is permanent, regardless of whether an Automation Panel is connected. The numbering of the Automation Panels depends on the SDL interface to which the SDL4 Converter is connected. With the 1-port SDL4 Converter, this is either panel 0 or 8; with the 3-port SLD4 Converter, this is either panel 0, 1 or 2 or panel 8, 9 or 10.
- A display is always emulated on the interface by the SDL4 Converter using EDID data and hot plug detection on SDL4 Out or SDL4 Out 0, so DVI-compatible operation is possible. For this reason, the following behavior may occur during operation with multiple displays.
  In the operating system, a connected panel is reported by the video driver even in the following situations:
  - No SDL3/SDL4 cable is connected.
  - There is no connection established yet between the SDL4 link module and SDL4 Converter.

  This behavior can be avoided by appropriate configuration in BIOS or via the graphics driver.
- If multiple USB devices are connected to the panel, it is important to note that only a certain number of USB endpoints are available. If this number is exceeded, communication problems with the USB devices may occur. This property is explained in detail below.

3.4.2.1 USB endpoint analysis

It is possible to analyze the number and type of endpoints on a particular USB device. Third-party USB analysis tools can be used for this purpose.

The SDL4 connection has a limited number of USB IN and USB OUT endpoints. This can cause problems if multiple USB devices are connected at the same time.

This limitation applies for each SDL4 connection (Automation Panel with SDL4 receiver).

Endpoints

Devices must be distinguished from *endpoints*:

A device can be considered a USB peripheral that connects to a host, such as a mouse, keyboard, camera, flash drive or mass storage device such as a hard disk.

Endpoints can be considered as data sources or storage locations, i.e. buffers that cache data during a transaction.

This means that a USB device can have multiple endpoints. There is no direct relation between the number of endpoints and the number of devices supported by a USB port.

Devices

SDL4 technology currently supports up to seven USB devices. Hubs are not counted since they are transparent (not visible) from the user's perspective. They are not considered as a device, nor are they counted in relation to endpoints.

The limitation concerning the maximum number of connected devices or maximum number of endpoints applies as soon as one of the maximum values is reached. For example, if all endpoints are assigned (i.e. allocated) by connecting two devices, no more devices are permitted to be connected (although the maximum of seven devices has not yet been reached).

Hubs

SDL4 currently supports up to eight downstream ports per hub. This means that it is possible to identify all eight ports on a given hub. By comparison, if SDL4 supported only four ports per hub, ports five to eight – on an eight-port hub – would be switched off and therefore unusable.

If more than one hub is connected (e.g. if several hubs are linked together), the limit of eight ports per hub remains.

Determining the maximum available endpoints

Single-touch panels

The following limitations apply to single-touch (resistive) panels:

- A maximum of two USB hubs with up to eight ports per hub is supported.
- A maximum of seven additional USB devices can be connected.
- Maximum permissible USB endpoints:

Transfer rate of the devices	Endpoints	
	IN	OUT
High speed	11	12
Full speed / Low speed	12	12

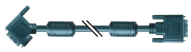
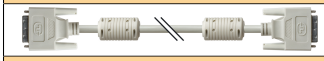
Multi-touch panels

The following limitations apply to multi-touch panels:

- A maximum of two USB hubs with up to eight ports per hub is supported.
- A maximum of six additional USB devices can be connected.
- Maximum permissible USB endpoints:

Transfer rate of the devices	Endpoints	
	IN	OUT
High speed	11	12
Full speed / Low speed	10	11

3.5 Design/Configuration

Configuration				
SDL4 Converter				Select 1
	5COSD4.1000-00 (1x) 5COSD4.1001-00 (3x)			
SDL3/SDL4 cables				Select 1 to 3
	5CASD3.0030-00 5CASD3.0200-00	5CASD3.0050-00 5CASD3.0300-00	5CASD3.0100-00 5CASD3.0500-00	5CASD3.0150-00 5CASD3.1000-00
SDL cable				Select 1[1]
	**SDL cable**			
	5CASDL.0008-00 5CASDL.0060-00	5CASDL.0018-00 5CASDL.0100-00	5CASDL.0050-00	
	**SDL cables with 45° connector**			
	5CASDL.0018-01	5CASDL.0050-01	5CASDL.0100-01	
	**SDL flex cables**			
	5CASDL.0018-03	5CASDL.0050-03	5CASDL.0100-03	
DVI cables				Select 1[2]
	5CADVI.0018-00		5CADVI.0050-00	
USB cables				Select 1[3]
	5CAUSB.0018-00		5CAUSB.0050-00	
Terminal blocks				Select 1
	**Power supply connector**			
	0TB103.9		0TB103.91	
Accessories				Optional selection
	**Cable strain relief clip**			
	5ACCRHMI.0011-000			

1) Only required for SDL operation.
2) Only required for DVI operation.
3) Optional for SDL operation, required for DVI operation.

3.6 System data

3.6.1 5COSD4.100x-00

3.6.1.1 General information

The SDL4 Converter makes operation via SDL4 with Automation Panels possible for B&R industrial PCs that are not equipped with an SDL4 interface or SDL4 slot. This makes it easy to upgrade systems to SDL4 as part of retrofit measures and conversions.
In addition, up to 3 Automation Panels (with the same resolution) can be connected to the 3-port SDL4 Converter in clone mode.

When combined with an SDL4 interface integrated on a B&R industrial PC, an additional Automation Panel can be connected in dual-independent display mode.

3.6.1.2 Order data

Order number	Short description	Figure
	Converter	
5COSD4.1000-00	SDL to SDL4 1x converter	
5COSD4.1001-00	SDL to SDL4 converter, 3-port	
	Required accessories	
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm²	
0TB103.91	Connector 24 VDC - 3-pin, female - Cage clamp terminal block 3.31 mm²	
	SDL-cables	
5CASDL.0008-00	SDL cable - 0.8 m	
5CASDL.0018-00	SDL cable - 1.8 m	
5CASDL.0050-00	SDL cable - 5 m	
5CASDL.0060-00	SDL cable - 6 m	
5CASDL.0100-00	SDL cable - 10 m	
	SDL3/SDL4/PoE cables	
5CASD3.0010-00	SDL3/SDL4/FT50 cable - 1 m - FT50 including Power over Ethernet	
5CASD3.0030-00	SDL3/SDL4/FT50 cable - 3 m - FT50 including Power over Ethernet	
5CASD3.0050-00	SDL3/SDL4/FT50 cable - 5 m - FT50 including Power over Ethernet	
5CASD3.0070-00	SDL3/SDL4/FT50 cable - 7 m - FT50 including Power over Ethernet	
5CASD3.0100-00	SDL3/SDL4/FT50 cable - 10 m - FT50 including Power over Ethernet	
5CASD3.0150-00	SDL3/SDL4/FT50 cable - 15 m - FT50 including Power over Ethernet	
5CASD3.0200-00	SDL3/SDL4/FT50 cable - 20 m - FT50 including Power over Ethernet	
5CASD3.0300-00	SDL3/SDL4/FT50 cable - 30 m - FT50 including Power over Ethernet	
5CASD3.0500-00	SDL3/SDL4/FT50 cable - 50 m - FT50 including Power over Ethernet	
5CASD3.1000-00	SDL3/SDL4/FT50 cable - 100 m - FT50 including Power over Ethernet	
	Optional accessories	
	Accessories	
5ACCRHMI.0011-000	Strain relief USB - For APC2100/APC2200 - For SDL3 Converter/SDL4 Converter	
	DVI cables	
5CADVI.0018-00	DVI-D cable - 1.8 m	
5CADVI.0050-00	DVI-D cable - 5 m	
	Other	
5ACCRHMI.0000-000	HMI grounding clip	
	SDL cables with 45° connector	
5CASDL.0018-01	SDL cable - 45-degree connector - 1.8 m	
5CASDL.0050-01	SDL cable - 45-degree connector - 5 m	
5CASDL.0100-01	SDL cable - 45-degree connector - 10 m	
	SDL flex cables	
5CASDL.0018-03	SDL flex cable - 1.8 m	
5CASDL.0050-03	SDL flex cable - 5 m	
5CASDL.0100-03	SDL flex cable - 10 m	
	USB cables	
5CAUSB.0018-00	USB 2.0 connection cable - Type A - type B connector - 1.8 m	
5CAUSB.0050-00	USB 2.0 connection cable - Type A - type B connector - 5 m	

3.6.1.3 Technical data

Information:

The following specified characteristic data, features and limit values are only valid for these individual components and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this individual component is used, for example.

