

Automation Panel 1000

User's manual

Version: **0.50 PRELIMINARY (November 2015)**
Model no.: **MAAP1000-ENG**

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Chapter 1 • General information

1 Manual history

| Version | Date | Change |
|------------------|------------|---|
| 0.10 PRELIMINARY | 2015-06-11 | <ul style="list-style-type: none"> First version |
| 0.20 PRELIMINARY | 2015-06-29 | <ul style="list-style-type: none"> Updated the following display units: <ul style="list-style-type: none"> "5AP1120.0573-000" on page 58 "5AP1120.0702-000" on page 62 "5AP1120.1043-000" on page 66 "5AP1120.1214-000" on page 74 "5AP1120.1906-000" on page 84 "5AP1151.0573-000" on page 60 "5AP1180.1043-000" on page 68 "5AP1181.1043-000" on page 70 "5AP1182.1043-000" on page 72 |
| 0.30 PRELIMINARY | 2015-09-16 | <ul style="list-style-type: none"> Updated the following display units: <ul style="list-style-type: none"> "5AP1120.101E-000" on page 64 "5AP1120.121E-000" on page 76 "5AP1120.156B-000" on page 82 Updated data in sections "Mechanical characteristics", "Environmental characteristics" and "Electrical characteristics". |
| 0.40 PRELIMINARY | 2015-10-12 | <ul style="list-style-type: none"> Updated information about complete system, see "Mechanical characteristics", "Environmental characteristics" and "Electrical characteristics". |
| 0.50 PRELIMINARY | 2015-11-02 | <ul style="list-style-type: none"> Modified technical data for "5AP1120.121E-000" on page 76 display unit. Updated information about complete system, see "Environmental characteristics". |

2 Safety guidelines

2.1 Intended use

Programmable logic controllers (PLCs), operating/monitoring devices (industrial PCs, Power Panels, Mobile Panels, etc.) and B&R uninterruptible power supplies have been designed, developed and manufactured for conventional use in industrial environments. They were not designed, developed and manufactured for any use involving serious risks or hazards that could lead to death, injury, serious physical damage or loss of any kind without the implementation of exceptionally stringent safety precautions. In particular, such risks and hazards include the use of these devices to monitor nuclear reactions in nuclear power plants, their use in flight control or flight safety systems as well as in the control of mass transportation systems, medical life support systems or weapons systems.

2.2 Protection against electrostatic discharge

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

2.2.1 Packaging

- **Electrical components with a housing**
...do not require special ESD packaging but must be handled properly (see "Electrical components with a housing").
- **Electrical components without a housing**
...are protected by ESD-suitable packaging.

2.2.2 Guidelines for proper ESD handling

Electrical components with a housing

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

Electrical components without a housing

The following applies in addition to the points listed under "Electrical components with a housing":

- Any persons handling electrical components or devices with installed electrical components must be grounded.
- Components are only permitted to be touched on their narrow sides or front plate.
- Components should always be stored in a suitable medium (ESD packaging, conductive foam, etc.). Metallic surfaces are not suitable storage surfaces!
- Components should not be subjected to electrostatic discharge (e.g. through the use of charged plastics).
- Ensure a minimum distance of 10 cm from monitors and TV sets.
- Measuring instruments and equipment must be grounded.
- Probes on potential-free measuring instruments must be discharged on sufficiently grounded surfaces before taking measurements.

Individual components

- ESD protective measures for individual components are thoroughly integrated at B&R (conductive floors, footwear, arm bands, etc.).
- These increased ESD protective measures for individual components are not necessary for customers handling B&R products.

2.3 Policies and procedures

Electronic devices are never completely failsafe. If the programmable control system, operating/monitoring device or uninterruptible power supply fails, the user is responsible for ensuring that other connected devices, e.g. motors, are brought to a secure state.

When using programmable logic controllers or operating/monitoring devices as control systems together with a soft PLC (e.g. B&R Automation Runtime or comparable product) or slot PLC (e.g. B&R LS251 or comparable product), safety precautions relevant to industrial control systems (e.g. the provision of safety devices such as emergency stop circuits, etc.) must be observed in accordance with applicable national and international regulations. The same applies for all other devices connected to the system, such as drives.

All tasks such as the installation, commissioning and servicing of devices are only permitted to be carried out by qualified personnel. Qualified personnel are those familiar with the transport, mounting, installation, commissioning and operation of devices who also have the appropriate qualifications (e.g. IEC 60364). National accident prevention regulations must be observed.

The safety notices, connection descriptions (type plate and documentation) and limit values listed in the technical data are to be read carefully before installation and commissioning and must be observed.

2.4 Transport and storage

During transport and storage, devices must be protected against undue stress (mechanical loads, temperature, moisture, corrosive atmospheres, etc.).

2.5 Installation

- These devices are not ready for use upon delivery and must be installed and wired according to the specifications in this documentation in order for the EMC limit values to apply.
- Installation must be performed according to this documentation using suitable equipment and tools.
- Devices are only permitted to be installed by qualified personnel without voltage applied. Before installation, voltage to the control cabinet must be switched off and prevented from being switched on again.
- General safety guidelines and national accident prevention regulations must be observed.
- Electrical installation must be carried out in accordance with applicable guidelines (e.g. line cross sections, fuses, protective ground connections).

2.6 Operation

2.6.1 Protection against touching electrical parts

To operate programmable logic controllers, operating and monitoring devices, and uninterruptible power supplies, certain components must carry dangerous voltage levels. Touching one of these parts can result in a life-threatening electric shock. This could lead to death, severe injury or damage to equipment.

Before turning on the programmable logic controller, operating/monitoring devices or uninterruptible power supply, the housing must be properly grounded (PE rail). Ground connections must be established even when testing or operating operating/monitoring devices or the uninterruptible power supply for a short time!

Before turning the device on, all parts that carry voltage must be securely covered. During operation, all covers must remain closed.

2.6.2 Environmental conditions - Dust, moisture, corrosive gases

The use of operating/monitoring devices (e.g. industrial PCs, Power Panels, Mobile Panels, etc.) and uninterruptible power supplies in very dusty environments should be avoided. Dust collection on the devices can affect functionality and may prevent sufficient cooling, especially in systems with active cooling systems (fans).

The presence of corrosive gases can also lead to malfunctions. When combined with high temperature and humidity, corrosive gases – e.g. with sulfur, nitrogen and chlorine components – can induce chemical reactions that can damage electronic components very quickly. Signs of the presence of corrosive gases are blackened copper surfaces and cable ends on existing equipment.

For operation in dusty or moist conditions, correctly installed (e.g. cutout installations) operating/monitoring devices like the Automation Panel or Power Panel are protected on the front. The back of all devices must be protected from dust and moisture and cleaned at suitable intervals.

2.6.3 Viruses and dangerous programs

This system is subject to potential risk each time data is exchanged or software is installed from a data medium (e.g. diskette, CD-ROM, USB flash drive, etc.), a network connection or the Internet. The user is responsible for assessing these dangers, implementing preventive measures such as virus protection programs, firewalls, etc. and making sure that software is only obtained from trusted sources.

2.7 Environmentally friendly disposal

All B&R programmable controllers, operating/monitoring devices and uninterruptible power supplies are designed to inflict as little harm as possible on the environment.

2.7.1 Separation of materials

It is necessary to separate different materials so the device can undergo an environmentally friendly recycling process.

| Component | Disposal |
|--|---------------------------------|
| Programmable logic controllers Operating/Monitoring devices Uninterruptible power supply Batteries and rechargeable batteries Cables | Electronics recycling |
| Cardboard box / Paper packaging | Cardboard box / Paper recycling |
| Plastic packaging | Plastic recycling |

Table 1: Environmentally friendly separation of materials

Disposal must comply with applicable legal regulations.

3 Organization of safety notices

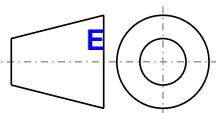
Safety notices in this manual are organized as follows:

| Safety notice | Description |
|---------------|--|
| Danger! | Disregarding these safety guidelines and notices can be life-threatening. |
| Warning! | Disregarding these safety guidelines and notices can result in severe injury or substantial damage to equipment. |
| Caution! | Disregarding these safety guidelines and notices can result in injury or damage to equipment. |
| Information: | This information is important for preventing errors. |

Table 2: Description of the safety notices used in this documentation

4 Guidelines

European dimension standards apply to all dimension diagrams in this document.



All dimensions are specified in mm.

| Range of nominal sizes | General tolerance according to DIN ISO 2768 (medium) |
|------------------------|--|
| Up to 6 mm | ±0.1 mm |
| For 6 to 30 mm | ±0.2 mm |
| For 30 to 120 mm | ±0.3 mm |
| For 120 to 400 mm | ±0.5 mm |
| For 400 to 1000 mm | ±0.8 mm |

Table 3: Range of nominal sizes

5 Overview

| Product ID | Short description | on page |
|---------------------------------------|---|---------|
| DVI cables | | |
| 5CADVI.0018-00 | DVI-D cable - 1.8 m | 116 |
| 5CADVI.0050-00 | DVI-D cable - 5 m | 116 |
| 5CADVI.0100-00 | DVI-D cable - 10 m | 116 |
| Display units | | |
| 5AP1120.0573-000 | Automation Panel 5.7" VGA TFT - 640 x 480 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - For PPC2100 / Link modules - Installation compatible with 5PP520.0573-00 | 58 |
| 5AP1120.0702-000 | Automation Panel 7.0" WVGA TFT - 800 x 480 pixels (16:10) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - For PPC2100 / Link modules - Installation compatible with 5PP520.0702-00 | 62 |
| 5AP1120.101E-000 | Automation Panel 10.1" WXGA TFT - 1280 x 800 pixels (16:10) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - For PPC2100 / Link modules | 64 |
| 5AP1120.1043-000 | Automation Panel 10.4" VGA TFT - 640 x 480 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP520.1043-00 | 66 |
| 5AP1120.1214-000 | Automation Panel 12.1" SVGA TFT - 800 x 600 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP520.1214-00 | 74 |
| 5AP1120.121E-000 | Automation Panel 12.1" WXGA TFT - 1280 x 800 pixels (16:10) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - For PPC2100 / Link modules | 76 |
| 5AP1120.1505-000 | Automation Panel 15.0" XGA TFT - 1024 x 768 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP520.1505-00/5AP920.1505-01/5PC720.1505-xx/5PC820.1505-00 | 78 |
| 5AP1120.156B-000 | Automation Panel 15.6" HD TFT - 1366 x 768 pixels (16:9) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - For PPC900 / PPC2100 / Link modules | 82 |
| 5AP1120.1906-000 | Automation Panel 19.0" SXGA TFT - 1280 x 1024 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - For PPC900 / PPC2100 / Link modules - Installation compatible with 5AP920.1906-01/5PC720.1906-00/5PC820.1906-00 | 84 |
| 5AP1151.0573-000 | Automation Panel 5.7" VGA TFT - 640 x 480 pixels (4:3) - Control cabinet installation - Portrait format - 22 function keys and 20 system keys - For PPC2100 / Link modules - Installation compatible with 5PP551.0573-00 | 60 |
| 5AP1180.1043-000 | Automation Panel 10.4" VGA TFT - 640 x 480 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - 22 function keys - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP580.1043-00/5AP980.1043-01 | 68 |
| 5AP1180.1505-000 | Automation Panel 15.0" XGA TFT - 1024 x 768 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - 32 function keys - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP580.1505-00/5AP980.1505-01 | 80 |
| 5AP1181.1043-000 | Automation Panel 10.4" VGA TFT - 640 x 480 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Portrait format - Front USB interface - 38 function keys and 20 system keys - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP581.1043-00/5AP981.1043-01/5PC781.1043-00 | 70 |
| 5AP1182.1043-000 | Automation Panel 10.4" VGA TFT - 640 x 480 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - 44 function keys and 20 system keys - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP582.1043-00/5AP982.1043-01/5PC782.1043-00 | 72 |
| Link modules | | |
| 5DLSD3.1001-00 | Automation Panel Link module - SDL3 Receiver - For Automation Panel 923/933/1000 | 87 |
| 5DLSDL.1001-00 | Automation Panel Link module SDL/DVI - Receiver - For Automation Panel 923/933/1000 | 86 |
| RS232 cables | | |
| 9A0014.02 | RS232 extension cable for remote operation of a display unit with touch screen, 1.8 m | 136 |
| 9A0014.05 | RS232 extension cable for remote operation of a display unit with touch screen, 5 m | 136 |
| 9A0014.10 | RS232 extension cable for remote operation of a display unit with touch screen, 10 m | 136 |
| SDL cables | | |
| 5CASDL.0008-00 | SDL cable - 0.8 m | 119 |
| 5CASDL.0018-00 | SDL cable - 1.8 m | 119 |
| 5CASDL.0050-00 | SDL cable - 5 m | 119 |
| 5CASDL.0100-00 | SDL cable - 10 m | 119 |
| 5CASDL.0150-00 | SDL cable - 15 m | 119 |
| 5CASDL.0200-00 | SDL cable - 20 m | 119 |
| 5CASDL.0250-00 | SDL cable - 25 m | 119 |
| 5CASDL.0300-00 | SDL cable - 30 m | 119 |
| SDL cables with 45° connectors | | |
| 5CASDL.0018-01 | SDL cable - 45 degree connection - 1.8 m | 122 |
| 5CASDL.0050-01 | SDL cable - 45 degree connection - 5 m | 122 |
| 5CASDL.0100-01 | SDL cable - 45 degree connection - 10 m | 122 |
| 5CASDL.0150-01 | SDL cable - 45 degree connection - 15 m | 122 |
| SDL flex cables | | |
| 5CASDL.0018-03 | SDL flex cable - 1.8 m | 125 |
| 5CASDL.0050-03 | SDL flex cable - 5 m | 125 |
| 5CASDL.0100-03 | SDL flex cable - 10 m | 125 |
| 5CASDL.0150-03 | SDL flex cable - 15 m | 125 |
| 5CASDL.0200-03 | SDL flex cable - 20 m | 125 |
| 5CASDL.0250-03 | SDL flex cable - 25 m | 125 |
| 5CASDL.0300-03 | SDL flex cable - 30 m | 125 |
| 5CASDL.0300-13 | SDL flex cable with extender - 30 m | 128 |
| 5CASDL.0400-13 | SDL flex cable with extender - 40 m | 128 |
| 5CASDL.0430-13 | SDL flex cable with extender - 43 m | 128 |
| SDL3 cables | | |
| 5CASD3.0050-00 | SDL3 cable - 5 m | 132 |

| Product ID | Short description | on page |
|------------------------|--|---------|
| 5CASD3.0100-00 | SDL3 cable - 10 m | 132 |
| 5CASD3.0150-00 | SDL3 cable - 15 m | 132 |
| 5CASD3.0200-00 | SDL3 cable - 20 m | 132 |
| 5CASD3.0300-00 | SDL3 cable - 30 m | 132 |
| 5CASD3.0500-00 | SDL3 cable - 50 m | 132 |
| 5CASD3.1000-00 | SDL3 cable - 100 m | 132 |
| Terminal blocks | | |
| OTB103.9 | Connector 24 VDC - 3-pin female - Screw clamps 3.31 mm ² | 112 |
| OTB103.91 | Connector 24 VDC - 3-pin female - Cage clamp terminal block 3.31 mm ² | 112 |
| USB accessories | | |
| 5MMUSB.2048-01 | USB 2.0 flash drive, 2048 MB, B&R | 114 |
| 5MMUSB.4096-01 | USB 2.0 flash drive, 4096 MB, B&R | 114 |
| USB cables | | |
| 5CAUSB.0018-00 | USB 2.0 connection cable - Type A - Type B connector - 1.8 m | 135 |
| 5CAUSB.0050-00 | USB 2.0 connection cable - Type A - Type B connector - 5 m | 135 |

Chapter 2 • Technical data

1 Introduction

1.1 About this user's manual

This user's manual contains all relevant information about an operational Automation Panel 1000 cabinet-mounted device.

This user's manual applies to the modular Automation Panel 1000 product generation. Information about Automation Panel 920, 980, 981 and 982 systems can be found in the Automation Panel 900 user's manual. Information about Automation Panel 9x3 systems can be found in the Automation Panel 9x3 user's manual.

1.2 Description of individual modules

1.2.1 AP1000 display units

Available in a wide variety of sizes with touch screen and keys, AP1000 display units are a core building block of the Automation Panel 1000, Panel PC 900 and Panel PC 2100 system families. These display units can be operated exclusively as a complete system together with a link module (Automation Panel 1000) or CPU board and system unit (Panel PC 900, Panel PC 2100).



1.2.2 Link modules

Link modules have various graphics interfaces and connections. An operational Automation Panel 9x3 or Automation Panel 9x3 is put together by installing a link module onto a display unit. Automation Panel systems are mounted using retaining clips.

A link module cannot function without a display unit.



1.3 System components / Configuration

Automation Panel 1000, Panel PC 900 and Panel PC 2100 systems can be assembled to meet individual requirements and operating conditions. Automation Panel 1000, Panel PC 900 and Panel PC 2100 systems are so flexible that an Automation Panel can be converted to a Panel PC, or vice versa.

1.3.1 Configuration

The following components are required for operation as an Automation Panel 1000:

- Display unit
- Link module

| Configuration - Base system | | | | | | | |
|-----------------------------|--------------------------|--|---|---|--|--|---|
| Display units | Select 1 | Display size | Resolution | Touch screen | Keys | Format | |
| | Display unit 1120 | 5AP1120.0573-000 5AP1120.0702-000 5AP1120.1043-000 5AP1120.101E-000 5AP1120.1214-000 5AP1120.121E-000 5AP1120.1505-000 5AP1120.156B-000 5AP1120.1906-000 | 5.7" 7.0" 10.4" 10.1" 12.1" 12.1" 15.0" 15.6" 19.0" | VGA WVGA VGA WXGA SVGA WXGA XGA HD SXGA | Single-touch Single-touch Single-touch Single-touch Single-touch Single-touch Single-touch Single-touch Single-touch | No No No No No No No No No | Landscape Landscape Landscape Landscape Landscape Landscape Landscape Landscape Landscape |
| | Display unit 1151 | 5AP1151.0573-000 | 5.7" | VGA | No | Yes | Portrait |
| | Display unit 1180 | 5AP1180.1043-000 5AP1180.1505-000 | 10.4" 15.0" | VGA XGA | Single-touch Single-touch | Yes Yes | Landscape Landscape |
| | Display unit 1181 | 5AP1181.1043-000 | 10.4" | VGA | Single-touch | Yes | Portrait |
| | Display unit 1182 | 5AP1182.1043-000 | 10.4" | VGA | Single-touch | Yes | Landscape |
| | Link modules | Select 1 | | | | | |
| | Terminal blocks | Select 1 | Power connectors 0TB103.9 0TB103.91 | | | | |

Figure 1: Automation Panel 1000 - Configuration

2 Complete system

2.1 Connection options

The Automation Panel can be connected to a B&R Industrial PC via SDL, DVI or SDL3. The connection options listed below provide an overview of the operating modes and possible limitations.