Order number	5COSD4.1000-00	5COSD4.1001-00
General information		
LEDs	Status, SDL4 Out	Status, SDL4 Out 0, SDL4 Out 1, SDL4 Out 2
B&R ID code	0xF10C	0xF10D
Certifications		
CE	Yes	
UL	cULus E115267 Industrial control equipment	
Interfaces		
USB		
Quantity	1	
Type	USB 2.0	
Variant	Type B	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)	
SDL/DVI-D interface		
Variant	DVI-I	
Type	SDL/DVI	
SDL4 Out		
Quantity	1	3
Variant	Female RJ45 connector, shielded	
Type	SDL4	
Electrical properties		
Nominal voltage	24 VDC ±25%, SELV [1]	
Nominal current	Max. 0.3 A	Max. 0.5 A
Overvoltage category per EN 61131-2	II	
Galvanic isolation	Yes	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Degree of protection per EN 60529	IP20	
Ambient conditions		
Temperature		
Operation	0 to 55°C [2]	0 to 45°C [2]
Storage	-20 to 60°C	
Transport	-20 to 60°C	
Relative humidity		
Operation	5 to 90%, non-condensing	
Storage	5 to 95%, non-condensing	
Transport	5 to 95%, non-condensing	
Vibration [3]		
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g peak	
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g peak	
Storage	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g peak / 200 to 500 Hz: 4 g peak	
Transport	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g peak / 200 to 500 Hz: 4 g peak	
Shock [3]		
Operation	15 g peak, 11 ms	
Storage	30 g peak, 6 ms	
Transport	30 g peak, 6 ms	
Elevation		
Operation	Max. 3000 m [2]	
Mechanical properties		
Housing		
Material	Aluminum	
Coating	White	
Dimensions		
Width	40 mm	49 mm
Height	100 mm	
Depth	80 mm	
Weight	Approx. 400 g	Approx. 500 g

1) IEC 61010-2-201 requirements must be observed.
2) The temperature specifications correspond to a specification at 500 meters. The max. ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.
3) Top-hat rail clamp set X20AC0RF1 can also be used for improved installation / vibration resistance.
Vibration testing is performed per EN 60068-2-6. Shock testing is performed per EN 60068-2-27.

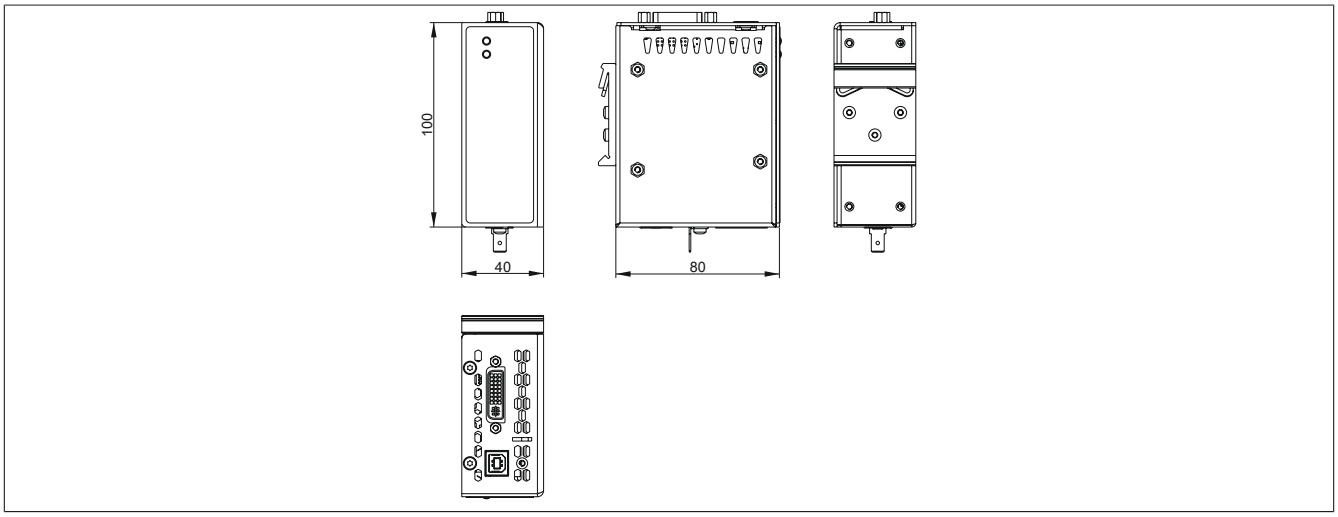
3.6.1.4 Dimensions

Information:

All specifications in dimension diagrams and associated tables are in millimeters [mm].

2D and 3D diagrams (DXF and STEP formats) can be downloaded from the B&R website (www.br-automation.com).

5COSD4.1000-00



5COSD4.1001-00

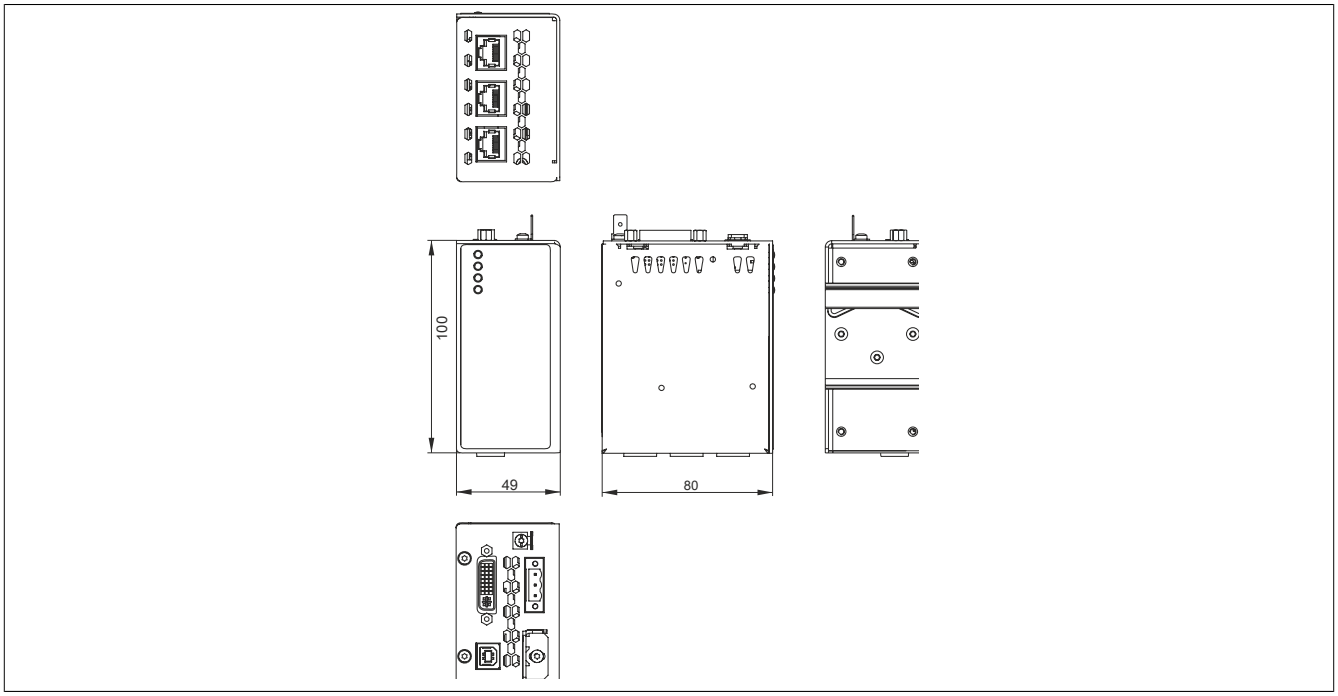


Figure 1: 5COSD4.1001-00 - Dimensions

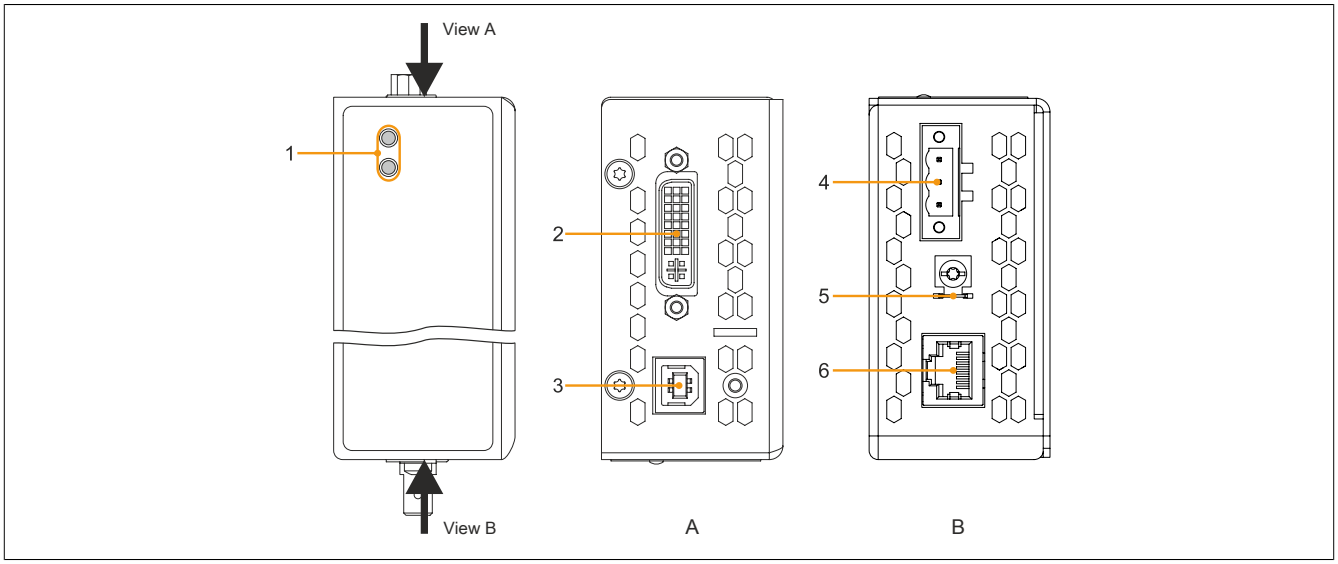
3.6.2 Device interfaces

3.6.2.1 Device interface overview

Information:

The interfaces available on the device or module are numbered for the purpose of clear differentiation. The numbering used by the operating system may deviate, however.

5COSD4.1000-00



Legend			
1	"LED status indicators" on page 24	4	"+24 VDC power supply" on page 21
2	"SDL/DVI In interface" on page 22	5	"Grounding" on page 21
3	"USB In interface" on page 23	6	"SDL4 Out interfaces" on page 23

5COSD4.1001-00

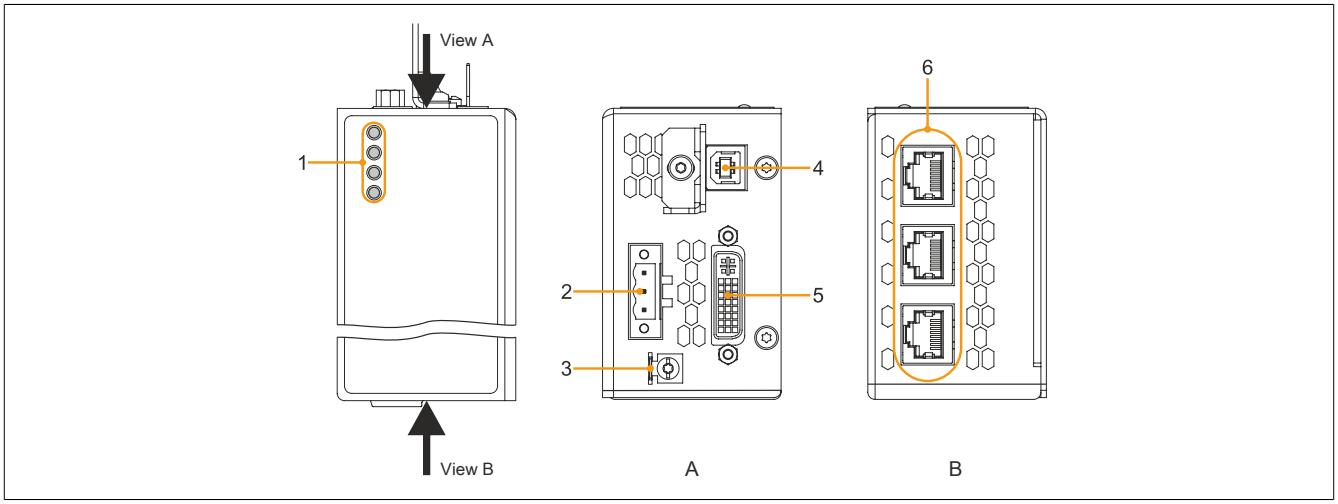


Figure 2: 5COSD4.1001-00 - Device interfaces overview

Legend			
1	"LED status indicators" on page 24	4	"USB In interface" on page 23
2	"+24 VDC power supply" on page 21	5	"SDL/DVI In interface" on page 22
3	"Grounding" on page 21	6	"SDL4 Out interfaces" on page 23

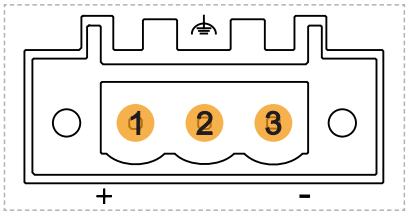
3.6.2.1.1 +24 VDC power supply

Danger!

This device is only permitted to by supplied by a SELV/PELV power supply unit or with safety extra-low voltage (SELV) per IEC 61010-2-201.

The necessary 3-pin connector is not included in delivery; for suitable accessories, see "0TB103.9x" on page 43.

The device is protected against overload and reverse polarity by a soldered fuse (3 A, fast-acting for 5COSD4.1000-00 and 10 A, fast-acting for 5COSD4.1001-00). If the fuse is defective (e.g. after overload), the device must be sent to B&R for repairs. If the polarity is reversed, it is not necessary to replace the fuse.

Pin	Description	Figure
1	+	
2	Functional ground	
3	-	
• Reverse polarity protection • 3-pin • Male		
Electrical properties		
Nominal voltage		24 VDC ±25%, SELV[1)]
Nominal current (5COSD4.1000-00)		Max. 0.3 A
Nominal current (5COSD4.1001-00)		Max. 0.5 A
Overvoltage category per EN 61131-2		II
Galvanic isolation		Yes

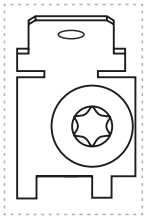
1) IEC 61010-2-201 requirements must be observed.

3.6.2.1.2 Grounding

Caution!

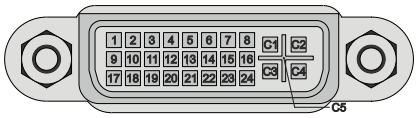
The functional ground (power supply pin 2 and ground connection) must be connected to the central grounding point (e.g. control cabinet or system) via the shortest possible path with the lowest possible resistance and with the largest possible wire cross section. This type of grounding is mandatory for proper functionality.

For example, a copper strip must be attached to the ground connection at a central grounding point of the control cabinet or system in which the device is installed. The wire cross section should be as large as possible (at least 2.5 mm²).



3.6.2.1.3 SDL/DVI In interface

The interface is designed as a DVI-I connector (female) and can be operated with DVI-D or SDL transmission technology.