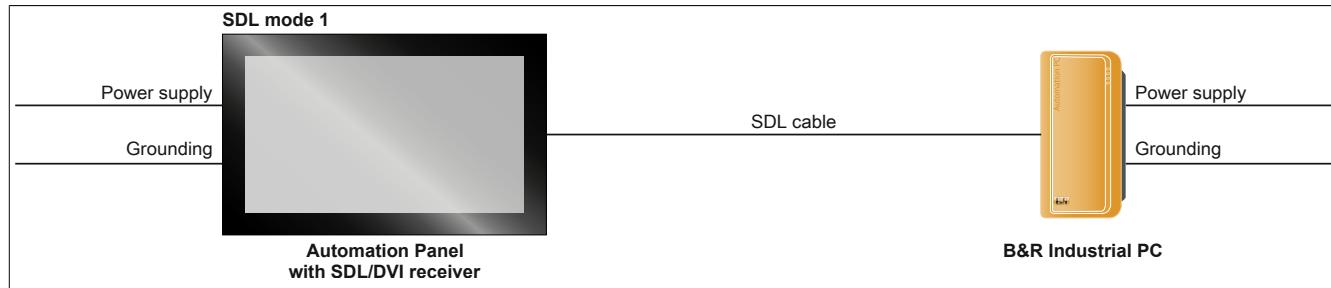
2.1.1 SDL mode

2.1.1.1 SDL mode - Mode 1

SDL mode 1 allows all communication between the Automation Panel and a B&R Industrial PC to be handled using a single SDL cable.

It is used to transfer not just display data, but touch screen, matrix key, LED, service and diagnostic data as well. The Automation Panel can be installed up to 40 m from the B&R Industrial PC. USB 1.1 is fully integrated in SDL and also transferred over this distance without requiring any external modules.

The display's brightness can be configured using the ADI Control Center.



Availability of interfaces on the Automation Panel with SDL/DVI receiver:

| | | | | | | | |
|------------|---|---------|---|--------------|---|---------------------|---|
| Panel In | ✓ | USB In | ✗ | Power supply | ✓ | Brightness controls | ✗ |
| USB1, USB2 | ✓ | USB 1.1 | ✗ | Grounding | ✓ | | |

Maximum cable length: 40 m

Prerequisites and requirements

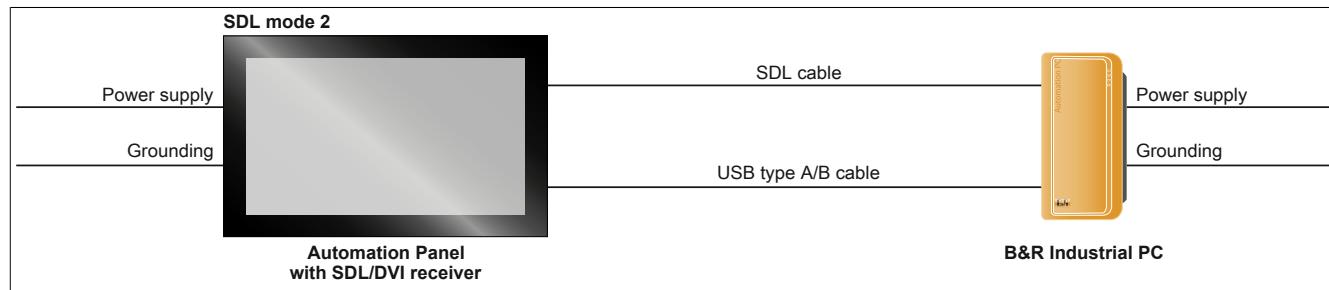
- Automation Panel with SDL/DVI receiver
- B&R Industrial PC with SDL interface
- SDL cable

2.1.1.2 SDL mode - Mode 2

In SDL mode 2, communication between the Automation Panel and the B&R Industrial PC is handled using an SDL cable connected to the Panel In interface and a USB type A/B cable connected to the USB In interface.

In addition to display data, the SDL cable is used to transfer resistive touch screen, matrix key and service/diagnostic data. Data from multi-touch touch screens is transferred over the USB type A/B cable. The Automation Panel can be installed up to 5 m (USB specification) from the B&R Industrial PC. USB 2.0 data can be transferred over the USB type A/B cable for this distance without requiring any external modules.

The display's brightness can be configured using the ADI Control Center.



Availability of interfaces on the Automation Panel with SDL/DVI receiver:

| | | | | | | | |
|------------|-----------|---------------------|-----------|--------------|---|---------------------|---|
| Panel In | ✓ | USB In | ✓ USB 2.0 | Power supply | ✓ | Brightness controls | ✗ |
| USB1, USB2 | ✓ USB 2.0 | COM touch interface | ✗ | Grounding | ✓ | | |

Maximum cable length: 5 m

Prerequisites and requirements

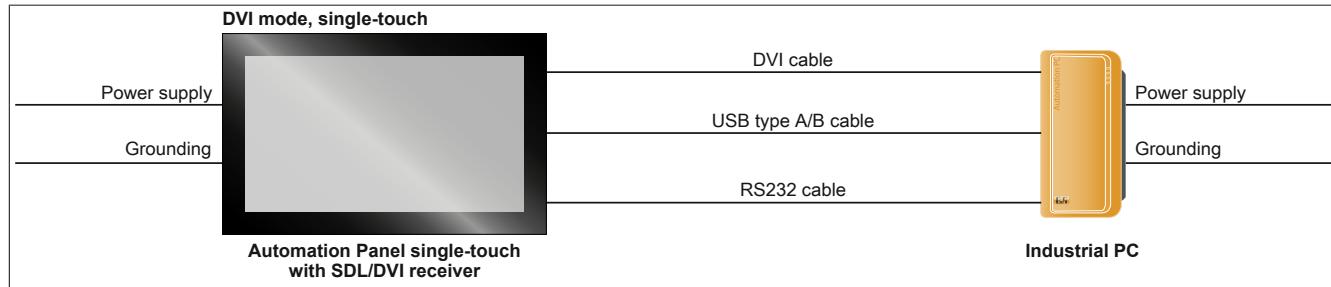
- Automation Panel with SDL/DVI receiver
- B&R Industrial PC with SDL interface
- SDL cable, USB type A/B cable

2.1.2 DVI mode

In DVI mode, the signals needed to operate the Automation Panel are each transferred over a separate cable. The brightness of the display can be configured using the brightness buttons.

2.1.2.1 DVI mode with single-touch Automation Panel

If an Automation Panel with resistive touch screen (single-touch) is operated in DVI mode, then a DVI cable, USB type A/B cable and RS232 cable must be connected.



Availability of interfaces on the Automation Panel with SDL/DVI receiver:

| | | | | | | | |
|------------|-----------|---------------------|-----------|--------------|---|---------------------|---|
| Panel In | ✓ | USB In | ✓ USB 2.0 | Power supply | ✓ | Brightness controls | ✓ |
| USB1, USB2 | ✓ USB 2.0 | COM touch interface | ✓ | Grounding | ✓ | | |

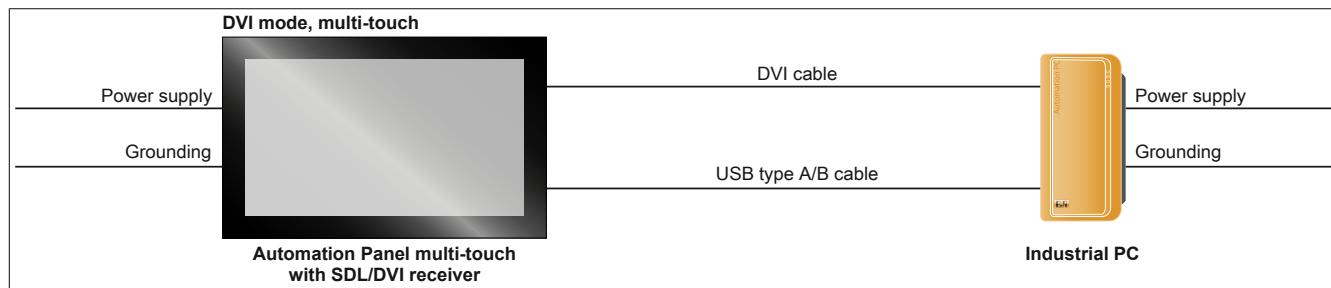
Maximum cable length: 5 m

Prerequisites and requirements

- Automation Panel with SDL/DVI receiver
- B&R Industrial PC with DVI interface
- DVI cable, USB type A/B cable, RS232 cable

2.1.2.2 DVI mode with multi-touch Automation Panel

If an Automation Panel with PCT touch screen (multi-touch) is operated in DVI mode, then a DVI cable and USB type A/B cable must be connected.



Availability of interfaces on the Automation Panel with SDL/DVI receiver:

| | | | | | | | |
|------------|-----------|---------------------|-----------|--------------|---|---------------------|---|
| Panel In | ✓ | USB In | ✓ USB 2.0 | Power supply | ✓ | Brightness controls | ✓ |
| USB1, USB2 | ✓ USB 2.0 | COM touch interface | ✗ | Grounding | ✓ | | |

Maximum cable length: 5 m

Prerequisites and requirements

- Automation Panel with SDL/DVI receiver
- B&R Industrial PC with DVI interface
- DVI cable, USB type A/B cable

2.1.2.3 Special considerations, limitations

- Key and LED data is not transferred.
- Data from control devices is not transferred.
- Service and diagnostic data is not transferred.
- Maximum cable length is limited to 5 m.

2.1.3 SDL3 mode

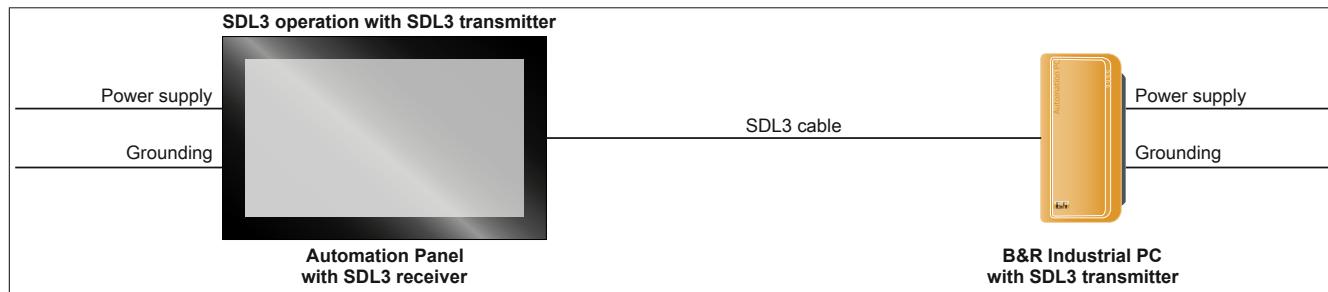
Smart Display Link 3 (SDL3) technology is used to transfer data from all communication channels between a B&R Industrial PC and a panel up to 100 m over a standard Ethernet cable. A male RJ45 connector designed for tight spaces such as feed-throughs and swing arm systems is used to connect to the device.

2.1.3.1 SDL3 mode with SDL3 transmitter

SDL3 mode with an SDL3 transmitter in the B&R Industrial PC allows all communication between the Automation Panel and the PC to be handled using a single SDL3 cable.

It is used to transfer not just display data, but touch screen, matrix key, LED, service and diagnostic data as well. The Automation Panel can be installed up to 100 m from the B&R Industrial PC. USB 2.0 is fully integrated in SDL3 and also transferred over this distance without the need for external modules.

The display's brightness can be configured using the ADI Control Center.



Availability of interfaces on the Automation Panel with SDL3 receiver:

| | | | | | | | | |
|----------------|---|------------|---|---------|--------------|---|-----------|---|
| SDL3 interface | ✓ | USB1, USB2 | ✓ | USB 2.0 | Power supply | ✓ | Grounding | ✓ |
|----------------|---|------------|---|---------|--------------|---|-----------|---|

Maximum cable length of SDL3: 100 m

Prerequisites and requirements

- Automation Panel with SDL3 receiver
- B&R Industrial PC with SDL3 interface
- SDL3 cable

2.1.3.2 Special considerations, limitations

- The USB 2.0 transfer rate is limited to 30 Mbit/s with SDL3.
- The SDL3 transmitter continuously emulates a display using EDID data and hot plugging code, which allows DVI-compatible operation. This can lead to improperly displayed images during operation with multiple displays. In Windows, a connected panel is detected by the graphics driver even in the following situation:
 - No cable is connected.
 - A connection has not yet been established between the SDL3 link module and the SDL3 transmitter.

It is possible to correct these improperly displayed images by making suitable settings in BIOS or via the graphics driver.

2.2 Mechanical characteristics

2.2.1 Dimensions

AP1000 display units with retaining clips - Dimensions

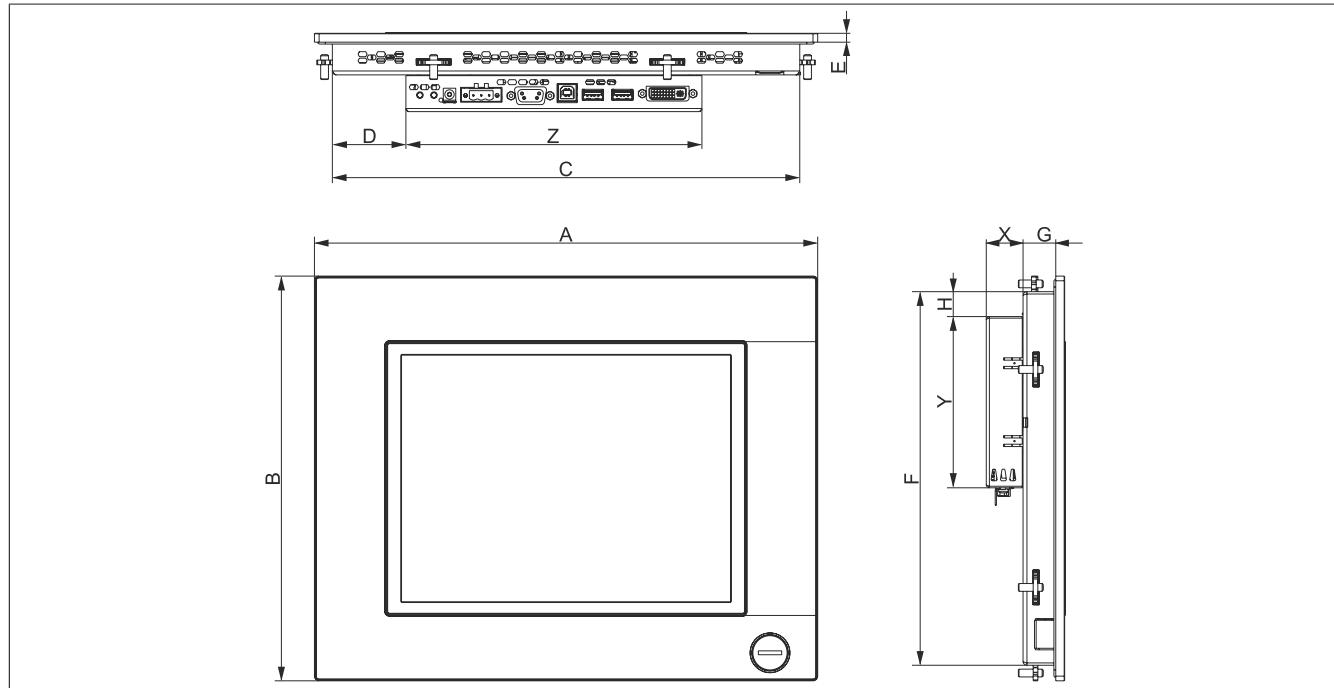


Figure 2: Automation Panel 1000 with retaining clips - Dimensions

All dimensions are specified in mm.

| Display type | Model number | A | B | C | D | E | F | G | H |
|------------------------------|------------------|-----|-------|-----|-------|-----|-------|------|------|
| 5.7" single-touch | 5AP1120.0573-000 | 212 | 156 | 196 | 3 | 5.7 | 140 | 19.5 | 2.5 |
| 5.7" keys | 5AP1151.0573-000 | 212 | 245 | 196 | 3 | 5.7 | 229 | 19.5 | 2.5 |
| 7.0" single-touch | 5AP1120.0702-000 | 212 | 156 | 196 | 3 | 5.7 | 140 | 19.5 | 2.5 |
| 10.1" single-touch | 5AP1120.101E-000 | 279 | 191 | 266 | 38 | 9 | 178 | 18 | 13.5 |
| 10.4" single-touch | 5AP1120.1043-000 | 323 | 260 | 300 | 47.2 | 5.7 | 240 | 21 | 16 |
| 10.4" single-touch with keys | 5AP1180.1043-000 | 323 | 260 | 300 | 47.2 | 5.7 | 240 | 21 | 16 |
| 12.1" single-touch | 5AP1120.121E-000 | 324 | 221.5 | 311 | 60.5 | 9 | 208.5 | 18 | 13.5 |
| 15.6" single-touch | 5AP1120.156B-000 | 414 | 258.5 | 401 | 105.5 | 9 | 245.5 | 20 | 13.5 |

Table 4: AP1000 display units with retaining clips - Dimensions

| Link module type | Model number | X | Y | Z |
|------------------|----------------|------|-----|-----|
| SDL/DVI receiver | 5DLSLD.1001-00 | 23.6 | 110 | 190 |
| SDL3 receiver | 5LSD3.1001-00 | 23.6 | 110 | 190 |

Table 5: Link modules - Dimensions

Information:

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

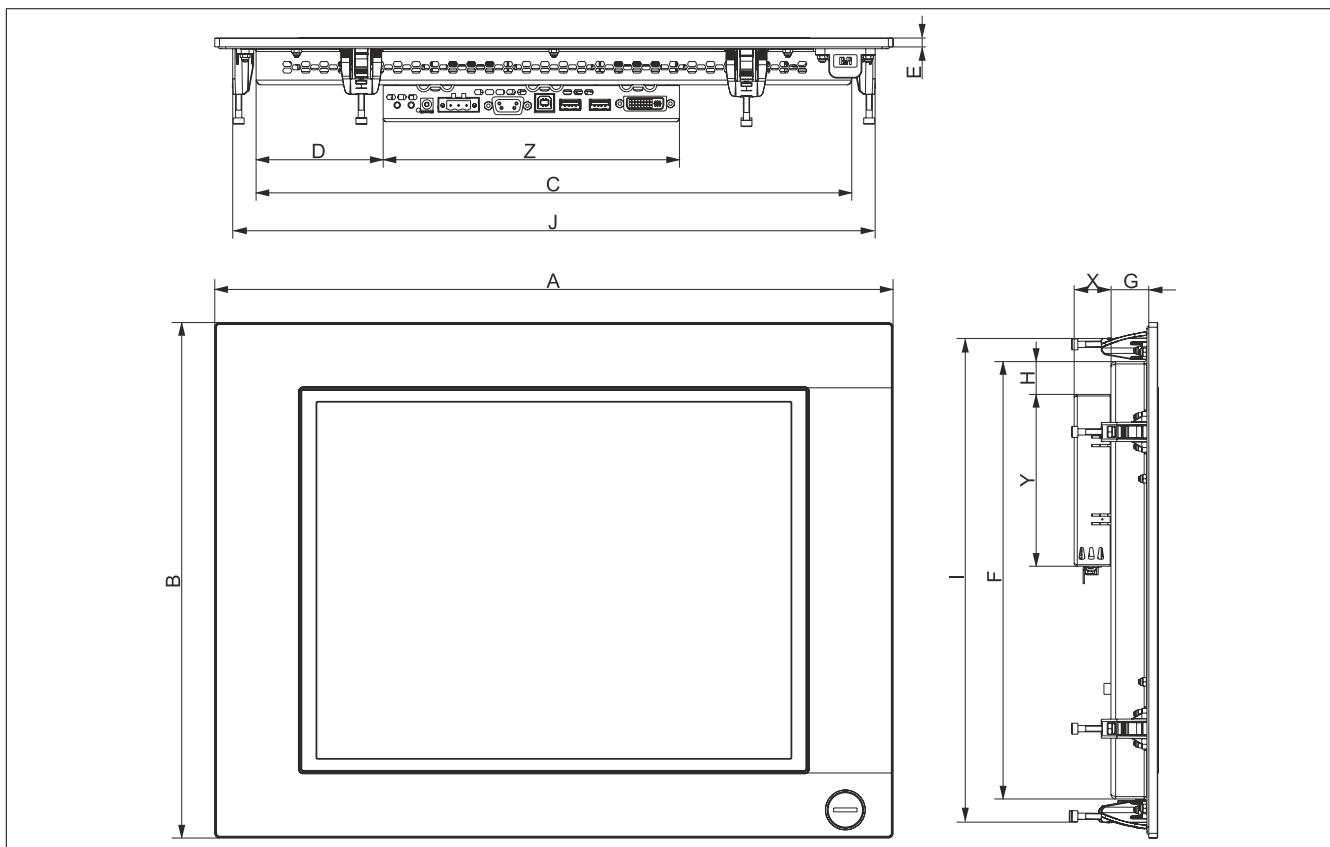
AP1000 display units with clamping blocks - Dimensions

Figure 3: Automation Panel 1000 with clamping blocks - Dimensions

All dimensions are specified in mm.

| Display type | Model number | A | B | C | D | E | F | G | H | I | J |
|------------------------------|------------------|-----|-----|-------|-------|-----|-----|------|------|-----|-----|
| 10.4" single-touch with keys | 5AP1181.1043-000 | 323 | 358 | 270 | 70.5 | 5.7 | 305 | 21.3 | 17.5 | 338 | 300 |
| 10.4" single-touch with keys | 5AP1182.1043-000 | 423 | 288 | 355.5 | 70.5 | 5.7 | 234 | 21.3 | 17.5 | 268 | 400 |
| 12.1" single-touch | 5AP1120.1214-000 | 362 | 284 | 309 | 52.5 | 5.7 | 234 | 20.3 | 17.5 | 264 | 339 |
| 15.0" single-touch | 5AP1120.1505-000 | 435 | 330 | 382 | 81.5 | 5.7 | 280 | 24.3 | 24 | 310 | 412 |
| 15.0" single-touch with keys | 5AP1180.1505-000 | 435 | 330 | 382 | 81.5 | 5.7 | 280 | 24.3 | 24 | 310 | 412 |
| 19.0" single-touch | 5AP1120.1906-000 | 527 | 421 | 445 | 186.5 | 5.7 | 351 | 23.3 | 19.3 | 401 | 507 |

Table 6: AP1000 display units with clamping blocks - Dimensions

| Link module type | Model number | X | Y | Z |
|------------------|----------------|------|-----|-----|
| SDL/DVI receiver | 5DLSDL.1001-00 | 23.6 | 110 | 190 |
| SDL3 receiver | 5DLSD3.1001-00 | 23.6 | 110 | 190 |

Table 7: Link modules - Dimensions

Information:

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

2.2.2 Installation diagrams

Information:

When installing the Automation Panel 1000, be sure to leave sufficient space for air circulation as well as additional space for operation and maintenance of the device.

AP1000 display units with retaining clips - Installation diagrams

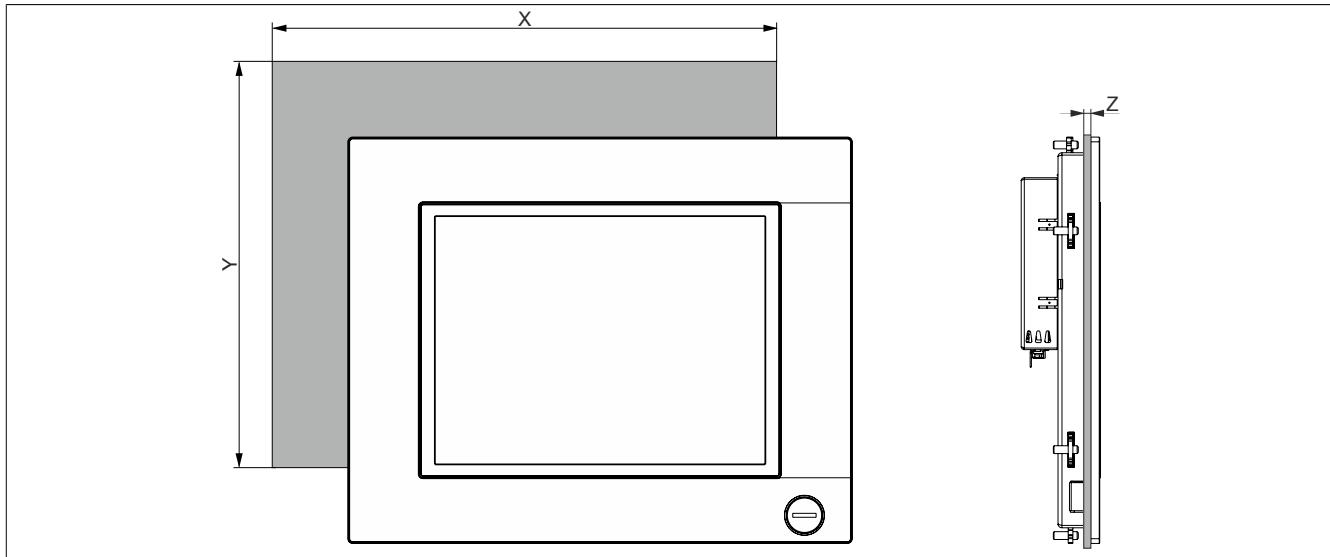


Figure 4: Automation Panel 1000 with retaining clips - Installation diagrams

All dimensions are specified in mm.

The cutout tolerance values are +0 mm/-0.5 mm.

| Display type | Model number | X | Y | Z min | Z max | Number of retaining clips |
|------------------------------|------------------|-----|-------|-------|-------|---------------------------|
| 5.7" single-touch | 5AP1120.0573-000 | 199 | 143 | 1 | 8 | 4 |
| 5.7" keys | 5AP1151.0573-000 | 199 | 232 | 1 | 8 | 6 |
| 7.0" single-touch | 5AP1120.0702-000 | 199 | 143 | 1 | 8 | 4 |
| 10.1" single-touch | 5AP1120.101E-000 | 268 | 180 | 1 | 6 | 10 |
| 10.4" single-touch | 5AP1120.1043-000 | 303 | 243 | 1 | 10 | 8 |
| 10.4" single-touch with keys | 5AP1180.1043-000 | 303 | 243 | 1 | 10 | 8 |
| 12.1" single-touch | 5AP1120.121E-000 | 313 | 210.5 | 1 | 6 | 10 |
| 15.6" single-touch | 5AP1120.156B-000 | 403 | 247.5 | 1 | 6 | 10 |

Table 8: AP1000 display units with retaining clips - Installation diagrams

The "Z" dimension indicates the thickness of the wall or control cabinet panel.

A 2.5 mm hex socket screwdriver is needed to tighten and loosen the screws on the retaining clips. The maximum tightening torque for the retaining clips is 1 Nm.

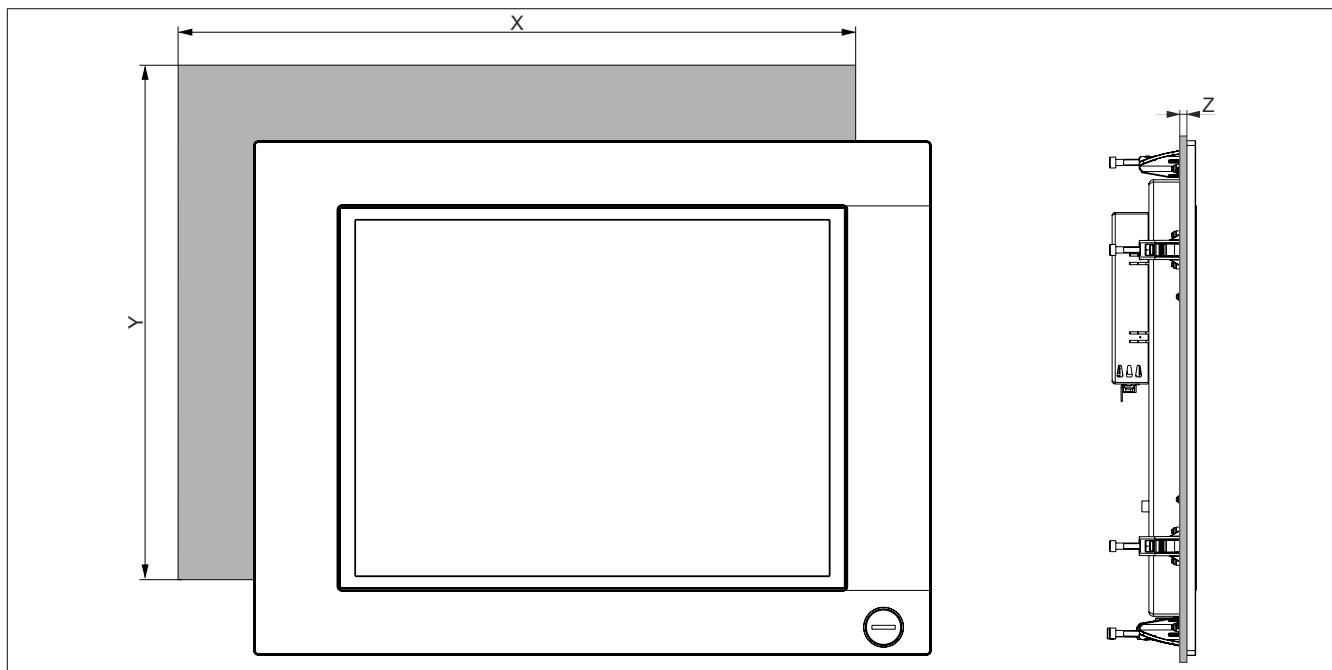
AP1000 display units with clamping blocks - Installation diagrams

Figure 5: Automation Panel 1000 with clamping blocks - Installation diagrams

All dimensions are specified in mm.

The cutout tolerance values are +0 mm/-0.5 mm.

| Display type | Model number | X | Y | Z min | Z max | Number of clamping blocks |
|------------------------------|------------------|-----|-----|-------|-------|---------------------------|
| 10.4" single-touch with keys | 5AP1181.1043-000 | 303 | 341 | 2 | 10 | 10 |
| 10.4" single-touch with keys | 5AP1182.1043-000 | 403 | 271 | 2 | 10 | 8 |
| 12.1" single-touch | 5AP1120.1214-000 | 342 | 267 | 2 | 10 | 8 |
| 15.0" single-touch | 5AP1120.1505-000 | 415 | 313 | 2 | 10 | 8 |
| 15.0" single-touch with keys | 5AP1180.1505-000 | 415 | 313 | 2 | 10 | 8 |
| 19.0" single-touch | 5AP1120.1906-000 | 510 | 404 | 2 | 10 | 12 |

Table 9: AP1000 display units with clamping blocks - Installation diagrams

The "Z" dimension indicates the thickness of the wall or control cabinet panel.

A 3 mm hex socket screwdriver is needed to tighten and loosen the screws on the clamping blocks. The maximum torque when tightening the clamp is 0.5 Nm.

2.2.3 Spacing for air circulation

In order to guarantee sufficient air circulation, allow the specified amount of space above, below, to the side and behind the device. The minimum specified spacing is indicated in the following diagram. This applies to all variants.

Information:

The following image and table provides a thermal examination of the complete system. If additional space is needed to operate or maintain the device, this must be taken into consideration during installation.

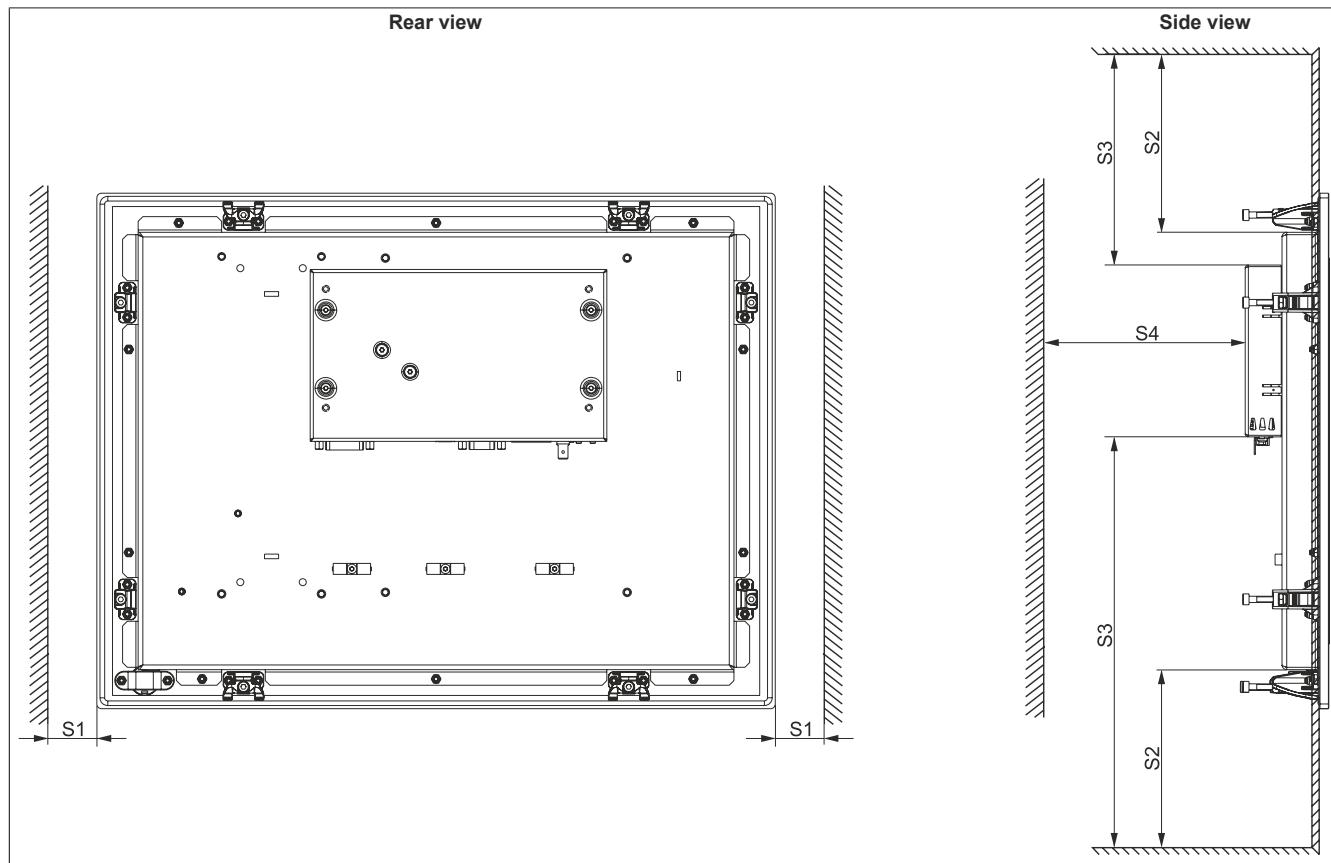


Figure 6: Automation Panel 1000 - Spacing for air circulation

S1: ≥ 10 mm

S2: ≥ 50 mm

S3: ≥ 80 mm

S4: ≥ 50 mm

Caution!

The spacing specifications for air circulation are based on the worst-case scenario for operation at the maximum specified ambient temperature. The maximum specified ambient temperature must not be exceeded!

If the spacing specifications for air circulation cannot be observed, then the maximum specified temperatures for the temperature sensors (see "Temperature sensor positions" on page 29) must be monitored by the user and appropriate measures taken if they are exceeded.

2.2.4 Mounting orientations

The following diagrams show the approved mounting orientations for the Automation Panel 1000. The AP1000 must be mounted as described in the following sections.