Pin	Pinout	Description	Pin	Pinout	Description
1	TMDS data 2-	DVI lane 2 (negative)	16	HPD	Hot plug detection
2	TMDS data 2+	DVI lane 2 (positive)	17	TMDS data 0-	DVI lane 0 (negative)
3	TMDS data 2/4 SHIELD	Shield for data pairs 2 and 4	18	TMDS data 0+	DVI lane 0 (positive)
4	SDL-	SDL lane (negative)	19	TMDS data 0/XUSB1 SHIELD	Shield of data pair 0 and USB1
5	SDL+	SDL lane (positive)	20	XUSB1-	USB lane 1 (negative)
6	DDC clock	DDC-based control signal (clock)	21	XUSB1+	USB lane 1 (positive)
7	DDC data	DDC-based control signal (data)	22	TMDS clock shield	Shield of clock pair
8	Not connected	Not connected	23	TMDS clock+	DVI clock (positive)
9	TMDS data 1-	DVI lane 1 (negative)	24	TMDS clock -	DVI clock (negative)
10	TMDS data 1+	DVI lane 1 (positive)	C1	Not connected	Not connected
11	TMDS data 1/XUSB0 SHIELD	Shield of data pair 1 and USB0	C2	Not connected	Not connected
12	XUSB0-	USB lane 0 (negative)	C3	Not connected	Not connected
13	XUSB0+	USB lane 0 (positive)	C4	Not connected	Not connected
14	+5 V power[1)]	+5 V power supply	C5	Not connected	Not connected
15	Ground (return for +5 V, HSync and VSync)	Ground	-	-	

1) Protected internally by a multifuse.

Information:

Hot plugging output devices on the interface for service purposes is supported by the hardware and graphic drivers of approved operating systems. Recalibration may be required for touch screen devices.

A maximum of 100 mating cycles are specified for this interface.

Information:

In SDL operation without USB type A/B cable, the USB transfer rate is limited to USB 1.1.

A USB transfer rate of USB 2.0 is possible in DVI or SDL operation with a USB type A/B cable.

3.6.2.1.3.1 Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment length and maximum resolution depending on the SDL cable:

SDL cable Segment length [m]	Resolution						
	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	HD 1366 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200	FHD 1920 x 1080
0.8	5CASDL.0008-00	5CASDL.0008-00	5CASDL.0008-00	5CASDL.0008-00	5CASDL.0008-00	5CASDL.0008-00	5CASDL.0008-00
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
6	5CASDL.0060-00	5CASDL.0060-00	5CASDL.0060-00	5CASDL.0060-00	5CASDL.0060-00	5CASDL.0060-00	5CASDL.0060-00
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03

3.6.2.1.3.2 Cable lengths and resolutions for DVI transfer

The following table shows the relationship between segment length and maximum resolution depending on the DVI cable:

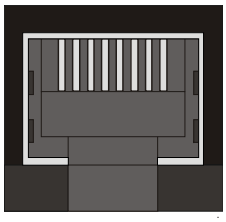
DVI cable Segment length [m]	Resolution						
	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	HD 1366 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200	FHD 1920 x 1080
1.8	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00
5	5CADVI.0050-00	5CADVI.0050-00	5CADVI.0050-00	5CADVI.0050-00	5CADVI.0050-00	5CADVI.0050-00	5CADVI.0050-00

The maximum cable length for DVI transfer is limited to 5 m due to the USB specification.

3.6.2.1.4 SDL4 Out interfaces

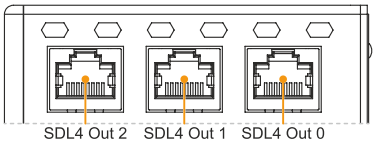
The SDL4 Out interfaces are female RJ45 connectors and operated with SDL4 transmission technology.

1



Quantity and description

- 5COSD4.1000-00: 1 SDL4 output (SDL4 Out)
- 5COSD4.1001-00: 3 SDL4 outputs (SDL4 Out 0-2)



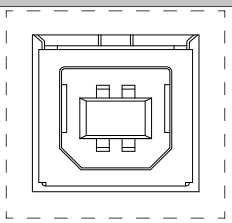
Information:

Hot plugging output devices on the interface for service purposes is supported by the hardware and graphic drivers of approved operating systems. Recalibration may be required for touch screen devices.

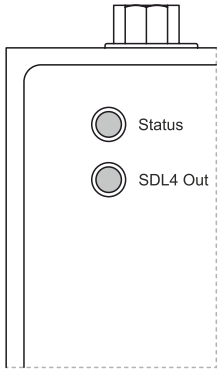
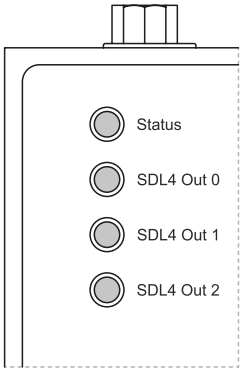
A maximum of 500 mating cycles are specified for this interface.

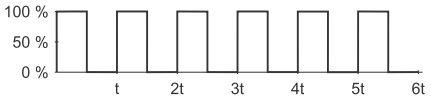
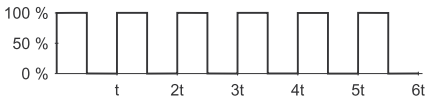
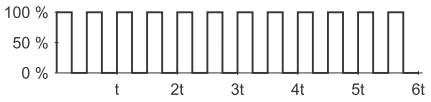
3.6.2.1.5 USB In interface

The USB In interface is a USB 2.0 type B interface that is used to transfer USB data. It must be connected to a USB interface on the output device (e.g. B&R industrial PC) if DVI operation or SDL operation with a USB cable was chosen as the transfer method.
For possible transfer methods, see section "Connection options" on page 11.

USB In interface		
Standard	USB 2.0	
Variant	Type B, female	
Transfer rate	Low speed (1.5 Mbit/s)	
	Full speed (12 Mbit/s)	
	High speed (480 Mbit/s)	
Cable length	Max. 5 m (without hub)	

3.6.2.1.6 LED status indicators

5COSD4.1000-00	5COSD4.1001-00
	

Converter - LED status indicators				
LED	**Color**	**Status**	**Explanation**	**LED status indicator**
Status	Green	On	Device ready for operation	
		Blinking (approx. 1 Hz)	Device ready for operation, but an invalid or incomplete firmware upgrade is indicated. **Information:** **The firmware upgrade must be performed again.**	
	Red	On	Firmware upgrade is in progress.	
5COSD4.1000-00 • SDL4 Out **5COSD4.1001-00** • SDL4 Out 0 • SDL4 Out 1 • SDL4 Out 2	Yellow	On	The SDL and SDL4 connection is established and OK.	
		Off	No active SDL and SDL4 connection.	
		Blinking (approx. 1 Hz)	No active SDL and SDL4 connection, but link partner found. **Information:** **In DVI mode, this LED blinks to indicate limited SDL4 operation.**	
		Blinking (approx. 10 Hz)	Firmware upgrade is in progress.	

3.7 Overview

Order number	Short description	Page
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm²	43
0TB103.91	Connector 24 VDC - 3-pin, female - Cage clamp terminal block 3.31 mm²	43
5ACCRHMI.0011-000	Strain relief USB - For APC2100/APC2200 - For SDL3 Converter/SDL4 Converter	44
	Converter	
5COSD4.1000-00	SDL to SDL4 1x converter	17
5COSD4.1001-00	SDL to SDL4 converter, 3-port	17
	Other	
5ACCRHMI.0006-000	HMI installation tool for control cabinet - 1x torque wrench ESD 0.3 - 1.2 Nm - 1x hex-head bit 2.5, length 89 mm - 1x hex-head bit 3.0, length 89 mm - 1x hex-head bit 5.0, length 89 mm - 1x Torx 10 bit, length 90 mm - 1x Torx 20 bit, length 89 mm	42

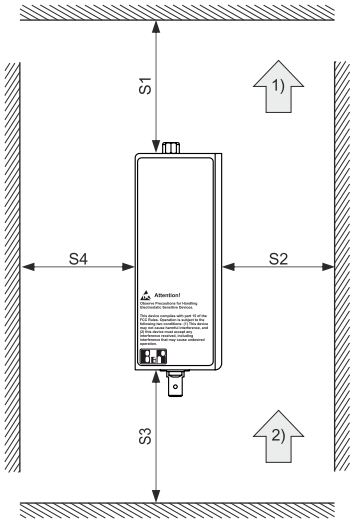
4 Dimensioning

4.1 Spacing for air circulation

To ensure sufficient air circulation, a specified clearance must be provided above, below, to the side and behind the device. For the minimum specified clearance, see the following diagrams. This is valid for all variants.

Information:

The following figure and table exclusively show the thermal view of the complete system. If additional space is required for operating or servicing the device or using accessories (e.g. cable strain relief clips), this must be taken into account during installation.



Legend			
1)	Air outlet	2)	Air inlet
Spacing			
Name	**Minimum spacing [mm]**	**Name**	**Minimum spacing [mm]**
S1	≥ 100	S2	≥ 50
S3	≥ 100	S4	≥ 50

Caution!

The specified spacing for air circulation is based on worst-case operation at the maximum specified ambient temperature. The maximum specified ambient temperature is not permitted to be exceeded!

If the specified spacing for air circulation cannot be maintained, the maximum specified temperatures of the temperature sensors (see "Temperature sensors" on page 27) must be monitored by the user and appropriate measures taken if these values are exceeded.

4.2 Temperature monitoring

Two sensors monitor the temperature values in the SDL4 Converter. The values specified represent the defined maximum temperature at this measuring point. If the temperature is exceeded, no alarm is triggered.

ADI sensors	Max. specified temperature [°C]
SDL4 Converter sensor 1	90
SDL4 Converter sensor 2	100

Table 6: Temperature sensors

4.2.1 Reading temperature values

- The temperatures can be read from approved Microsoft Windows operating systems using the B&R Control Center.

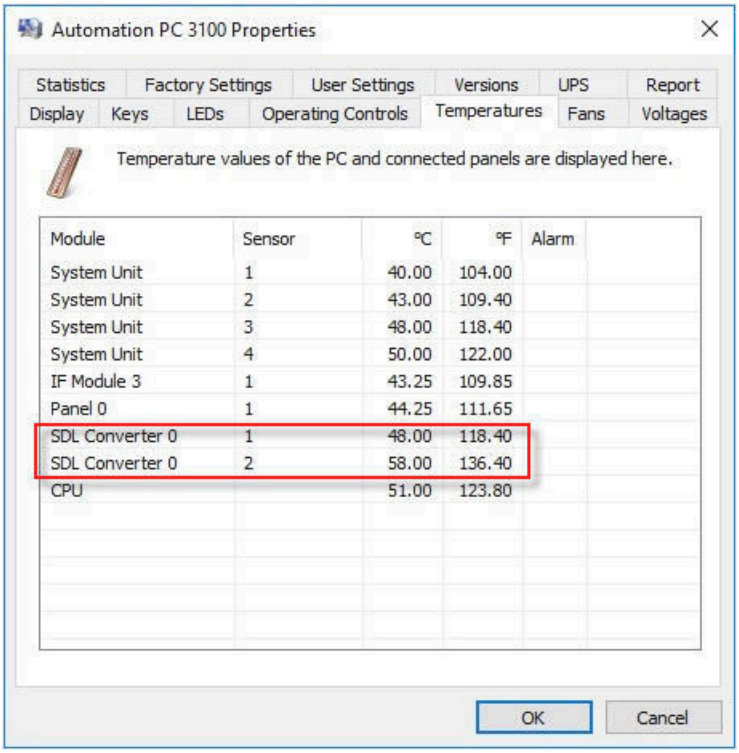


Figure 3: Temperature sensors - SDL4 Converter

- For applications that do not run in approved operating systems, temperatures can be evaluated using the B&R MTCX Development Kit. The B&R MTCX Development Kit also contains executable EFI sample programs.

5 Installation and wiring

5.1 Basic information

A damaged device has unpredictable properties and states. The unintentional installation or startup of a damaged device must be prevented. The damaged device must be marked as such and made inaccessible, or it must be returned for repairs immediately.

Unpacking

The following activities must be performed before unpacking the device:

- Check the packaging for visible transport damage.
- If transport damage is noticeable, document this immediately and submit a complaint. If possible, have the damage confirmed by the carrier/delivery service.
- Check the contents of the shipment for completeness and damage.
- If the contents of the packaging are incomplete, damaged or do not correspond to the order, the responsible sales office or B&R Headquarters must be informed immediately.
- The information in section "Protection against electrostatic discharge" on page 6 must be observed for unpacked devices and components.
- Keep the original packaging for further transport.

Power supply

The following information is generally applicable and should be observed before performing any work on the device:

- The entire power supply must be disconnected before removing any covers or components from the device and installing or removing any accessories, hardware or cables.
- Remove the power cable from the device and from the power supply.
- All covers and components, accessories, hardware and cables must be installed or secured before the device is connected to the power supply and switched on.

Caution!

Energy regeneration is not permitted and can cause damage or the device to become defective. Built-in or connected peripheral devices (e.g. USB hubs) are not permitted to introduce any voltage into the device.

Installation

Information:

Optional sets are available that contain all necessary tools for installation. For additional information about tool sets, see section "Installation accessories" on page 42.

Before installation

The following activities and limitations must be observed before installing the device.

- Allow sufficient space for installation, operation and maintenance of the device.
- The device must be installed on a flat, clean and burr-free surface.
- The wall or control cabinet plate must be able to support four times the total weight of the device. If necessary, bracing must be attached to reinforce the mounting surface.

  #### Caution!

  If the load-bearing capacity of the mounting surface is insufficient, or if the fastening material is inadequate or incorrect, the device may fall and become damaged.

- To avoid overheating, the device is not permitted to be placed near other heat sources.

Information about the device's environment

- Observe the notes and regulations regarding the power supply and functional ground.
- Observer the specified bend radius when connecting cables.
- Ventilation openings are not permitted to be covered or blocked.
- The device is only permitted to be operated in closed rooms and not permitted to be exposed to direct sunlight.
- The climatic and ambient conditions must be taken into account – see the technical data of the converter used.

General installation instructions

- When installed in a closed housing, there must be sufficient volume for air circulation - see "Spacing for air circulation" on page 26.
- When connecting installed or connected peripherals, follow the instructions in the peripheral device's documentation.

Transport and storage

When transporting at low temperatures or in the event of large temperature fluctuations, the collection of moisture in or on the device is not permitted. Moisture can cause short circuits in electrical circuits and damage the device.

If a device is transported or stored without packaging, all environmental influences such as shocks, vibrations, pressure and moisture have an unprotected effect on the device. Damaged packaging indicates that the device has been severely affected by environmental influences and may have been damaged.

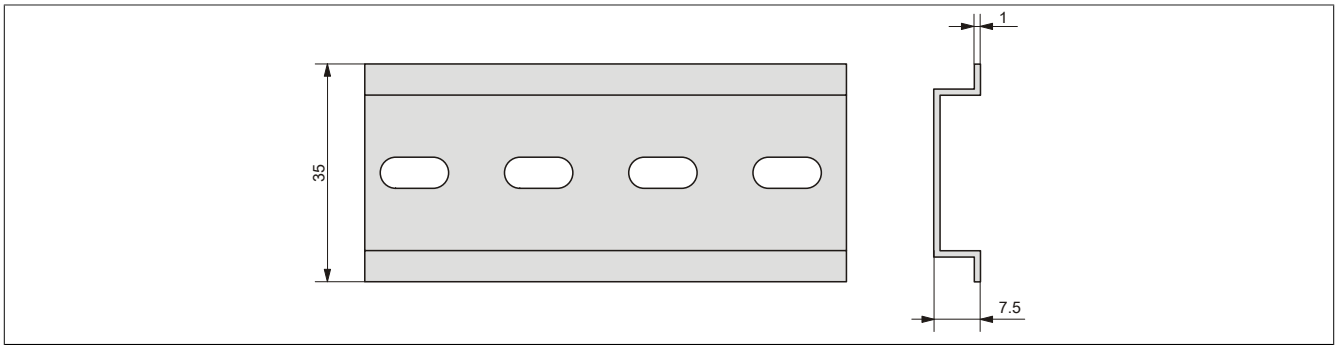
This can result in malfunctions of the device, machine or system.

Use of third-party products

If third-party devices or components are used, the relevant manufacturer's documentation must be observed. If limitations or interactions by or with third-party products are possible, this must be taken into account in the application.