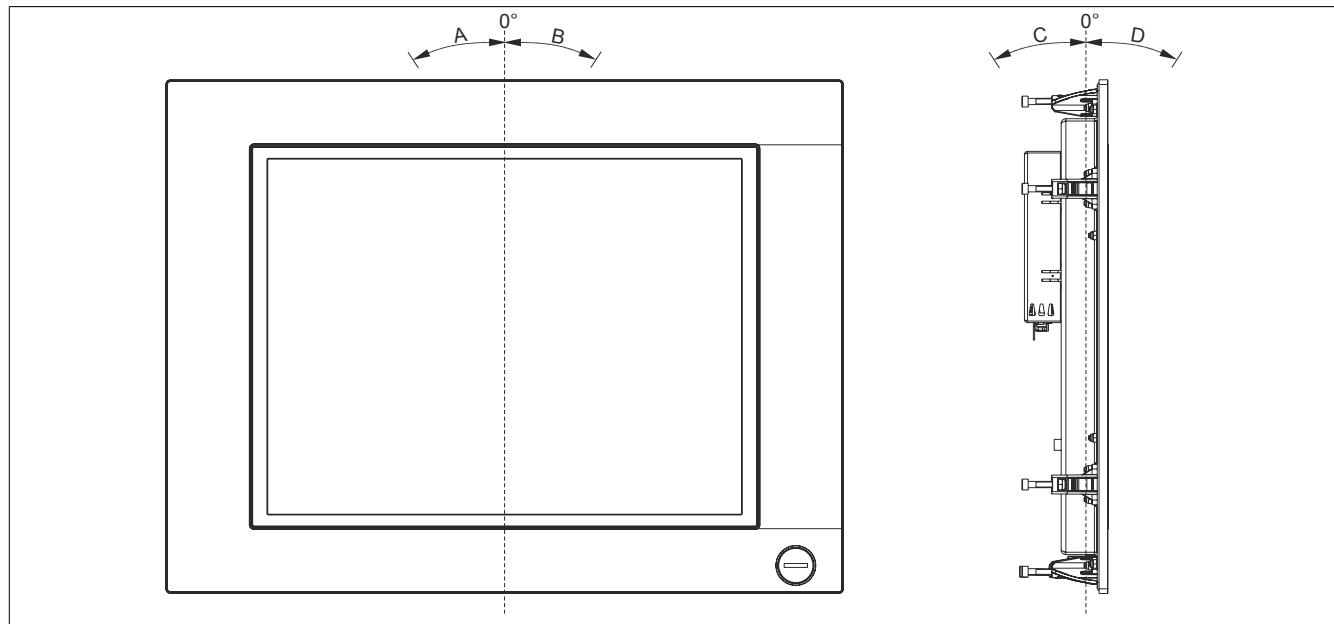


Figure 7: Automation Panel 1000 - Mounting orientation

If there is a "✓" next to the display unit, it can be used at the maximum ambient temperature (see "Maximum ambient temperature during operation" on page 27) of the complete system without problems.

If there is a specific temperature for the display unit in a particular mounting orientation, for example "55", then the ambient temperature is not permitted to exceed this temperature.

Mounting orientations for the Automation Panel 1000 with SDL/DVI receiver

| | | Display unit | | | | | | | | | | | | | |
|----------------------|------|-----------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | | 5AP1120.0573-000 | 5AP1151.0573-000 | 5AP1120.0702-000 | 5AP1120.101E-000 | 5AP1120.1043-000 | 5AP1180.1043-000 | 5AP1181.1043-000 | 5AP1182.1043-000 | 5AP1120.1214-000 | 5AP1120.121E-000 | 5AP1120.1505-000 | 5AP1180.1505-000 | 5AP1120.156B-000 | 5AP1120.1906-000 |
| Mounting orientation | 0° | 0° | ✓ | ✓ | ✓ | TBD | ✓ | ✓ | ✓ | TBD | TBD | ✓ | ✓ | ✓ | |
| | A | -1° to -90° (counterclockwise) | ✓ | ✓ | ✓ | TBD | ✓ | ✓ | ✓ | TBD | TBD | ✓ | ✓ | ✓ | |
| | B | +1° to +90° (clockwise) | ✓ | ✓ | ✓ | TBD | ✓ | ✓ | ✓ | TBD | TBD | ✓ | ✓ | ✓ | |
| | C, D | ±180° (interfaces on top) | ✓ | ✓ | ✓ | TBD | ✓ | ✓ | ✓ | TBD | TBD | ✓ | ✓ | ✓ | |
| | C | -1° to -45° | ✓ | ✓ | ✓ | TBD | ✓ | ✓ | ✓ | TBD | TBD | ✓ | ✓ | ✓ | |
| | D | +1° to +90° (display facing down) | ✓ | ✓ | ✓ | TBD | ✓ | ✓ | ✓ | TBD | TBD | ✓ | ✓ | ✓ | |

Table 10: Automation Panel 1000 with SDL/DVI receiver - Mounting orientations

Mounting orientations for the Automation Panel 1000 with SDL3 receiver

| | | Display unit | | | | | | | | | | | | | |
|----------------------|------|-----------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | | 5AP1120.0573-000 | 5AP1151.0573-000 | 5AP1120.0702-000 | 5AP1120.101E-000 | 5AP1120.1043-000 | 5AP1180.1043-000 | 5AP1181.1043-000 | 5AP1182.1043-000 | 5AP1120.1214-000 | 5AP1120.121E-000 | 5AP1120.1505-000 | 5AP1180.1505-000 | 5AP1120.156B-000 | 5AP1120.1906-000 |
| Mounting orientation | 0° | 0° | ✓ | ✓ | ✓ | TBD | ✓ | ✓ | ✓ | TBD | TBD | ✓ | ✓ | ✓ | |
| | A | -1° to -90° (counterclockwise) | 55 | 55 | ✓ | TBD | ✓ | ✓ | ✓ | TBD | TBD | ✓ | ✓ | ✓ | 55 |
| | B | +1° to +90° (clockwise) | 55 | 55 | ✓ | TBD | ✓ | ✓ | ✓ | TBD | TBD | ✓ | ✓ | ✓ | ✓ |
| | C, D | ±180° (interfaces on top) | 55 | 55 | ✓ | TBD | ✓ | ✓ | ✓ | TBD | TBD | ✓ | ✓ | ✓ | ✓ |
| | C | -1° to -45° | 55 | 55 | ✓ | TBD | ✓ | ✓ | ✓ | TBD | TBD | ✓ | ✓ | ✓ | 55 |
| | D | +1° to +90° (display facing down) | 55 | 55 | 55 | TBD | 55 | 55 | 55 | TBD | TBD | 55 | 55 | ✓ | 55 |

Table 11: Automation Panel 1000 with SDL3 receiver - Mounting orientations

2.2.5 Weight specifications

All weights are specified in g (grams).

| Display type | Model number | Weight |
|------------------------------|------------------|--------|
| 5.7" single-touch | 5AP1120.0573-000 | 1100 |
| 5.7" keys | 5AP1151.0573-000 | 1400 |
| 7.0" single-touch | 5AP1120.0702-000 | 900 |
| 10.1" single-touch | 5AP1120.101E-000 | 1900 |
| 10.4" single-touch | 5AP1120.1043-000 | 2800 |
| 10.4" single-touch with keys | 5AP1180.1043-000 | 2800 |
| 10.4" single-touch with keys | 5AP1181.1043-000 | 3400 |
| 10.4" single-touch with keys | 5AP1182.1043-000 | 3500 |
| 12.1" single-touch | 5AP1120.1214-000 | 3200 |
| 12.1" single-touch | 5AP1120.121E-000 | 2300 |
| 15.0" single-touch | 5AP1120.1505-000 | 5000 |
| 15.0" single-touch with keys | 5AP1180.1505-000 | 4900 |
| 15.6" single-touch | 5AP1120.156B-000 | 4200 |
| 19.0" single-touch | 5AP1120.1906-000 | 7300 |

Table 12: AP1000 display units - Weight

| Link module type | Model number | Weight |
|------------------|----------------|--------|
| SDL/DVI receiver | 5DSDL.1001-00 | 538 |
| SDL3 receiver | 5DSDL3.1001-00 | 527 |

Table 13: Link modules - Weight

2.3 Environmental characteristics

2.3.1 Temperature specifications

Display units and link modules can be combined. The many different configurations possible result in varying maximum ambient temperatures, which can be seen in the following table in this section.

Information:

The maximum specified ambient temperatures for operation were determined under worst-case conditions. Experience has shown that higher ambient temperatures can be reached in typical applications, e.g. those in Microsoft Windows. Testing and evaluation must be performed on-site by the user (temperatures can be read in BIOS or using the B&R Control Center).

Information regarding worst-case conditions

- BurnInTest tool (BurnInTest V4.0 Pro from Passmark Software) for simulating a 100% load on the interface via loopback adapters (serial interface, USB interfaces)
- Maximum system expansion and power consumption

2.3.1.1 Maximum ambient temperature during operation

All specifications are valid for non-condensing operation.

| | | Link module | | Location of sensor(s) | |
|---|------------------|-------------|-------------------|---|--|
| | | SDL/DVI | SDL3 | | |
| All temperature values in degrees Celsius (°C) at 500 m above sea level. | | | | | |
| The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level). | | | | | |
| Maximum ambient temperature | | 60 | 60 ¹⁾ | | |
| What else can also be operated at the max. ambient temperature, or are there any limits? | | | | | |
| Display units | 5AP1120.0573-000 | ✓ | ✓ ¹⁾ | Display - See temperature sensor position | |
| | 5AP1151.0573-000 | ✓ | ✓ ¹⁾ | | |
| | 5AP1120.0702-000 | ✓ | ✓ ¹⁾ | | |
| | 5AP1120.101E-000 | TBD | TBD ¹⁾ | | |
| | 5AP1120.1043-000 | ✓ | ✓ ¹⁾ | | |
| | 5AP1180.1043-000 | ✓ | ✓ ¹⁾ | | |
| | 5AP1181.1043-000 | ✓ | ✓ ¹⁾ | | |
| | 5AP1182.1043-000 | ✓ | ✓ ¹⁾ | | |
| | 5AP1120.1214-000 | TBD | TBD ¹⁾ | | |
| | 5AP1120.121E-000 | TBD | TBD ¹⁾ | | |
| | 5AP1120.1505-000 | ✓ | ✓ ¹⁾ | | |
| | 5AP1180.1505-000 | ✓ | ✓ ¹⁾ | | |
| | 5AP1120.156B-000 | 50 | 50 ¹⁾ | | |
| | 5AP1120.1906-000 | ✓ | ✓ ¹⁾ | | |

¹⁾ The maximum ambient temperature for the SDL link module 5DLS3.1001-00 < Rev. A5 with the corresponding display unit is 5°C less.

Table 14: Maximum ambient temperature during operation

2.3.1.2 How to determine the maximum ambient temperature

1. Selection of the link module.
2. The "Maximum ambient temperature" row shows the maximum ambient temperature for the complete system, including the respective link module.

Information:

Maximum temperature data is for operation at 500 meters. The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).

3. The display unit determines if there are temperature limits.

If there is a "✓" next to the component, it can be used at the maximum ambient temperature of the complete system without problems.

If there is a specific temperature next to the component, for example "45", then the ambient temperature of the complete system is not permitted to exceed this temperature.

2.3.1.3 Minimum ambient temperature during operation

The minimum ambient temperature during non-condensing operation is 0°C.

2.3.1.4 Ambient temperature during storage and transport

The following table provides an overview of the minimum and maximum ambient temperature for storing and transporting the individual components.

| Display type | Model number | Storage | Transport |
|------------------------------|------------------|-------------|-------------|
| 5.7" single-touch | 5AP1120.0573-000 | -25 to 80°C | -25 to 80°C |
| 5.7" keys | 5AP1151.0573-000 | -25 to 70°C | -25 to 70°C |
| 7.0" single-touch | 5AP1120.0702-000 | -25 to 80°C | -25 to 80°C |
| 10.1" single-touch | 5AP1120.101E-000 | -25 to 70°C | -25 to 70°C |
| 10.4" single-touch | 5AP1120.1043-000 | -25 to 80°C | -25 to 80°C |
| 10.4" single-touch with keys | 5AP1180.1043-000 | -25 to 70°C | -25 to 70°C |
| 10.4" single-touch with keys | 5AP1181.1043-000 | -25 to 70°C | -25 to 70°C |
| 10.4" single-touch with keys | 5AP1182.1043-000 | -25 to 70°C | -25 to 70°C |
| 12.1" single-touch | 5AP1120.1214-000 | -25 to 80°C | -25 to 80°C |
| 12.1" single-touch | 5AP1120.121E-000 | -25 to 80°C | -25 to 80°C |
| 15.0" single-touch | 5AP1120.1505-000 | -25 to 80°C | -25 to 80°C |
| 15.0" single-touch with keys | 5AP1180.1505-000 | -25 to 80°C | -25 to 80°C |
| 15.6" single-touch | 5AP1120.156B-000 | -20 to 60°C | -20 to 60°C |
| 19.0" single-touch | 5AP1120.1906-000 | -25 to 70°C | -25 to 70°C |

Table 15: AP1000 display units - Ambient temperature during storage and transport

| Link module | Model number | Storage | Transport |
|------------------|----------------|-------------|-------------|
| SDL/DVI receiver | 5DLSLD.1001-00 | -20 to 60°C | -20 to 60°C |
| SDL3 receiver | 5DLSD3.1001-00 | -20 to 60°C | -20 to 60°C |

Table 16: Link modules - Ambient temperature during storage and transport

2.3.1.5 Temperature monitoring

A sensor in the display monitors the temperature of the AP1000 display unit. The location of the temperature sensor is illustrated in Tab. 17 "Temperature sensor position" on page 29. The values listed in Tab. 17 "Temperature sensor position" on page 29 represent the defined maximum temperature for this measurement point. An alarm is not triggered if this temperature is exceeded. These temperatures can be read in BIOS or approved Microsoft Windows operating systems using the B&R Control Center.

2.3.1.6 Temperature sensor positions

These temperatures¹⁾ can be read in BIOS or Microsoft Windows operating systems using the B&R Control Center²⁾. For applications that don't use Windows, temperatures can be evaluated using the B&R implementation guide. In addition to the implementation guide, there are also programs available in MS-DOS.

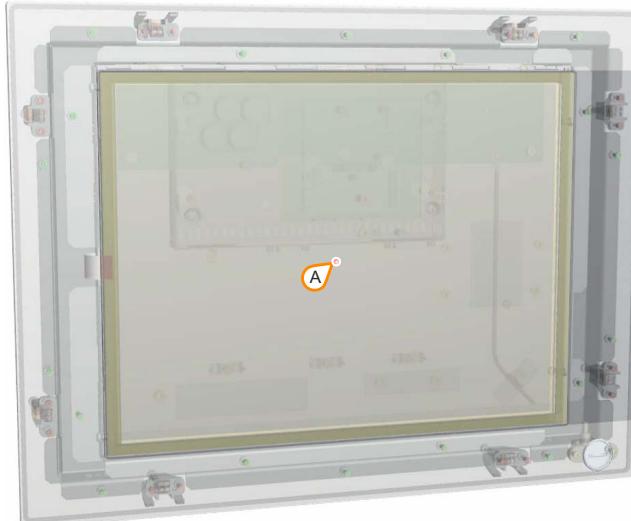


Figure 8: Automation Panel 1000 - Temperature sensor position

| ADI sensors | Position | Measurement point for | Measurement | Max. specified |
|-------------|----------|-----------------------|--|---|
| Panel | A | Display | Temperature of the display (sensor integrated in display unit) | 5AP1120.0573-000: 80°C 5AP1151.0573-000: 80°C 5AP1120.0702-000: 85°C 5AP1120.101E-000: TBD 5AP1120.1043-000: 90°C 5AP1180.1043-000: 90°C 5AP1181.1043-000: 90°C 5AP1182.1043-000: 90°C 5AP1120.1214-000: TBD 5AP1120.121E-000: TBD 5AP1120.1505-000: 90°C 5AP1180.1505-000: 90°C 5AP1120.156B-000: 75°C 5AP1120.1906-000: 80°C |

Table 17: Temperature sensor position

¹⁾ The temperature measured approximates the immediate ambient temperature but may also be influenced by neighboring components.
²⁾ The ADI driver that includes the B&R Control Center is available in the Downloads section of the B&R website (www.br-automation.com).

2.3.2 Humidity

The following table lists the minimum and maximum relative humidity values (non-condensing) for the individual components that are relevant for the humidity limitations of a complete system. The lowest and highest common values are always used when establishing these limits.

| Display type | Model number | Operation | Storage | Transport |
|------------------------------|------------------|------------|-----------|-----------|
| 5.7" single-touch | 5AP1120.0573-000 | 5 to 90% | 5 to 90% | 5 to 90% |
| 5.7" keys | 5AP1151.0573-000 | 5 to 90% | 5 to 90% | 5 to 90% |
| 7.0" single-touch | 5AP1120.0702-000 | 20 to 90 % | 10 to 90% | 10 to 90% |
| 10.1" single-touch | 5AP1120.101E-000 | 20 to 90 % | 10 to 90% | 10 to 90% |
| 10.4" single-touch | 5AP1120.1043-000 | 5 to 90% | 5 to 90% | 5 to 90% |
| 10.4" single-touch with keys | 5AP1180.1043-000 | 5 to 80 % | 5 to 90% | 5 to 90% |
| 10.4" single-touch with keys | 5AP1181.1043-000 | 5 to 80 % | 5 to 90% | 5 to 90% |
| 10.4" single-touch with keys | 5AP1182.1043-000 | 5 to 80 % | 5 to 90% | 5 to 90% |
| 12.1" single-touch | 5AP1120.1214-000 | 20 to 90 % | 10 to 90% | 10 to 90% |
| 12.1" single-touch | 5AP1120.121E-000 | 5 to 90% | 5 to 90% | 5 to 90% |
| 15.0" single-touch | 5AP1120.1505-000 | 8 to 90% | 8 to 90% | 8 to 90% |
| 15.0" single-touch with keys | 5AP1180.1505-000 | 8 to 90% | 8 to 90% | 8 to 90% |
| 15.6" single-touch | 5AP1120.156B-000 | 5 to 90% | 5 to 90% | 5 to 90% |
| 19.0" single-touch | 5AP1120.1906-000 | 5 to 90% | 5 to 90% | 5 to 90% |

Table 18: AP1000 display units - Humidity

| Link module type | Model number | Operation | Storage | Transport |
|------------------|-----------------|-----------|----------|-----------|
| SDL/DVI receiver | 5DLSLD.1001-00 | 5 to 90% | 5 to 95% | 5 to 95% |
| SDL3 receiver | 5DLSLD3.1001-00 | 5 to 90% | 5 to 95% | 5 to 95% |

Table 19: Link modules - Humidity

The specifications listed correspond to the relative humidity (non-condensing) at an ambient temperature of 30°C. More detailed information about specific temperature-dependent humidity values can be found in the technical data for the individual components.

2.3.3 Vibration

The following table provides an overview of the maximum vibration specifications of the complete system. The use of individual components may result in limitations.

| | Operation ¹⁾ | | Storage ^{1 2)} | Transport ^{1 2)} |
|-----------------------|---|--|---|---|
| | Continuous | Periodic | | |
| Automation Panel 1000 | 2 to 9 Hz: 1.75 mm amplitude 9 to 200 Hz: 0.5 g | 2 to 9 Hz: 3.5 mm amplitude 9 to 200 Hz: 1 g | 2 to 8 Hz: 7.5 mm amplitude 8 to 200 Hz: 2 g 200 to 500 Hz: 4 g | 2 to 8 Hz: 7.5 mm amplitude 8 to 200 Hz: 2 g 200 to 500 Hz: 4 g |

Table 20: Vibration

- 1) Testing is performed in accordance with EN 60068-2-6.
 2) This value applies to a device in its original packaging.

2.3.4 Shock

The following table provides an overview of the maximum shock specifications of the complete system. The use of individual components may result in limitations.

| | Operation ¹⁾ | Storage ^{1 2)} | Transport ^{1 2)} |
|-----------------------|-------------------------|-------------------------|---------------------------|
| Automation Panel 1000 | 15 g, 11 ms | 30 g, 6 ms | 30 g, 6 ms |

Table 21: Shock

- 1) Testing is performed in accordance with EN 60068-2-27.
 2) This value applies to a device in its original packaging.

2.3.5 Protection

In accordance with EN 60529, the Automation Panel 1000 has IP65 protection on the front and IP20 protection on the back under the following conditions:

- The Automation Panel 1000 is installed correctly (see "Installation" on page 88).
- All covers and components are installed on the interfaces and slots.
- All environmental conditions observed

2.4 Electrical characteristics

2.4.1 +24 VDC voltage supply

The 3-pin male connector required for the power supply interface is not included in delivery. It can be ordered from B&R using model number 0TB103.9 (screw clamps) or 0TB103.91 (cage clamp terminal block).

The pinout is listed in the following table. The supply voltage is protected internally by a soldered fuse (10 A, fast-acting) to prevent damage to the device in the event of an overload (fuse replacement necessary) or if the voltage supply is connected incorrectly (reverse polarity protection -> fuse replacement not necessary). The device must be returned to B&R for repairs if the fuse is blown in the event of an error.

| +24 VDC power supply | |
|----------------------|--|
| Pin | Description |
| 1 | + |
| 2 | Functional ground |
| 3 | - |
| Model number | Short description |
| 0TB103.9 | Male connector 24 V 5.08 3-pin screw clamps |
| 0TB103.91 | Male connector 24 V 5.08 3-pin cage clamp terminal block |

Table 22: +24 VDC voltage supply connection

| Electrical characteristics | |
|------------------------------|-------------|
| Nominal voltage | 24 VDC ±25% |
| Nominal current | Max. 3 A |
| Electrical isolation | Yes |
| Uninterruptible power supply | No |

2.4.2 Power calculation

In order to calculate the total power of the Automation Panel, the power rating of the display being used must be added to the power rating of the link module being used.

| Link module | Model number | Total power consumption of link module |
|------------------|----------------|--|
| SDL/DVI receiver | 5DLSDL.1001-00 | Max. 3.6 W without USB consumers Max. 8.6 W with USB consumers |
| SDL3 receiver | 5DLSD3.1001-00 | Max. 8.1 W without USB consumers Max. 13.1 W with USB consumers |

Table 23: Link modules - Power calculation

The following specifications are maximum values without additional consumers (e.g. USB devices, etc.).

| Display type | Model number | +5 V | 3V3 | +12 V | Power consumption Total |
|------------------------------|------------------|-------|-------|--------|-------------------------|
| 5.7" single-touch | 5AP1120.0573-000 | - | 0.7 W | 2.5 W | 3.2 W |
| 5.7" keys | 5AP1151.0573-000 | 0.5 W | 1.3 W | 2.5 W | 4.3 W |
| 7.0" single-touch | 5AP1120.0702-000 | - | 1 W | 3.5 W | 4.5 W |
| 10.1" single-touch | 5AP1120.101E-000 | - | 1 W | 5.8 W | 6.8 W |
| 10.4" single-touch | 5AP1120.1043-000 | - | 1.3 W | 3.6 W | 4.9 W |
| 10.4" single-touch with keys | 5AP1180.1043-000 | 0.5 W | 1.9 W | 3.6 W | 6 W |
| 10.4" single-touch with keys | 5AP1181.1043-000 | 0.7 W | 1.9 W | 3.6 W | 6.2 W |
| 10.4" single-touch with keys | 5AP1182.1043-000 | 1 W | 1.9 W | 3.6 W | 6.5 W |
| 12.1" single-touch | 5AP1120.1214-000 | - | 1.9 W | 7 W | 8.9 W |
| 12.1" single-touch | 5AP1120.121E-000 | - | 2.5 W | 7.8 W | 10.3 W |
| 15.0" single-touch | 5AP1120.1505-000 | - | 2.1 W | 8.9 W | 11 W |
| 15.0" single-touch with keys | 5AP1180.1505-000 | 0.5 W | 2.7 W | 8.9 W | 12.1 W |
| 15.6" single-touch | 5AP1120.156B-000 | 2.5 W | - | 10.5 W | 13 W |
| 19.0" single-touch | 5AP1120.1906-000 | 5 W | - | 22 W | 27 W |

Table 24: AP1000 display units - Power calculation

Example

| | | |
|-----------------------------------|----------------------------|---------------|
| 5AP1120.1505-000 15" display unit | 2.1 W + 8.9 W | 11.0 W |
| 5DLSDL.1001-00 SDL/DVI receiver | 8.6 W (with USB consumers) | 8.6 W |
| Total max.: | | 19.6 W |

2.4.3 Block diagrams

The following block diagram shows the simplified structure of the 5DLSLD.1001-00 SDL/DVI receiver link module.

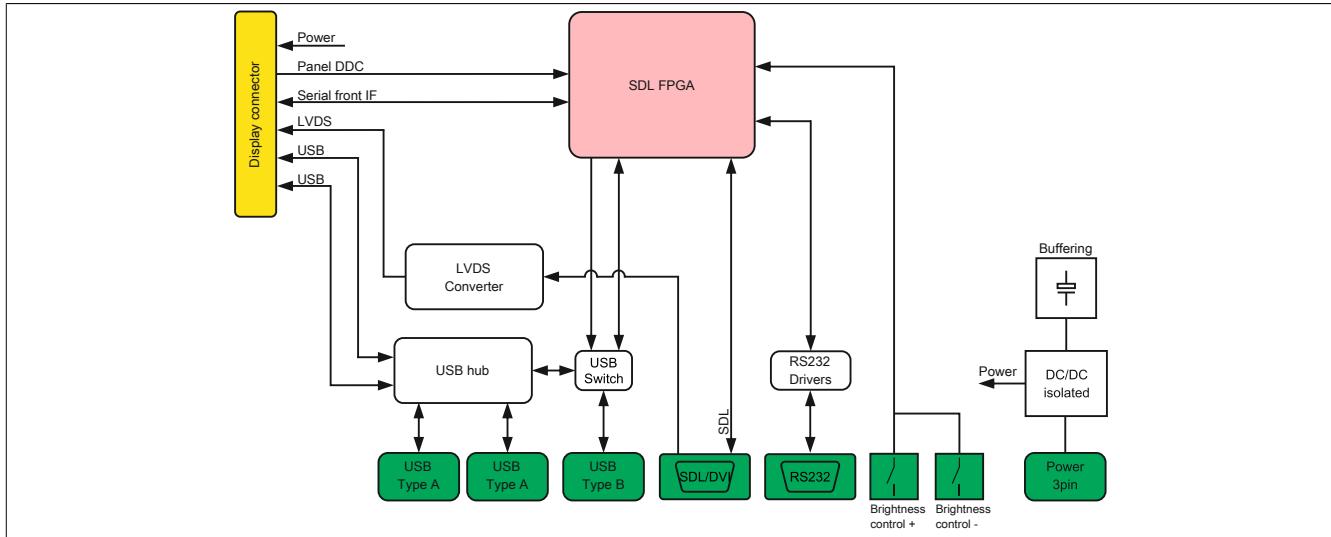


Figure 9: SDL/DVI receiver link module - Block diagram

The following block diagram shows the simplified structure of the 5DLSD3.1001-00 SDL3 receiver link module.

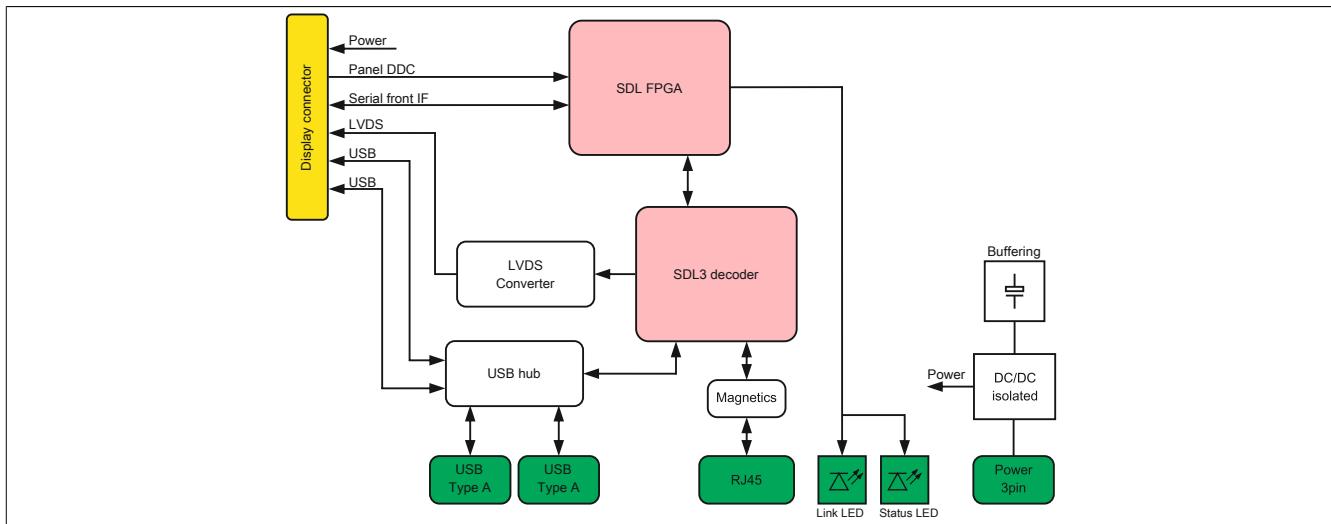


Figure 10: SDL3 receiver link module - Block diagram

2.5 SDL/DVI receiver - 5DLSDL.1001-00 device interfaces

2.5.1 Overview

SDL/DVI receiver interfaces are located on the back of the Automation Panel 1000.

Information about SDL/DVI mode can be found in sections "SDL mode" on page 16 and "DVI mode" on page 18.

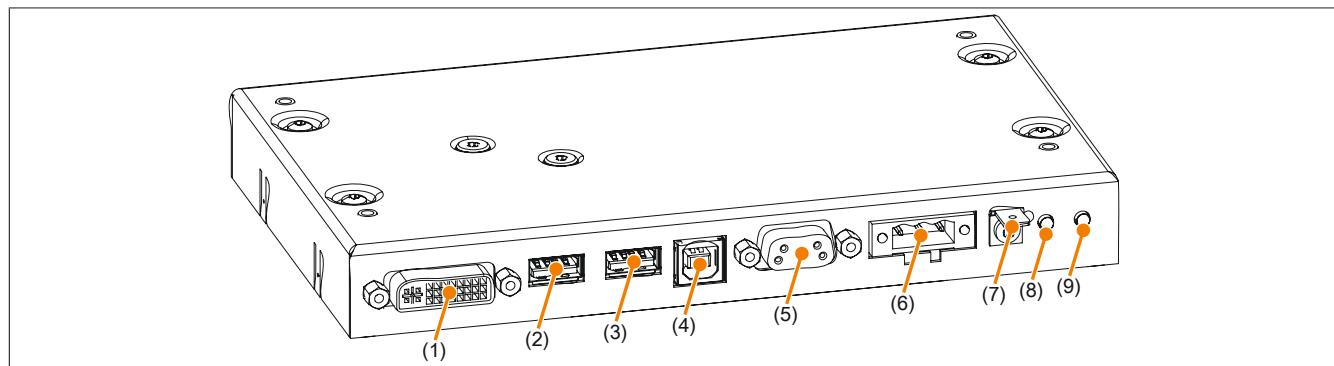


Figure 11: Overview of interfaces - SDL/DVI receiver link module

| No. | Type of interface | No. | Type of interface |
|-----|--------------------|-----|----------------------|
| 1 | "Panel In SDL/DVI" | 6 | "24 VDC power" |
| 2 | "USB1" | 7 | "Grounding" |
| 3 | "USB2" | 8 | "Brightness (DVI) +" |
| 4 | "USB In" | 9 | "Brightness (DVI) -" |
| 5 | "COM" | | |

2.5.2 +24 VDC voltage supply

The 3-pin male connector required for the power supply interface is not included in delivery. It can be ordered from B&R using model number 0TB103.9 (screw clamps) or 0TB103.91 (cage clamp terminal block).

The pinout is listed in the following table. The supply voltage is protected internally by a soldered fuse (10 A, fast-acting) to prevent damage to the device in the event of an overload (fuse replacement necessary) or if the voltage supply is connected incorrectly (reverse polarity protection -> fuse replacement not necessary). The device must be returned to B&R for repairs if the fuse is blown in the event of an error.

| | | +24 VDC power supply | |
|-----------------|--|------------------------------------|-----------------------------------|
| | | Protected against reverse polarity | 3-pin male power supply connector |
| Pin | Description | | +24 VDC power supply |
| 1 | + | | |
| 2 | Functional ground | | |
| 3 | - | | |
| Model number | Short description | | |
| Terminal blocks | | | |
| 0TB103.9 | Male connector 24 V 5.08 3-pin screw clamps | | |
| 0TB103.91 | Male connector 24 V 5.08 3-pin cage clamp terminal block | | |

Table 25: +24 VDC voltage supply connection

| Electrical characteristics | |
|------------------------------|-------------|
| Nominal voltage | 24 VDC ±25% |
| Nominal current | Max. 3 A |
| Electrical isolation | Yes |
| Uninterruptible power supply | No |

2.5.2.1 Grounding

Caution!

Functional ground (pin 2 of power supply and ground connection) must be kept as short as possible and connected to the largest possible wire cross section at the central grounding point (e.g. the control cabinet or system).

The ground connection is located next to the power supply for the link module.

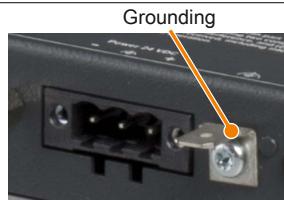


Figure 12: Ground connection

The ground connection must be used, for example, to fasten a copper strip to a central grounding point in the control cabinet or system where the device is installed. The largest possible conductor cross section should be used (at least 2.5 mm²).

2.5.3 Panel In interface

The Panel In interface can be used for SDL or DVI transfers. For more information, see "SDL mode" on page 16 and "DVI mode" on page 18.

| Panel In interface - SDL (Smart Display Link) / DVI | |
|---|---------------|
| The following overview lists the video signals available on the panel input. For additional details, see the technical data for the link module or display unit being used. | |
| Link module | Video signals |
| 5DLSDL.1001-00 | SDL, DVI |



Table 26: Panel In interface - SDL, DVI

Information:

The hardware and graphics drivers of approved operating systems support the hot plugging of display devices to the Panel In interface for service purposes. The panel connector is specified for 100 connection cycles.

Information:

If a display device with touch screen is connected to the Panel In interface and then disconnected again during operation (hot plugging), it may be necessary to recalibrate the touch screen.

2.5.3.1 Pinout

| Pin | Assignment | Description | Pin | Assignment | Description |
|-----|---|---|-----|---------------------------|---------------------------------|
| 1 | TMDS data 2- | DVI lane 2 (negative) | 16 | HPD | Hot plug detect |
| 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 pair 2 and 4 | 18 | TMDS data 0+ | DVI lane 0 (positive) |
| 4 | SDL- | SDL lane (negative) | 19 | TMDS Data 0/ XUSB1 SHIELD | Shield for 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 for clock pair |
| 8 | N/C | 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 (negative) HDMI clock (positive) | C1 | N/C | Not connected |
| 11 | TMDS DATA 1/ XUSBO SHIELD | Shield for data pair 1 and USBO | C2 | N/C | Not connected |
| 12 | XUSBO- | USB lane 0 (negative) | C3 | N/C | Not connected |
| 13 | XUSBO+ | USB lane 0 (positive) | C4 | N/C | Not connected |
| 14 | +5 V power | +5 V power supply | C5 | N/C | Not connected |
| 15 | Ground (return for +5 V, HSync and VSync) | Ground | | | |

DVI, 24-pin, female

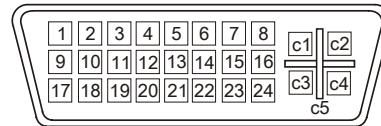


Table 27: DVI interface - Pinout

2.5.3.2 USB communication in SDL and DVI mode

Information:

The USB transfer rate is limited to USB 1.1 in SDL mode.

In DVI mode, the maximum USB transfer rate is determined by the USB interface and USB hub on the industrial PC.