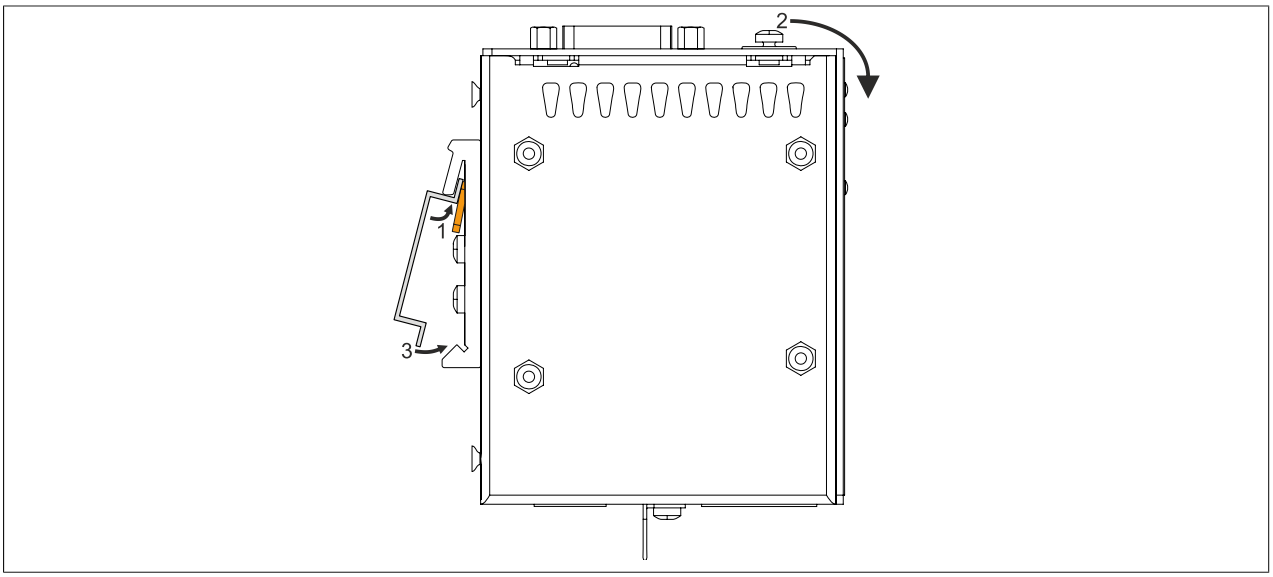
5.2 Installing the SDL4 Converter

The frame on the back of the device allows the system to be installed on a top-hat rail (TS35) that corresponds to the EN 50022 standard.



5.2.1 Procedure

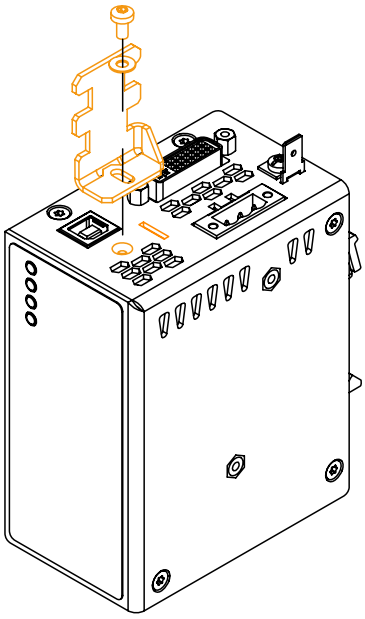
1. Attach the SDL4 Converter in the desired position to the top-hat rail (1) and press down (2) on the device to engage the locking mechanism (3).



5.3 Installing the cable strain relief clip

1. The cable strain relief clip must be positioned on the SDL4 Converter according to the following figure and secured with the supplied locating screws (M3, max. tightening torque 0.5 Nm).

   The cable strain relief clip is only permitted to be installed at the intended location on the device.



2. Secure the connected USB cables to the cable strain relief clip using the cable ties provided.

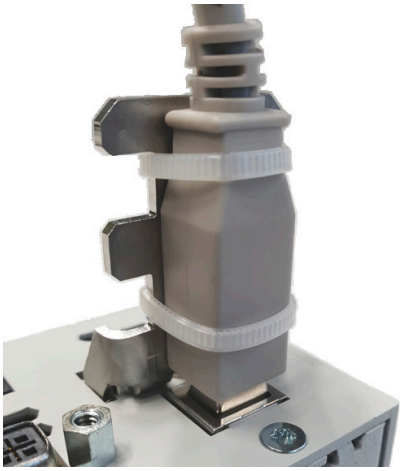


Figure 4: (symbolic image)

5.4 Connecting to the power grid

Danger!

- **The entire power supply must be disconnected and electrostatic discharge must take place on the housing or ground connection before removing any covers or components from the device and installing or removing any accessories, hardware or cables.**
- **Remove the power cable from the device and from the power supply.**
- **All covers and components, accessories, hardware and cables must be installed or secured before the device is connected to the power supply and switched on.**

5.4.1 Installing the DC power cable

Danger!

The entire power supply to the B&R industrial PC or B&R Automation Panel must be interrupted. Before connecting the DC power cable, it must be checked whether it has been disconnected from the voltage source (e.g. power supply unit).

5.4.1.1 Wiring

Caution!

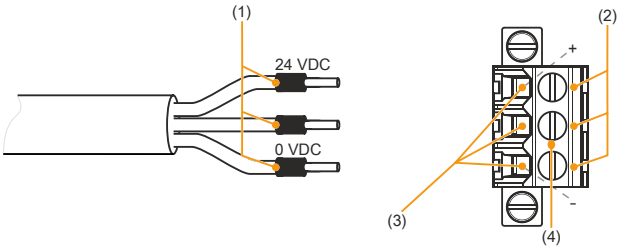
The pinout of the power supply interface must be observed!

The DC power cable must be implemented with a wire cross section of 0.75 mm² to 1.5 mm² and wire end sleeves.

Conductors of the power cable	Terminal connection symbol
+24 VDC	+
GND	⏚
0 VDC	-

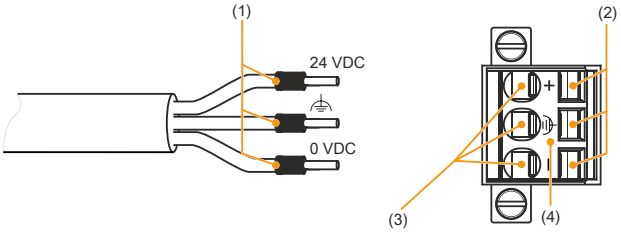
Installing screw clamp terminal block 0TB103.9

Secure the conductors with wire end sleeves ① in the terminal contacts ③ as shown in the figure below and tighten the screw clamp terminals ④ with a screwdriver (max. tightening torque 0.4 Nm). It is important to pay attention to the label on the spring clamp terminal ②.



Installing cage clamp terminal block 0TB103.91

Insert a screwdriver into the cage clamp terminals ③ and secure the conductors with wire end sleeves ① in the terminal contacts ② as shown in the figure below. Close the terminal contact by removing the screwdriver. It is important to pay attention to the label on the spring clamp terminal ④.

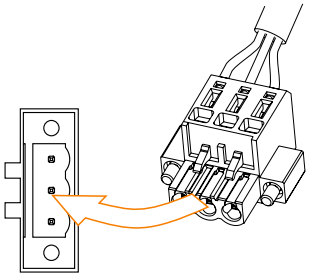


5.4.2 Connecting the power supply to a B&R device

Danger!

The entire power supply to the B&R device must be interrupted. Before connecting the power cable, it must be checked whether it has been disconnected from the voltage source (e.g. power supply unit).

1. Carry out electrostatic discharge on the housing or at the ground connection.
2. Connect the power supply connector to the B&R device and tighten the mounting screws (max. tightening torque 0.5 Nm).



5.4.3 Grounding concept - Functional ground

Functional ground is a current path of low impedance between circuits and ground. It is used to improve immunity to interference, for example, and not as a protective measure. It serves only to divert interference, not to protect against contact with persons.