2.5.3.3 Cable lengths and resolutions for SDL transmission

The following table lists the relationship between segment lengths and maximum resolution depending on the SDL cable being used:

| 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.0018-00 | 5CASDL.0018-00 | 5CASDL.0018-00 | 5CASDL.0018-00 | 5CASDL.0018-00 | 5CASDL.0018-00 |
| | 5CASDL.0018-01 | 5CASDL.0018-01 | 5CASDL.0018-01 | 5CASDL.0018-01 | 5CASDL.0018-01 | 5CASDL.0018-01 | 5CASDL.0018-01 |
| | 5CASDL.0018-03 | 5CASDL.0018-03 | 5CASDL.0018-03 | 5CASDL.0018-03 | 5CASDL.0018-03 | 5CASDL.0018-03 | 5CASDL.0018-03 |
| 5 | 5CASDL.0050-00 | 5CASDL.0050-00 | 5CASDL.0050-00 | 5CASDL.0050-00 | 5CASDL.0050-00 | 5CASDL.0050-00 | 5CASDL.0050-00 |
| | 5CASDL.0050-01 | 5CASDL.0050-01 | 5CASDL.0050-01 | 5CASDL.0050-01 | 5CASDL.0050-01 | 5CASDL.0050-01 | 5CASDL.0050-01 |
| | 5CASDL.0050-03 | 5CASDL.0050-03 | 5CASDL.0050-03 | 5CASDL.0050-03 | 5CASDL.0050-03 | 5CASDL.0050-03 | 5CASDL.0050-03 |
| 10 | 5CASDL.0100-00 | 5CASDL.0100-00 | 5CASDL.0100-00 | 5CASDL.0100-00 | 5CASDL.0100-00 | 5CASDL.0100-00 | 5CASDL.0100-00 |
| | 5CASDL.0100-01 | 5CASDL.0100-01 | 5CASDL.0100-01 | 5CASDL.0100-01 | 5CASDL.0100-01 | 5CASDL.0100-01 | 5CASDL.0100-01 |
| | 5CASDL.0100-03 | 5CASDL.0100-03 | 5CASDL.0100-03 | 5CASDL.0100-03 | 5CASDL.0100-03 | 5CASDL.0100-03 | 5CASDL.0100-03 |
| 15 | 5CASDL.0150-00 | 5CASDL.0150-00 | 5CASDL.0150-00 | 5CASDL.0150-00 | 5CASDL.0150-00 | - | - |
| | 5CASDL.0150-01 | 5CASDL.0150-01 | 5CASDL.0150-01 | 5CASDL.0150-01 | 5CASDL.0150-01 | - | - |
| | 5CASDL.0150-03 | 5CASDL.0150-03 | 5CASDL.0150-03 | 5CASDL.0150-03 | 5CASDL.0150-03 | - | 5CASDL.0150-03 |
| 20 | 5CASDL.0200-00 | 5CASDL.0200-00 | 5CASDL.0200-00 | 5CASDL.0200-00 | 5CASDL.0200-00 | - | - |
| | 5CASDL.0200-03 | 5CASDL.0200-03 | 5CASDL.0200-03 | 5CASDL.0200-03 | 5CASDL.0200-03 | - | 5CASDL.0200-03 |
| 25 | 5CASDL.0250-00 | 5CASDL.0250-00 | 5CASDL.0250-00 | 5CASDL.0250-00 | - | - | - |
| | 5CASDL.0250-03 | 5CASDL.0250-03 | 5CASDL.0250-03 | 5CASDL.0250-03 | - | - | - |
| 30 | 5CASDL.0300-00 | 5CASDL.0300-00 | - | - | - | - | - |
| | 5CASDL.0300-03 | 5CASDL.0300-03 | 5CASDL.0300-13 | 5CASDL.0300-13 | 5CASDL.0300-13 | - | 5CASDL.0300-13 |
| 40 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | - | 5CASDL.0400-13 |

Table 28: Cable lengths and resolutions for SDL transmission

2.5.3.4 Cable lengths and resolutions for DVI transmission

The following table lists the relationship between segment lengths and maximum resolution depending on the DVI cable being used:

| 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 |

Table 29: Cable lengths and resolutions for DVI transmission

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

2.5.4 USB interfaces

The link module is equipped with a USB 2.0 (Universal Serial Bus) host controller with multiple USB interfaces, 2 of which are accessible externally for the user.

Warning!

Peripheral USB devices can be connected to the USB interfaces on this device. Due to the large number of USB devices available on the market, B&R cannot guarantee their performance. All USB devices provided by B&R are guaranteed to function properly.

Caution!

Because this interface is designed according to general PC specifications, extreme care should be exercised with regard to EMC, cable routing, etc.

USB1, USB2

The USB1 and USB2 interfaces are available for the user to connect USB devices.

Depending on the transfer method (SDL or DVI mode), the transfer rate of the USB1 and USB2 interfaces may be limited. Possible transfer methods are listed in the section "Connection options" on page 16.

| Transfer method | USB type | Max. cable length |
|------------------------|----------|-------------------|
| SDL mode 1 | USB 1.1 | 40 m |
| SDL mode 2 | USB 2.0 | 5 m |
| DVI mode, single-touch | USB 2.0 | 5 m |
| DVI mode, multi-touch | USB 2.0 | 5 m |

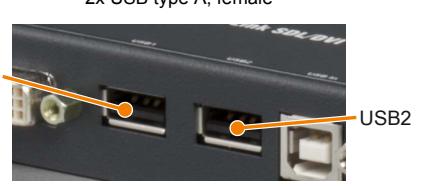
| Universal Serial Bus (USB1, USB2) ¹⁾ | | |
|---|---|---|
| Type | USB 2.0 | 2x USB type A, female |
| Design | Type A | |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) | |
| Current load ²⁾ USB1, USB2 | Total max. 1 A | |
| Cable length USB 2.0 | Max. 5 m (without hub) |  |

Table 30: USB1/USB2 interface

- 1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering may differ from that used by the particular operating system.
- 2) The USB interfaces are protected by a shared, maintenance-free "USB current-limiting circuit breaker" (total max. 1 A).

Front USB

The Automation Panel 1000 display units with 10.4", 12.1" (4:3 format only), 15" and 19" display sizes are equipped with a USB 2.0 interface on the front. For more information, see the section "USB interface" on page 47.

2.5.5 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 the USB interface on the output device (e.g. B&R Industrial PC) when using DVI mode or SDL operating mode 2 as the transfer method. Possible transfer methods are listed in the section "Connection options" on page 16.

If the interface is connected to an output device (B&R Industrial PC), then USB 2.0 transfer rates are possible on the USB1 and USB2 interfaces.

| USB In interface ¹⁾ | |
|--------------------------------|---|
| Type | USB 2.0 |
| Design | Type B |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load ²⁾ | Max. 500 mA |
| Cable length | Max. 5 m (without hub) |
| | |



Table 31: USB In interface

- 1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering may differ from that used by the particular operating system.
- 2) Each USB interface is protected by a maintenance-free "USB current-limiting circuit breaker" (max. 500 mA).

2.5.6 COM serial interface

The serial interface is only available for use with single-touch displays in DVI mode. It is used to transfer data from the resistive touch screen and must be connected to a serial interface on the output device.

| COM serial interface ¹⁾ | |
|------------------------------------|---|
| RS232 | |
| Type | RS232, modem-capable, not electrically isolated |
| UART | 16550-compatible, 16-byte FIFO |
| Transfer rate | Max. 115 kbit/s |
| Bus length | Max. 15 m |
| Pin | Assignment |
| 1 | N/C |
| 2 | RXD |
| 3 | TXD |
| 4 | N/C |
| 5 | GND |
| 6 | N/C |
| 7 | RTS |
| 8 | CTS |
| 9 | N/C |

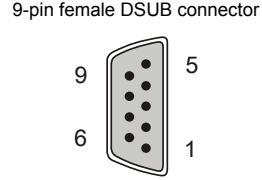


Table 32: COM - Pinout

- 1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering may differ from that used by the particular operating system.

2.5.7 Brightness controls

The brightness controls can be used to configure the brightness of the backlight on the Automation Panel in DVI mode. These buttons have no effect in SDL mode; in this case, the brightness can only be configured in the Control Center.

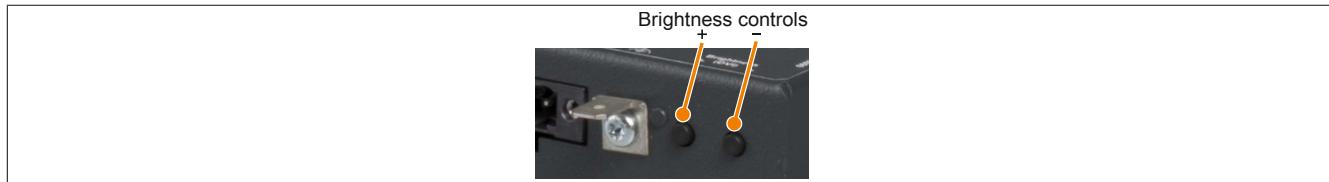


Figure 13: Brightness controls

2.6 5DLSD3.1001-00 SDL/DVI receiver - Device interfaces

2.6.1 Overview

SDL3 receiver interfaces are located on the back of the Automation Panel 1000.

Information about SDL3 mode can be found in section "SDL3 mode" on page 19.

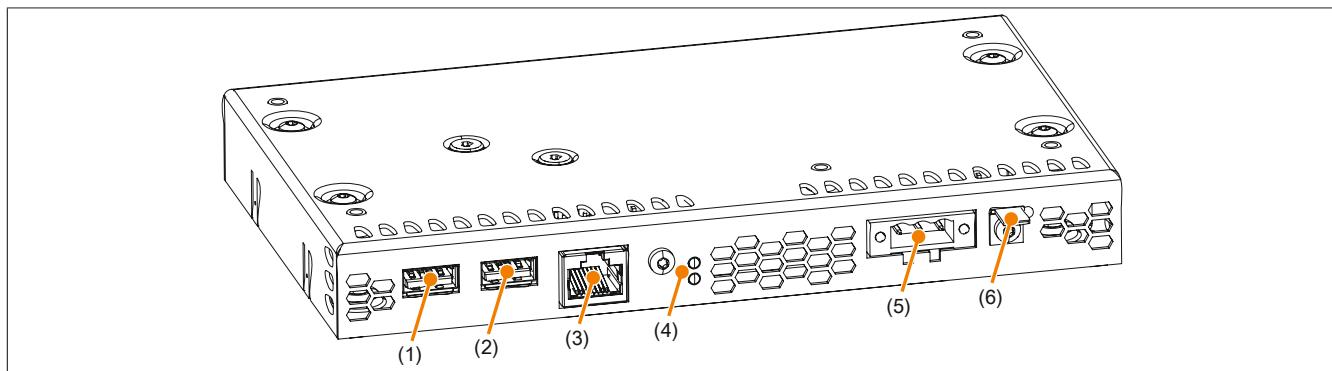


Figure 14: Overview of interfaces - SDL3 receiver link module

| No. | Type of interface | No. | Type of interface |
|-----|---------------------|-----|--------------------------|
| 1 | "USB interfaces" | 4 | "SDL3 In LEDs" |
| 2 | "USB interfaces" | 5 | "+24 VDC voltage supply" |
| 3 | "SDL3 In interface" | 6 | "Grounding" |

2.6.2 +24 VDC voltage supply

The 3-pin male connector required for the power supply interface is not included in delivery. It can be ordered from B&R using model number 0TB103.9 (screw clamps) or 0TB103.91 (cage clamp terminal block).

The pinout is listed in the following table. The supply voltage is protected internally by a soldered fuse (10 A, fast-acting) to prevent damage to the device in the event of an overload (fuse replacement necessary) or if the voltage supply is connected incorrectly (reverse polarity protection -> fuse replacement not necessary). The device must be returned to B&R for repairs if the fuse is blown in the event of an error.

| | | +24 VDC power supply | |
|-----------------|--|------------------------------------|--|
| | | Protected against reverse polarity | |
| Pin | | Description | |
| 1 | | + | |
| 2 | | Functional ground | |
| 3 | | - | |
| Model number | Short description | | |
| Terminal blocks | | | |
| 0TB103.9 | Male connector 24 V 5.08 3-pin screw clamps | | |
| 0TB103.91 | Male connector 24 V 5.08 3-pin cage clamp terminal block | | |



Table 33: +24 VDC voltage supply connection

| Electrical characteristics | |
|-----------------------------------|-------------|
| Nominal voltage | 24 VDC ±25% |
| Nominal current | Max. 3 A |
| Electrical isolation | Yes |
| Uninterruptible power supply | No |

2.6.2.1 Grounding

Caution!

Functional ground (pin 2 of power supply and ground connection) must be kept as short as possible and connected to the largest possible wire cross section at the central grounding point (e.g. the control cabinet or system).

The ground connection is located next to the power supply for the link module.

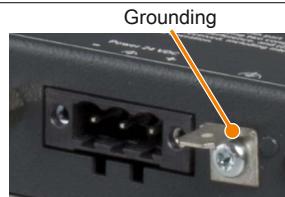


Figure 15: Ground connection

The ground connection must be used, for example, to fasten a copper strip to a central grounding point in the control cabinet or system where the device is installed. The largest possible conductor cross section should be used (at least 2.5 mm²).

2.6.3 SDL3 In interface

The SDL3 In interface is a female RJ45 connector and operated with SDL3 transmission technology. For more information, see the section "SDL3 mode" on page 19.

| SDL3 In interface - SDL3 | |
|---|---------------|
| The following overview lists the video signals available on the panel input. For additional details, see the technical data for the link module or display unit being used. | |
| Link module | Video signals |
| 5DLSD3.1001-00 | SDL3 |
| | |

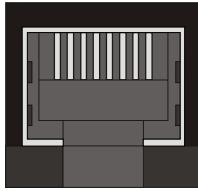


Table 34: SDL3 In interface

Information:

The hardware and graphics drivers of approved operating systems support the hot plugging of display devices to the SDL3 In interface for service purposes. The female RJ45 connector is specified for 500 connection cycles.

Information:

If a display device with touch screen is connected to the SDL3 In interface and then disconnected again during operation (hot plugging), it may be necessary to recalibrate the touch screen.

2.6.3.1 Cable lengths and resolutions for SDL3 transmission

The following table lists the relationship between segment lengths and maximum resolution depending on the SDL3 cable being used:

| SDL3 cable | 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 |
| 5 | 5CASD3.0050-00 | 5CASD3.0050-00 | 5CASD3.0050-00 | 5CASD3.0050-00 | 5CASD3.0050-00 | 5CASD3.0050-00 | 5CASD3.0050-00 |
| 10 | 5CASD3.0100-00 | 5CASD3.0100-00 | 5CASD3.0100-00 | 5CASD3.0100-00 | 5CASD3.0100-00 | 5CASD3.0100-00 | 5CASD3.0100-00 |
| 15 | 5CASD3.0150-00 | 5CASD3.0150-00 | 5CASD3.0150-00 | 5CASD3.0150-00 | 5CASD3.0150-00 | 5CASD3.0150-00 | 5CASD3.0150-00 |
| 20 | 5CASD3.0200-00 | 5CASD3.0200-00 | 5CASD3.0200-00 | 5CASD3.0200-00 | 5CASD3.0200-00 | 5CASD3.0200-00 | 5CASD3.0200-00 |
| 30 | 5CASD3.0300-00 | 5CASD3.0300-00 | 5CASD3.0300-00 | 5CASD3.0300-00 | 5CASD3.0300-00 | 5CASD3.0300-00 | 5CASD3.0300-00 |
| 50 | 5CASD3.0500-00 | 5CASD3.0500-00 | 5CASD3.0500-00 | 5CASD3.0500-00 | 5CASD3.0500-00 | 5CASD3.0500-00 | 5CASD3.0500-00 |
| 100 | 5CASD3.1000-00 | 5CASD3.1000-00 | 5CASD3.1000-00 | 5CASD3.1000-00 | 5CASD3.1000-00 | 5CASD3.1000-00 | 5CASD3.1000-00 |

Table 35: Cable lengths and resolutions for SDL3 transmission

2.6.4 SDL3 In LEDs

The SDL3 In LEDs are located next to the SDL3 In interface.

| SDL3 In LEDs | | | |
|--------------|--------|----------|--|
| LED | Color | Status | Function |
| Link | Yellow | On | Indicates an active SDL3 connection |
| | | Off | No active SDL3 connection |
| Status | Yellow | On | SDL3 connection established and OK |
| | | Off | No active SDL3 connection |
| | | Blinking | Indicates the SDL3 connection is OK, but a firmware image is corrupt |



Table 36: SDL3 In LEDs

2.6.5 USB interfaces

The link module is equipped with a USB 2.0 (Universal Serial Bus) host controller with multiple USB interfaces, 2 of which are accessible externally for the user.

Warning!

Peripheral USB devices can be connected to the USB interfaces on this device. Due to the large number of USB devices available on the market, B&R cannot guarantee their performance. All USB devices provided by B&R are guaranteed to function properly.

Caution!

Because this interface is designed according to general PC specifications, extreme care should be exercised with regard to EMC, cable routing, etc.

USB1, USB2

The USB1 and USB2 interfaces are available for the user to connect USB devices.

| Universal Serial Bus (USB1, USB2) ¹⁾ | |
|---|--|
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (30 Mbit/s) |
| Current load ²⁾ USB1, USB2 | Total max. 1 A |
| Cable length USB 2.0 | Max. 5 m (without hub) |
| | |

2x USB type A, female

USB1 USB2

Table 37: USB1/USB2 interface

- 1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering may differ from that used by the particular operating system.
- 2) The USB interfaces are protected by a shared, maintenance-free "USB current-limiting circuit breaker" (total max. 1 A).

Front USB

The Automation Panel 1000 display units with 10.4", 12.1" (4:3 format only), 15" and 19" display sizes are equipped with a USB 2.0 interface on the front. For more information, see the section "USB interface" on page 47.

2.7 Layout of AP1000 display units

Different display sizes as well as display units with touch screen can be chosen from. The following table provides an overview of the display units and their features.

| Display type | Model number | Resolution | Touch screen | Function keys | System keys | USB front interface |
|------------------------------|------------------|------------|--------------|---------------|-------------|---------------------|
| 5.7" single-touch | 5AP1120.0573-000 | VGA | Single-touch | No | No | No |
| 5.7" keys | 5AP1151.0573-000 | VGA | No | Yes | Yes | No |
| 7.0" single-touch | 5AP1120.0702-000 | WVGA | Single-touch | No | No | No |
| 10.1" single-touch | 5AP1120.101E-000 | WXGA | Single-touch | No | No | No |
| 10.4" single-touch | 5AP1120.1043-000 | VGA | Single-touch | No | No | Yes |
| 10.4" single-touch with keys | 5AP1180.1043-000 | VGA | Single-touch | Yes | No | Yes |
| 10.4" single-touch with keys | 5AP1181.1043-000 | VGA | Single-touch | Yes | Yes | Yes |
| 10.4" single-touch with keys | 5AP1182.1043-000 | VGA | Single-touch | Yes | Yes | Yes |
| 12.1" single-touch | 5AP1120.1214-000 | SVGA | Single-touch | No | No | Yes |
| 12.1" single-touch | 5AP1120.121E-000 | WXGA | Single-touch | No | No | No |
| 15.0" single-touch | 5AP1120.1505-000 | XGA | Single-touch | No | No | Yes |
| 15.0" single-touch with keys | 5AP1180.1505-000 | XGA | Single-touch | Yes | No | Yes |
| 15.6" single-touch | 5AP1120.156B-000 | HD | Single-touch | No | No | No |
| 19.0" single-touch | 5AP1120.1906-000 | SXGA | Single-touch | No | No | Yes |

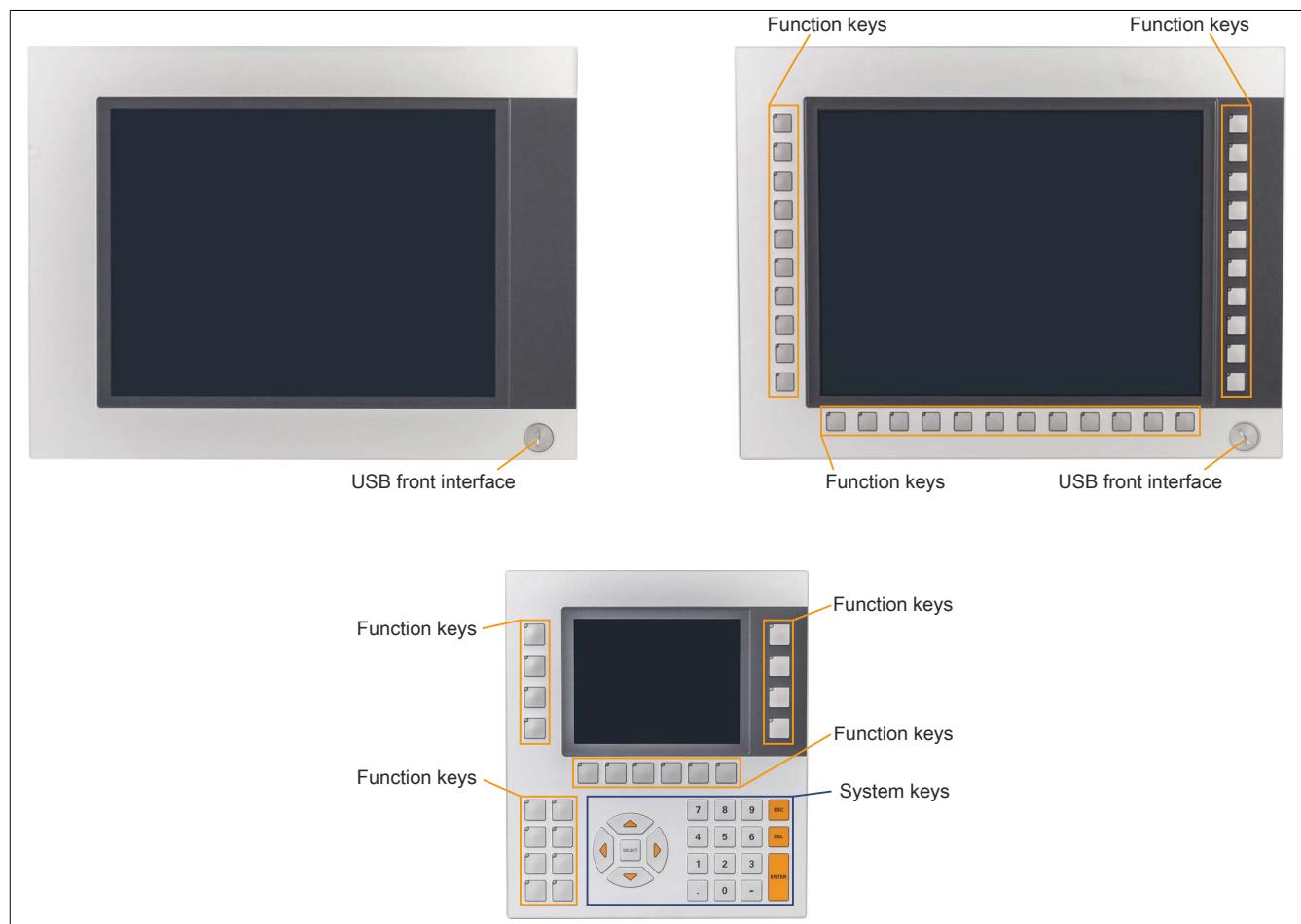


Figure 16: Layout of AP1000 display units

2.7.1 Slide-in labels

Display units with keys come with inserted, transparent slide-in labels in the function keys on delivery. These labels can be written on by hand.

The slide-in label slots are accessible on the back of the Automation Panel device.

2.7.2 Key and LED configuration

Each button and LED can be individually configured and adapted directly to the application. Various B&R tools are available for this:

- B&R Key Editor for Windows operating systems
- Visual Components for Automation Runtime

Keys and LEDs from each device are processed by the matrix controller in a bit sequence of 128 bits each.

The positions of keys and LEDs in the matrix are shown as hardware numbers. These hardware numbers can be read directly from the target system using the B&R Key Editor or B&R Control Center.

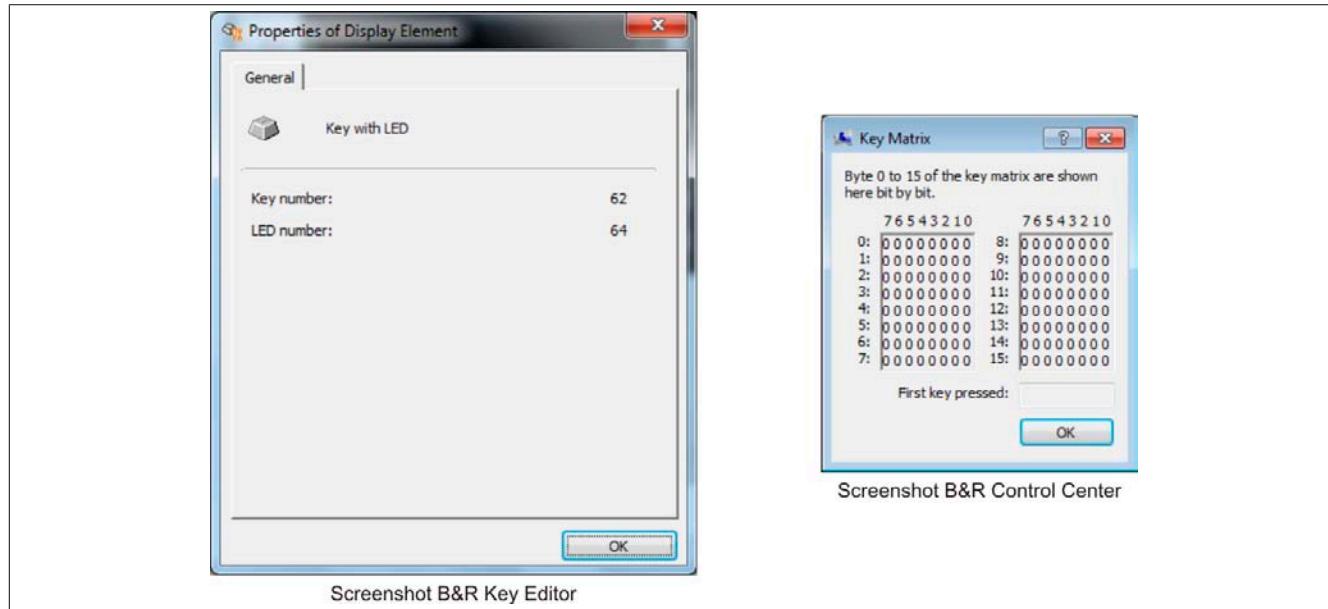


Figure 17: Hardware numbers in the B&R Key Editor and B&R Control Center

The images below show the positions of buttons and LEDs in the matrix. This information is indicated as follows.