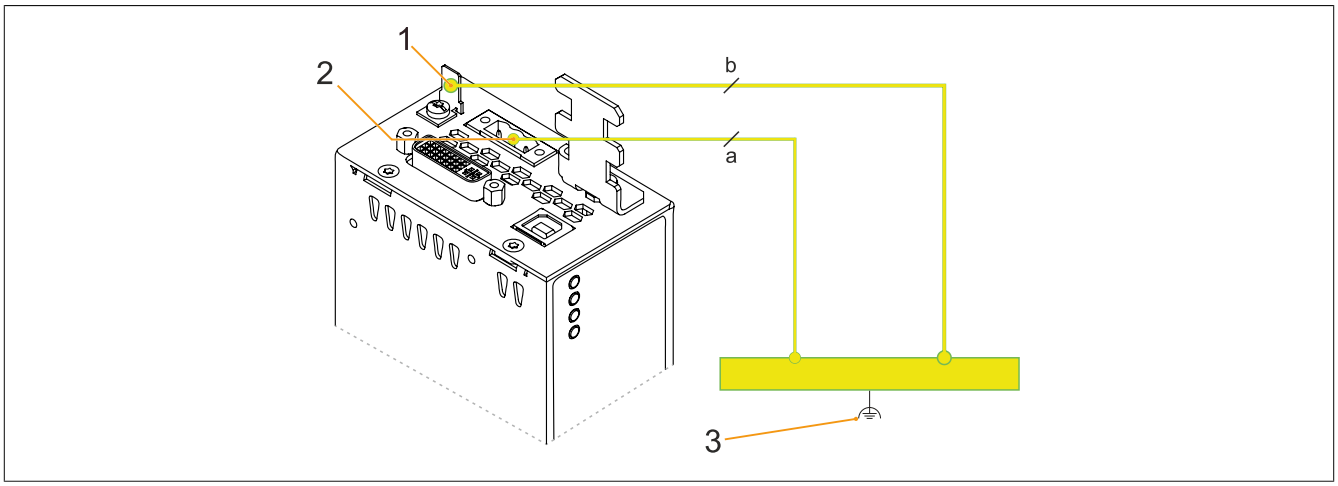
The device is equipped with 2 functional ground connections:

- Functional ground connection of the power supply
- Ground connection

The following points must be observed to ensure that electrical interference is safely diverted:

- Connect the device to the central grounding point (e.g. the control cabinet or the system) using the shortest possible low-resistance path.
- Cable design with at least 2.5 mm² per connection. If a cable with wire end sleeve is used at terminal block 0TB103.9 or 0TB103.91, a cable with a maximum of 1.5 mm² per connection is possible.
- Observe the shielding concept of the conductors. All data cables connected to the device must be shielded.

The functional ground on the B&R device is marked with the following symbol: ⏚



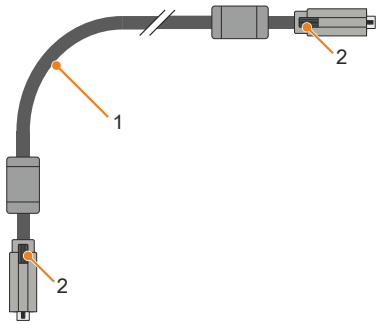
Legend					
1	Ground connection ⏚	2	Power supply connection +24 VDC pin 2	3	Central grounding point
a	At least 1.5 mm²	b	At least 2.5 mm²		-

5.5 Connecting cables

Information:

B&R generally recommends connecting swing arm devices to the Automation PC via SDL4 instead of SDL. The Cat 6 / Cat 7 cables used with SDL4 are much easier to install and connect.

When connecting or installing cables, the bend radius specification must be observed. For this specification, see the technical data of the respective cable.
The maximum tightening torque of the locating screws is 0.5 Nm.

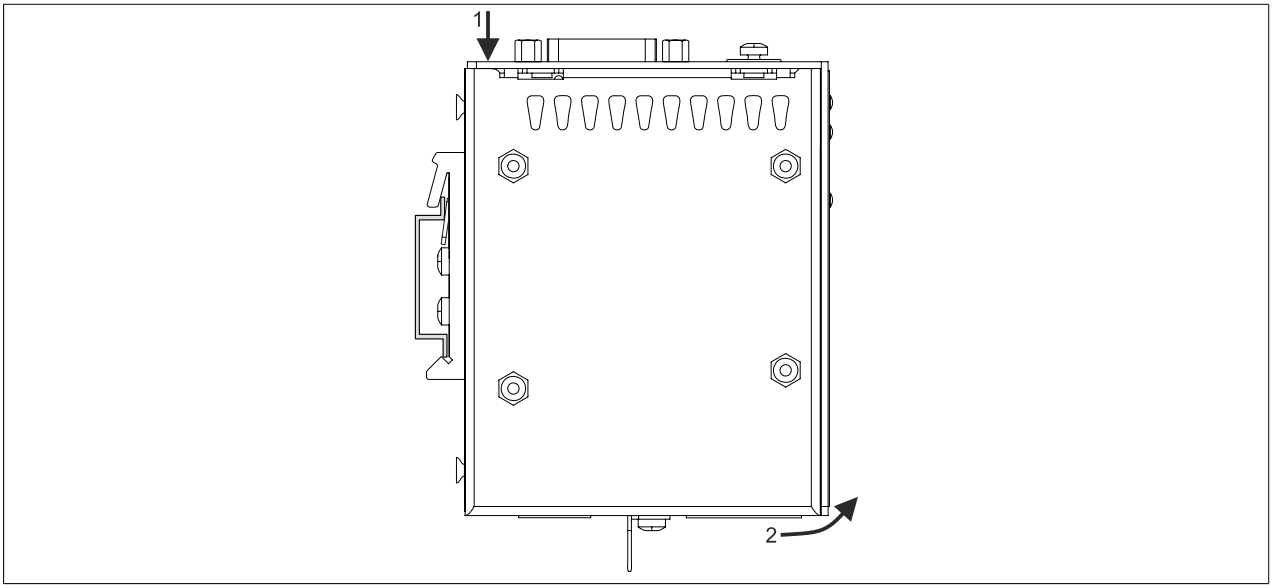


1) Bend radius
2) Locating screws

5.6 Removing the SDL4 Converter

5.6.1 Procedure

1. Pull the SDL4 Converter downwards (1) and slightly in the opposite direction away from the top-hat rail (2). This releases the locking mechanism for the top-hat rail installation.



6 Commissioning

6.1 Switching on the device for the first time

6.1.1 General information before switching on the device

Checklist

Before the device is started up for the first time, the following points must be checked:

- Have the installation instructions been observed as described in "Installation and wiring" on page 28?
- Have the permissible ambient conditions and environmental conditions for the device been taken into account?
- Is the power supply connected correctly and have the values been checked?
- Is the ground cable correctly connected to the ground connection?
- Before installing additional hardware, the device must have been started up.

> **Caution!**
>
> **Before the device is started up, it must be gradually adapted to room temperature! Exposure to direct heat radiation is not permitted.**
>
> **When transporting at low temperatures or in the event of large temperature fluctuations, the collection of moisture in or on the device is not permitted.**
>
> **Moisture can cause short circuits in electrical circuits and damage the device.**

Requirements

The following criteria must be met before switching on the device for the first time:

- The functional ground connections are as short as possible and connected to the central grounding point using the largest possible wire cross section.
- All connection cables are connected correctly.
- An Automation PC or Panel PC and Automation Panel are connected.

6.1.2 Switching on the SDL4 Converter

Procedure

1. Connect the power supply and switch it on.
2. The device is operating.

7 Software

7.1 Upgrade information

> **Warning!**
>
> **The BIOS and firmware on B&R devices must always be kept up to date. New versions can be downloaded from the B&R website (www.br-automation.com).**

7.1.1 Firmware upgrade

To upgrade the firmware, an APC910/PPC900, APC2200 or APC3100/PPC3100 with compatible MTCX firmware must be connected in addition to an Automation Panel with an SDL4 link module.

A current firmware upgrade can be downloaded directly from the Downloads section of the B&R website (www.br-automation.com).

For detailed information regarding this procedure, see the "Readme" file included with the firmware upgrade.

8 Maintenance

The following chapter describes the maintenance work that can be carried out by a qualified and trained end user.

Information:

Only components approved by B&R are permitted to be used for maintenance work.

8.1 Repairs/Complaints and replacement parts

Danger!

Unauthorized opening or repair of a device may result in personal injury and/or serious damage to property. Repairs are therefore only permitted to be carried out by authorized qualified personnel at the manufacturer's premises.

To process a repair/complaint, a repair order or complaint must be created via the B&R Material Return Portal on the B&R website (www.br-automation.com).

9 International and national certifications

9.1 Directives and declarations

9.1.1 CE marking

All directives applicable to the respective product and their harmonized EN standards are met.

9.1.2 EMC Directive

The products meet the requirements of EU directive "Electromagnetic compatibility 2014/30/EU" and are designed for industrial applications:

EN 61131-2:2007	Programmable controllers - Part 2: Equipment requirements and tests
EN 61000-6-2:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4:2007	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

Information:

The declarations of conformity are available on the B&R website under Declarations of conformity.

9.2 Certifications

Danger!

A complete system can only receive certification if all individual components installed and connected in it have the corresponding certifications. If an individual component is used that does not have the corresponding certification, the complete system will also not be certified.

B&R products and services comply with applicable standards. These are international standards from organizations such as ISO, IEC and CENELEC, as well as national standards from organizations such as UL, CSA, FCC, VDE, ÖVE, etc. We pay special attention to the reliability of our products in the industrial sector.

Information:

The certifications valid for the respective product are available on the website and in the user's manual under the technical data in section "Certifications" or in the associated certificates.

9.2.1 UL certification

Ind. Cont. Eq.
E115267

Products with this mark are tested by Underwriters Laboratories and listed as "industrial control equipment". The mark is valid for the USA and Canada and facilitates the certification of your machines and systems in this economic area.

Underwriters Laboratories (UL) per standards UL 61010-1 and UL 61010-2-201
Canadian (CSA) standard per C22.2 No. 61010-1-12 and CSA C22.2 No. 61010-2-201:14

The UL certificates are available on the B&R website under Downloads - Certificates - UL.

When using industrial control equipment per UL 61010-1 / UL 61010-2-201, make sure that the device is classified as "open type". The prerequisite for certification or operation per UL 61010-1 / UL 61010-2-201 is therefore the installation of the device in an appropriate protective housing.

9.2.2 EAC

Products with this mark are tested by an accredited test laboratory and permitted to be imported into the Eurasian Customs Union (based on EU conformity).

9.2.3 KC

Products with this mark are tested by an accredited test laboratory and permitted to be introduced into the Korean market (based on EU conformity).

9.2.4 RCM

Products with this mark are tested by an accredited test laboratory and certified by the ACMA. The mark is valid for Australia/Oceania and facilitates the certification of your machines and systems in this economic area (based on EU conformity).

10 Accessories

The following accessories have undergone functional testing by B&R in connection with the device used and can be operated with this device. Possible limitations regarding operation with individual components other than the complete system must be taken into account, however. All individual specifications of the components must be observed when operating the complete system.

All components listed in this manual have undergone intensive system and compatibility testing and been approved accordingly. B&R cannot assume any functional warranty for accessories that have not been approved.

10.1 General accessories

The following accessories can be ordered for the Automation PC, Panel PC link modules and converters:

- Grounding clip
- Cable strain relief clip for USB (see "Cable strain relief clip" on page 44)

10.1.1 Accessories - Order data

Material number	Description
5ACCRHMI.0000-000	REP HMI grounding clip
5ACCRHMI.0011-000	REP strain relief USB - For APC2100/APC2200 - For SDL3 Converter/SDL4 Converter

10.2 Installation accessories

Suitable tool sets can be ordered to easily install B&R industrial PCs and converters.

- ESD-protected
- Screwdriver with quick-change chuck
- Consisting of:

  5ACCRHMI.0006-000

  - 1x torque screwdriver: 0.3 to 1.2 Nm
  - 1x bit set (5 pieces): Hex recess (2.5 mm, 3.0 mm, 5.0 mm), Torx (T10, T20)

10.2.1 Order data

Order number	Short description	Figure
	Other	
5ACCRHMI.0006-000	HMI installation tool for control cabinet - 1x torque wrench ESD 0.3 - 1.2 Nm - 1x hex-head bit 2.5, length 89 mm - 1x hex-head bit 3.0, length 89 mm - 1x hex-head bit 5.0, length 89 mm - 1x Torx 10 bit, length 90 mm - 1x Torx 20 bit, length 89 mm	

10.3 Cables

For additional information about compatible cables, see the B&R website (HMI cable manual).

10.4 0TB103.9x

10.4.1 General information

1-row 3-pin terminal block 0TB103 is used for the power supply.

10.4.2 Order data

Order number	Short description	Figure
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm²	
0TB103.91	Connector 24 VDC - 3-pin, female - Cage clamp terminal block 3.31 mm²	

10.4.3 Technical data

> **Information:**
>
> **The following specified characteristic data, features and limit values are only valid for this accessory and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this accessory is installed, for example.**

Order number	0TB103.9	0TB103.91
General information		
Certifications		
CE	Yes	
UL	cULus E115267 Industrial control equipment	
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4 [1]	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4 [2]
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck) [3]	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck) [4]
KR	Yes	
EAC	Yes	
Terminal block		
Note	Protected against vibration by the screw flange Nominal values according to UL	Protected against vibration by the screw flange Nominal data per UL
Number of pins	3 (female)	
Type of terminal block	Screw clamp terminal block	Cage clamp terminal block variant [5]
Cable type	Only copper wires (no aluminum wires!)	
Pitch	5.08 mm	
Connection cross section		
AWG wire	26 to 14 AWG	26 to 12 AWG
Wire end sleeves with plastic covering	0.20 to 1.50 mm²	
Solid wires	0.20 to 2.50 mm²	
Fine-stranded wires	0.20 to 1.50 mm²	0.20 to 2.50 mm²
With wire end sleeves	0.20 to 1.50 mm²	
Tightening torque	0.4 Nm	-
Electrical properties		
Nominal voltage	300 V	
Nominal current [6]	10 A / contact	
Contact resistance	≤5 mΩ	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	

1) Yes, although applies only if all components installed within the complete system have this certification and the complete system itself carries the corresponding mark.
2) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
3) Yes, although applies only if all components installed in the complete system have this certification and are listed on the associated DNV GL certificate for the product family.
4) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV GL certificate for the product family.
5) The cage clamp terminal block cannot be used side by side.
6) The limit data for each I/O module must be taken into consideration.

10.5 Cable strain relief clip

10.5.1 General information

A cable strain relief clip is available for the SDL4 Converter.

The locating screws and cable ties required for installation on the device are included in delivery. For details about installation, see "Installing the cable strain relief clip" on page 31.

10.5.2 Order data

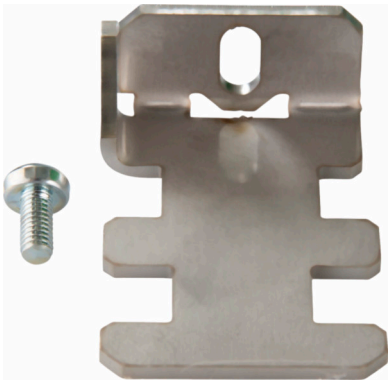
Order number	Short description	Figure
	Accessories	
5ACCRHMI.0011-000	Strain relief USB - For APC2100/APC2200 - For SDL3 Converter/SDL4 Converter	

Table 10: 5ACCRHMI.0011-000 - Order data

10.5.3 Technical data

Order number	5ACCRHMI.0011-000
General information	
Certifications	
CE	Yes
Mechanical properties	
Material	Stainless steel
Dimensions	
Width	24.5 mm
Length	37 mm (including length overhang)
Height	12 mm
Weight	15 g
Locating screws	
Quantity	1

Table 11: 5ACCRHMI.0011-000 - Technical data

11 Environmentally friendly disposal

All programmable logic controllers, operating and monitoring devices and uninterruptible power supplies from B&R are designed to have as little impact on the environment as possible.

11.1 Separation of materials

To ensure that devices can be recycled in an environmentally friendly manner, it is necessary to separate out the different materials.

Component	Disposal
Programmable logic controllers Operating and monitoring devices Uninterruptible power supplies Batteries and rechargeable batteries Cables	Electronics recycling
Paper/Cardboard packaging	Paper/Cardboard recycling
Plastic packaging material	Plastic recycling

Disposal must be carried out in accordance with applicable legal regulations.