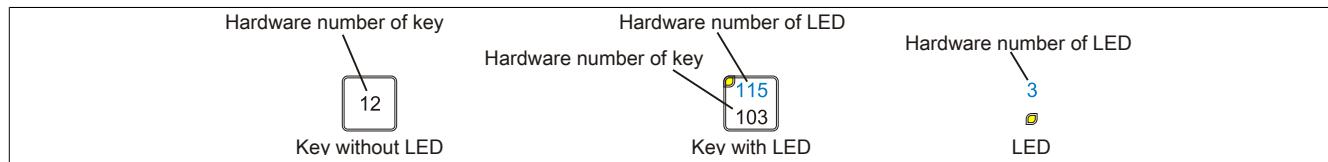


Figure 18: Display - Keys and LEDs

5AP1151.0573-000

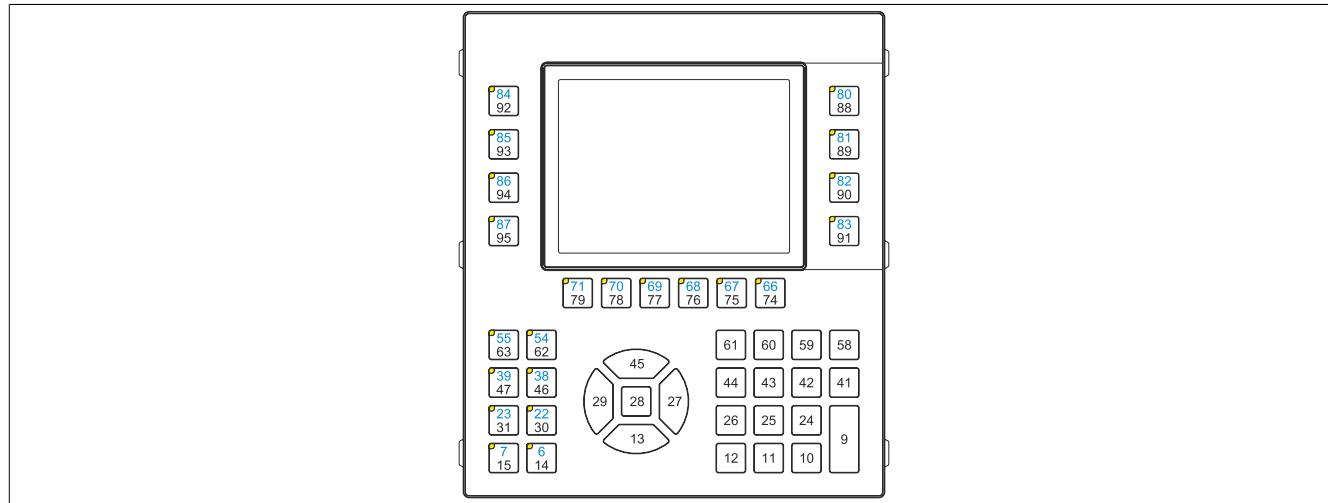


Figure 19: 5AP1151.0573-000 - Key and LED configuration

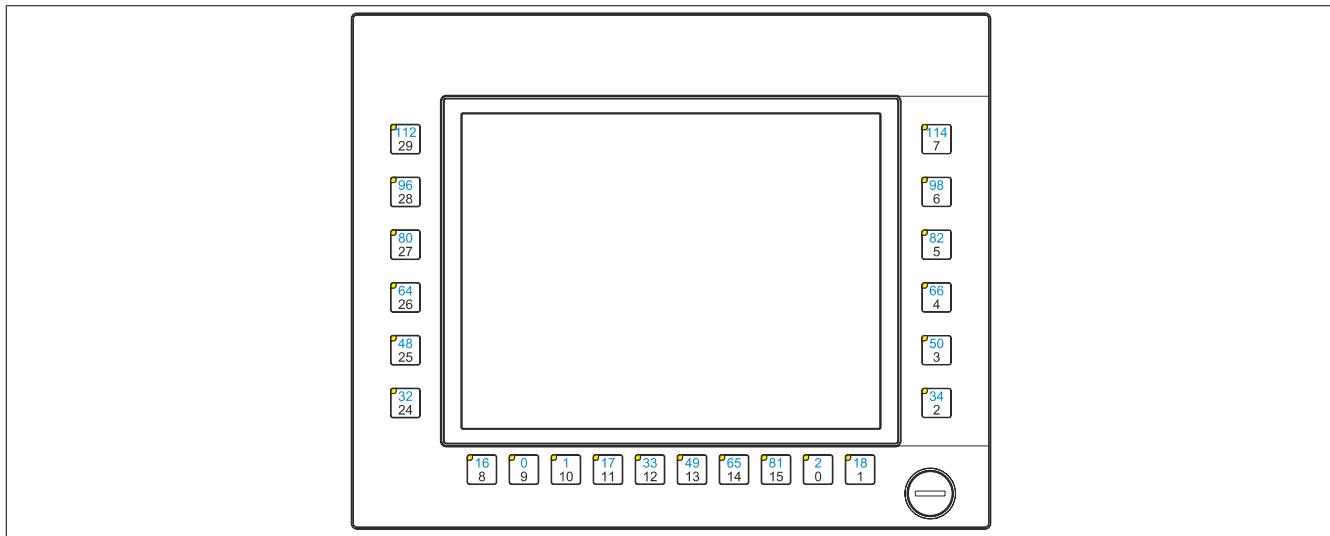
5AP1180.1043-000

Figure 20: 5AP1180.1043-000 - Key and LED configuration

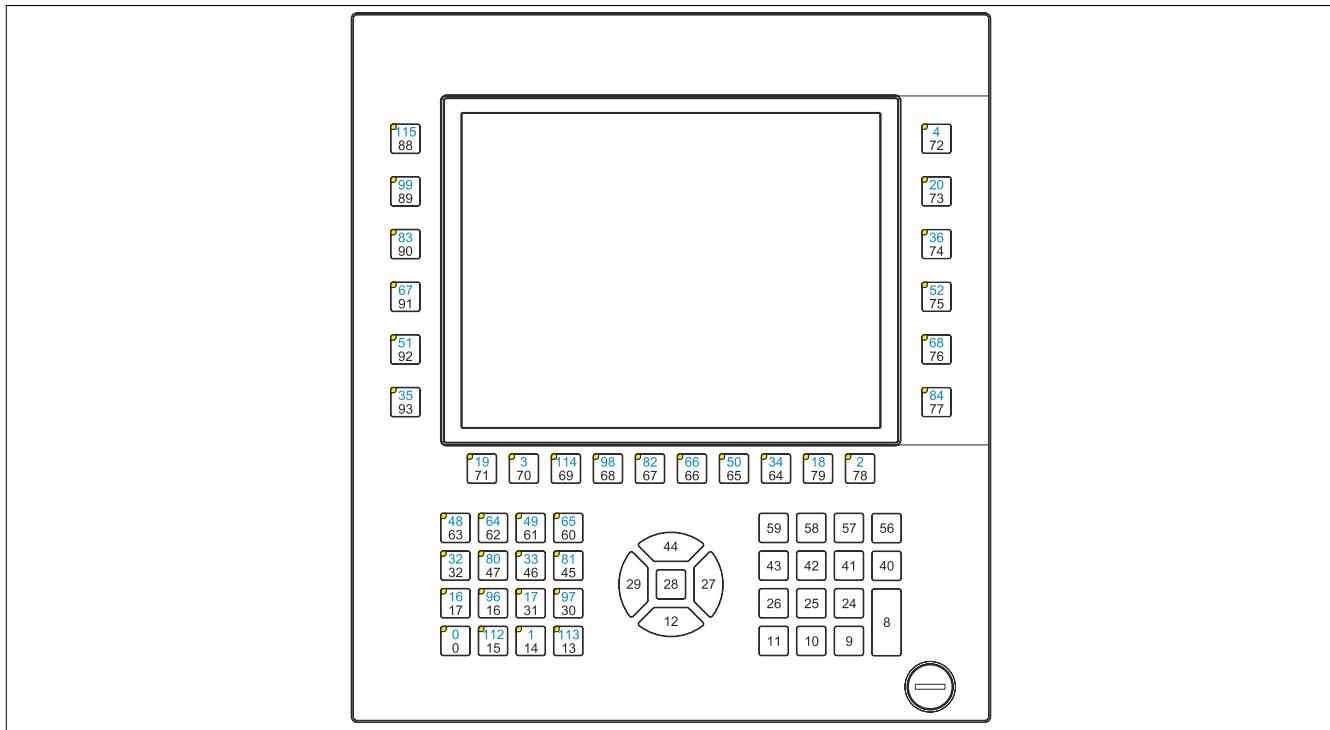
5AP1181.1043-000

Figure 21: 5AP1181.1043-000 - Key and LED configuration

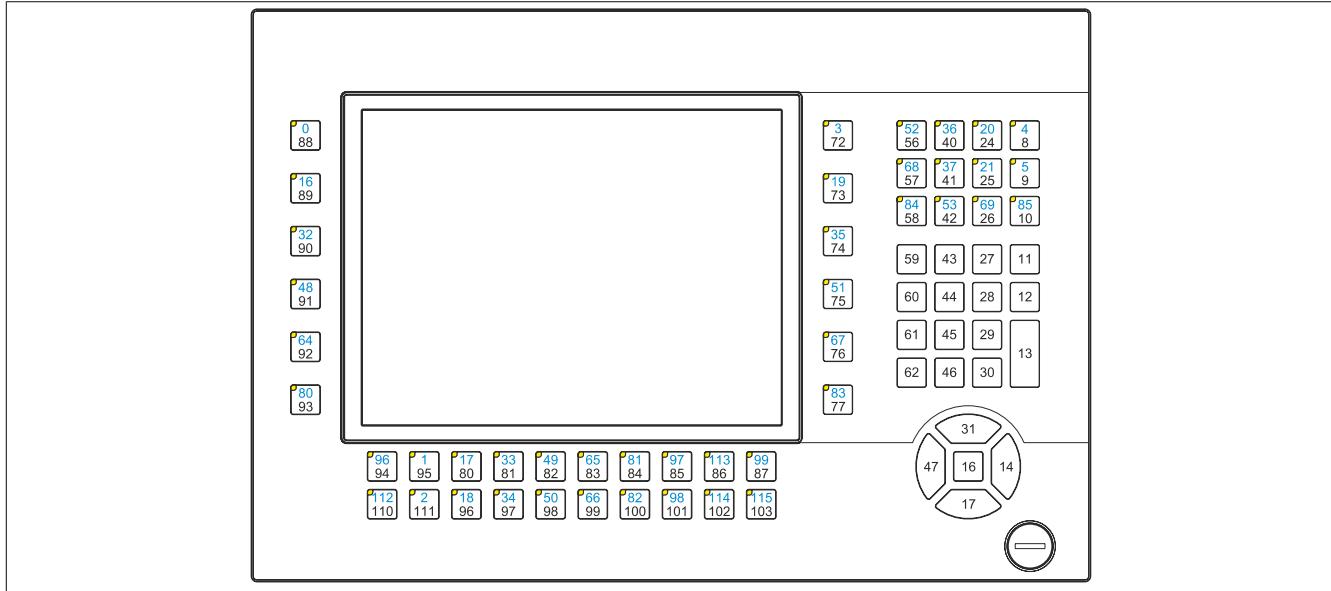
5AP1182.1043-000

Figure 22: 5AP1182.1043-000 - Key and LED configuration

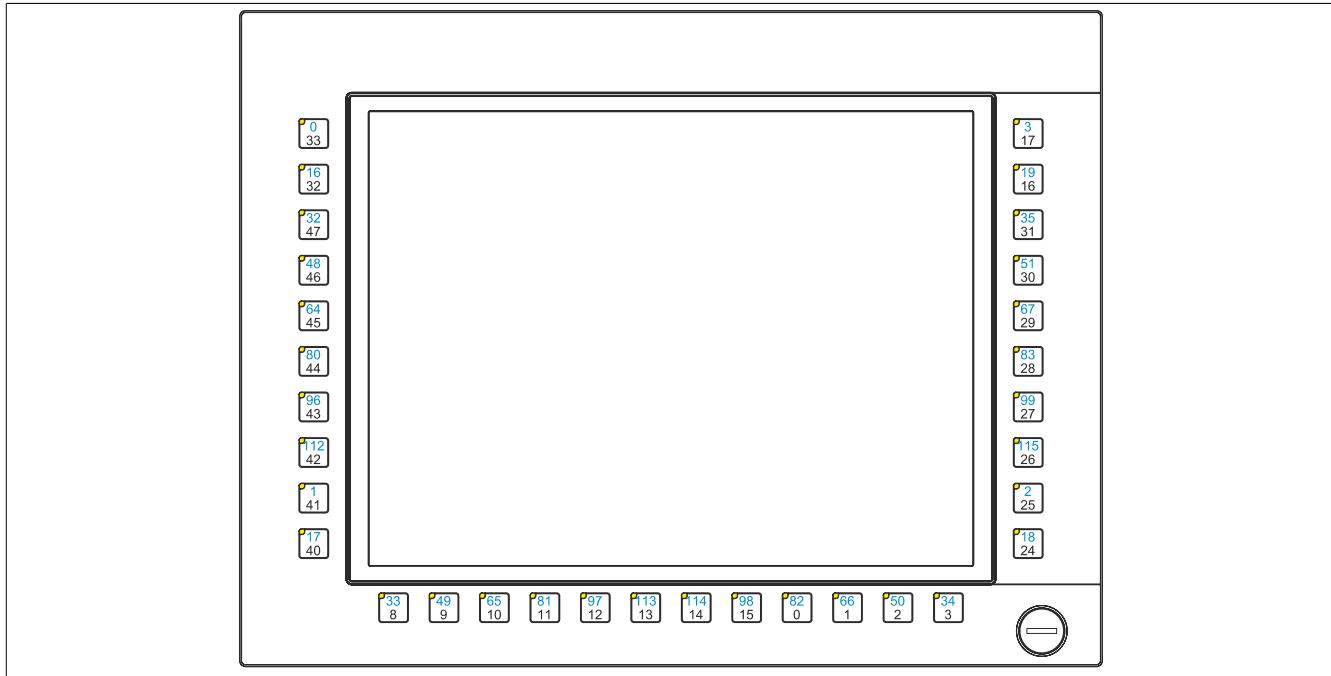
5AP1180.1505-000

Figure 23: 5AP1180.1505-000 - Key and LED configuration

2.7.3 USB interface

The AP 1000 display units with 10.4", 12.1" (4:3 format only), 15" and 19" display sizes are equipped with a USB 2.0 interface on the front. This is equipped with a USB interface cover. IP65 protection (front) is only provided if the USB interface cover is installed correctly.

Warning!

Peripheral USB devices can be connected to the USB interfaces on this device. Due to the large number of USB devices available on the market, B&R cannot guarantee their performance. All USB devices provided by B&R are guaranteed to function properly.

Caution!

Because this interface is designed according to general PC specifications, extreme care should be exercised with regard to EMC, cable routing, etc.

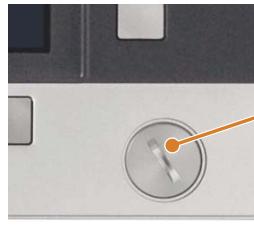
Front USB

The front USB interface is available to the user for service purposes.

Depending on the transfer method (SDL or DVI mode), the transfer rate of the USB1 and USB2 interfaces may be limited. Possible transfer methods are listed in the section "Connection options" on page 16.

| Transfer method | USB type | Max. cable length |
|------------------------|----------|-------------------|
| SDL mode 1 | USB 1.1 | 40 m |
| SDL mode 2 | USB 2.0 | 5 m |
| DVI mode, single-touch | USB 2.0 | 5 m |
| DVI mode, multi-touch | USB 2.0 | 5 m |
| SDL3 mode | USB 2.0 | 100 m |

| Universal Serial Bus (front USB) ¹⁾ | |
|--|---|
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) ²⁾ |
| Current load ³⁾ Front USB | Max. 500 mA |
| Cable length USB 2.0 | Max. 5 m (without hub) |



1x USB type A, female (sample image)

Front USB interface

Table 38: Front USB interface

- 1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering may differ from that used by the particular operating system.
- 2) In SDL3 mode: Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (30 Mbit/s)
- 3) The USB interface is protected by a maintenance-free "USB current-limiting circuit breaker" (max. 500 mA).

2.8 Mounting compatibility

This section describes the compatibility of the installation dimensions for Power Panel 100/200, Power Panel 300/400, Power Panel 500, Automation Panel 900, Automation Panel 1000, Automation Panel 700 and Panel PC 800 devices according to device display size.

The outer dimensions of the device types are identical for the respective display sizes.

Information:

The AP1000 device name refers to the Automation Panel 1000 as well as the Panel PC 900 and Panel PC 2100 with a built in AP1000 display unit.

The different device types are abbreviated as follows:

| Device type | Abbreviation |
|-----------------------|--------------|
| Power Panel 100/200 | PP100/200 |
| Power Panel 300/400 | PP300/400 |
| Power Panel 500 | PP500 |
| Automation Panel 900 | AP900 |
| Automation Panel 1000 | AP1000 |
| Panel PC 700 | PPC700 |
| Panel PC 800 | PPC800 |

Table 39: Product abbreviations

2.8.1 Compatibility overview

The following table provides an overview of PP100/200, PP300/400, PP500, AP900, AP1000, PPC700 and PPC800 devices. Detailed information can be found in section "Compatibility details".

Information:

**Cutout tolerance values for the PP100/200, PP300/400, PP500, AP900, PPC700 and PPC800 are $\pm 0,5$ mm.
The cutout tolerance values from the AP1000 are +0 mm/-0.5 mm.**

Compatibility between device types is represented on each line by matching symbols.

| Display size | Format | | PP100/200 | PP300/400 | PP500 | AP900 | AP1000 ¹⁾ | PPC700 | PPC800 |
|--------------|-------------|-------------------------|---------------|---------------|-------------|-------------|----------------------|-------------|--------|
| 5.7" | Horizontal1 | Outer dimensions | ■ 212 x 156 | ■ 212 x 156 | ■ 212 x 156 | - | ■ 212 x 156 | - | - |
| | | Installation dimensions | ● 199 x 143 | ● 199 x 143 | ● 199 x 143 | - | ● 199 x 143 | - | - |
| | Horizontal2 | Outer dimensions | ■ 302 x 187 | ■ 302 x 187 | ■ 302 x 187 | - | - | - | - |
| | | Installation dimensions | ● 289 x 174 | ● 289 x 174 | ● 289 x 174 | - | - | - | - |
| | Vertical1 | Outer dimensions | ■ 212 x 245 | ■ 212 x 245 | ■ 212 x 245 | - | ■ 212 x 245 | - | - |
| | | Installation dimensions | ● 199 x 226.8 | ● 199 x 226.8 | ▲ 199 x 232 | - | ▲ 199 x 232 | - | - |
| 7" | Horizontal1 | Outer dimensions | - | - | ■ 212 x 156 | - | ■ 212 x 156 | - | - |
| | | Installation dimensions | - | - | ▲ 199 x 143 | - | ▲ 199 x 143 | - | - |
| 10.4" | Horizontal1 | Outer dimensions | ■ 323 x 260 | ■ 323 x 260 | ■ 323 x 260 | ■ 323 x 260 | ■ 323 x 260 | ■ 323 x 260 | - |
| | | Installation dimensions | ● 303 x 243 | ● 303 x 243 | ● 303 x 243 | ● 303 x 243 | ● 303 x 243 | ● 303 x 243 | - |
| | Horizontal2 | Outer dimensions | ■ 423 x 288 | ■ 423 x 288 | ■ 423 x 288 | ■ 423 x 288 | ■ 423 x 288 | ■ 423 x 288 | - |
| | | Installation dimensions | ● 402 x 266.5 | ● 402 x 266.5 | ▲ 403 x 271 | □ 402 x 271 | ▲ 403 x 271 | □ 402 x 271 | - |
| | Vertical1 | Outer dimensions | ■ 323 x 358 | ■ 323 x 358 | ■ 323 x 358 | ■ 323 x 358 | ■ 323 x 358 | ■ 323 x 358 | - |
| | | Installation dimensions | ● 303 x 336 | ● 303 x 336 | ▲ 303 x 341 | ▲ 303 x 341 | ▲ 303 x 341 | ▲ 303 x 341 | - |

Table 40: Overview of device compatibility

| Display size | Format | | PP100/200 | PP300/400 | PP500 | AP900 | AP1000 ¹⁾ | PPC700 | PPC800 |
|--------------|-------------|-------------------------|-------------|-------------|-------------|-------------|----------------------|-------------|-------------|
| 12.1" | Horizontal1 | Outer dimensions | ■ 362 x 284 | ■ 362 x 284 | - |
| | | Installation dimensions | ● 345 x 267 | ● 345 x 267 | ▲ 342 x 267 | ▲ 342 x 267 | ▲ 342 x 267 | ▲ 342 x 267 | - |
| 15" | Horizontal1 | Outer dimensions | ■ 435 x 330 | ■ 435 x 330 | ■ 435 x 330 |
| | | Installation dimensions | ● 415 x 312 | ● 415 x 312 | ▲ 415 x 313 | ● 415 x 312 | ▲ 415 x 313 | ● 415 x 312 | ● 415 x 312 |
| 15" | Vertical1 | Outer dimensions | ■ 435 x 430 | - | ■ 435 x 430 | - |
| | | Installation dimensions | ● 415 x 412 | ● 415 x 412 | ▲ 415 x 413 | ● 415 x 412 | - | ● 415 x 412 | - |
| 17" | Horizontal1 | Outer dimensions | - | - | - | ■ 477 x 390 | - | ■ 477 x 390 | - |
| | | Installation dimensions | - | - | - | ▲ 460 x 373 | - | ▲ 460 x 373 | - |
| 19" | Horizontal1 | Outer dimensions | - | - | - | ■ 527 x 421 | ■ 527 x 421 | ■ 527 x 421 | ■ 527 x 421 |
| | | Installation dimensions | - | - | - | ▲ 510 x 404 | ▲ 510 x 404 | ▲ 510 x 404 | ▲ 510 x 404 |
| 21.3" | Horizontal1 | Outer dimensions | - | - | - | ■ 583 x 464 | - | - | - |
| | | Installation dimensions | - | - | - | ▲ 566 x 447 | - | - | - |

Table 40: Overview of device compatibility

1) The AP1000 device name refers to the Automation Panel 1000 as well as the Panel PC 900 and Panel PC 2100 with a built in AP1000 display unit.

2.8.2 Compatibility details

2.8.2.1 Example

The dimensions (all in mm) shown in this image apply to the other figures below.

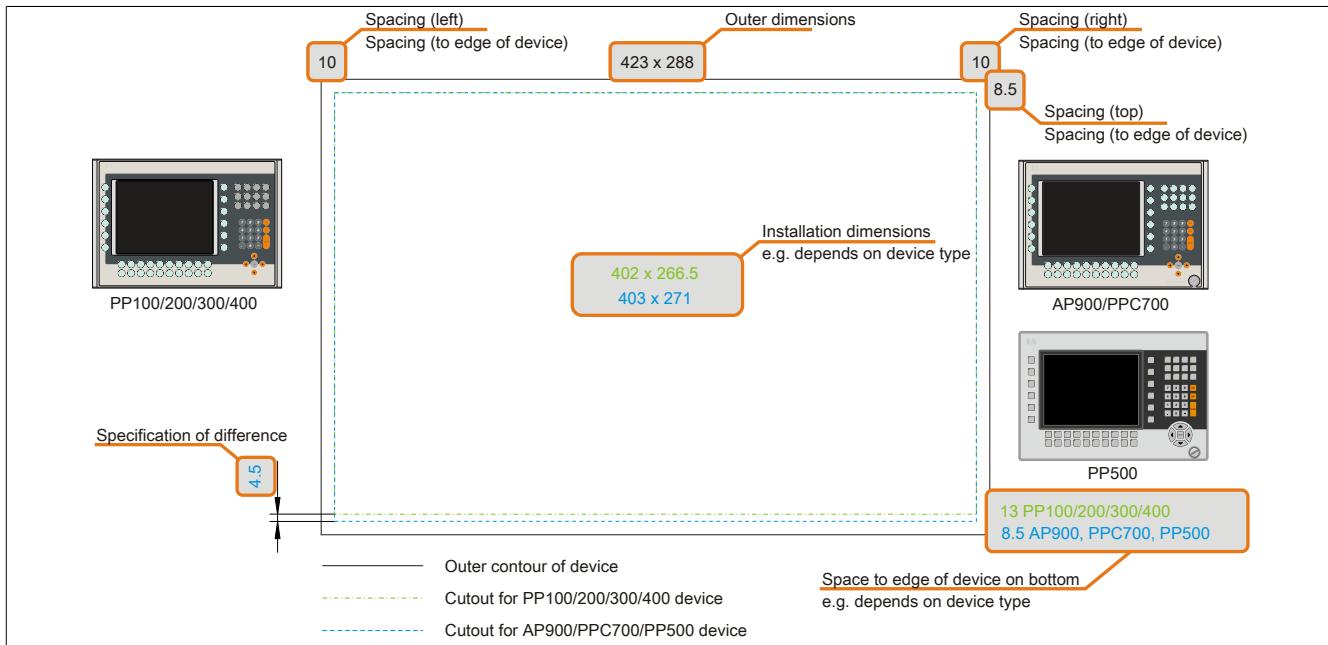


Figure 24: Overview of compatibility figures

2.8.2.2 5.7" devices

Cutout tolerance values for the PP100/200, PP300/400, PP500, AP900, PPC700 and PPC800 are ± 0.5 mm. The cutout tolerance values from the AP1000 are +0 mm/-0.5 mm.

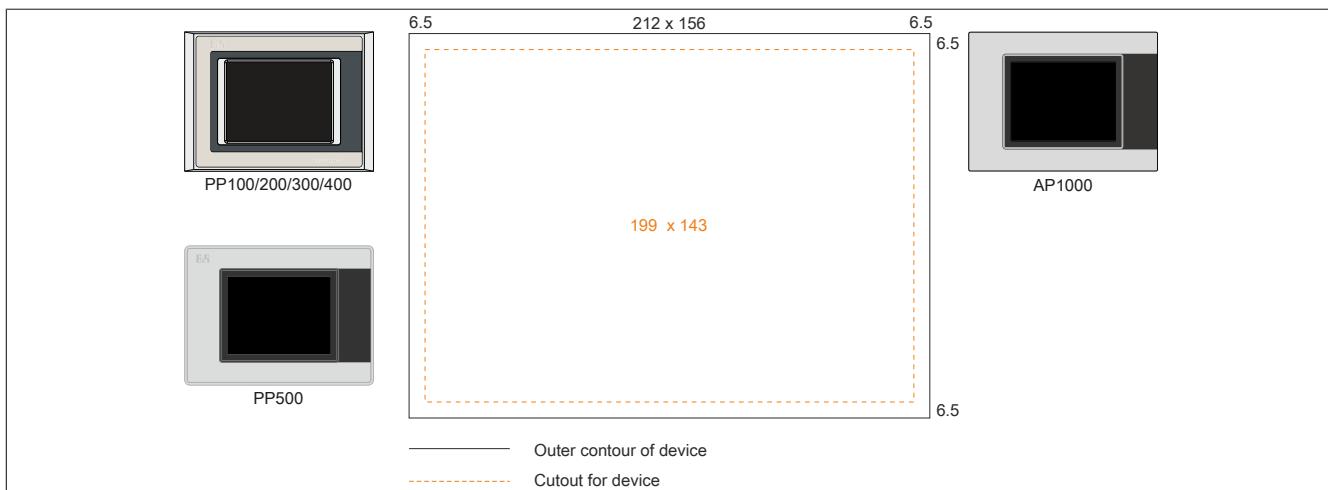


Figure 25: Mounting compatibility - 5.7" device - Horizontal1

5.7" Automation Panel 1000, Power Panel 500 devices and Power Panel 100/200/300/400 devices are 100% mounting compatible in the Horizontal1 format.

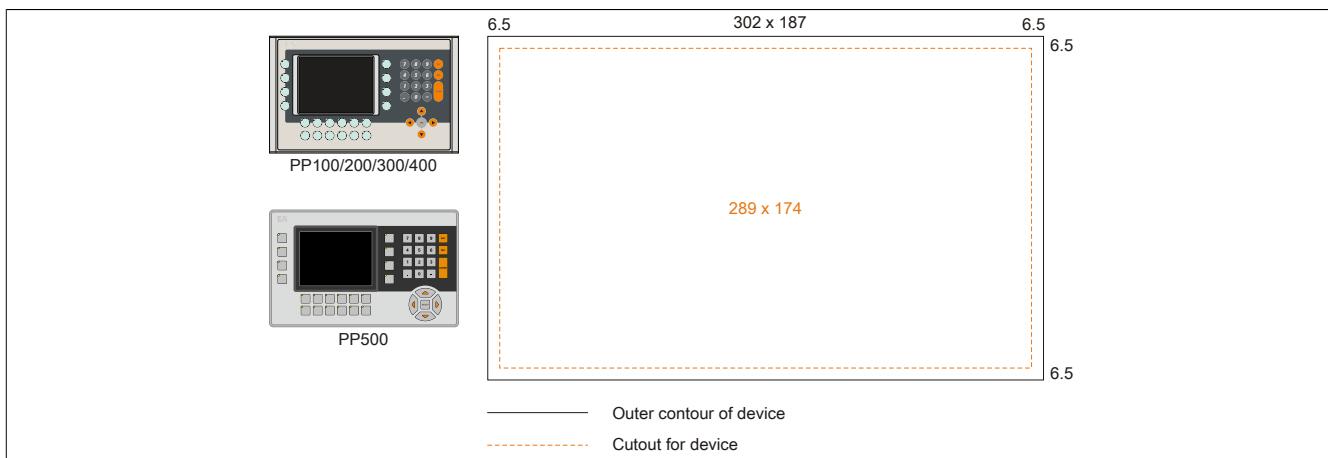


Figure 26: Mounting compatibility - 5.7" device - Horizontal2

5.7" Power Panel 500 devices and Power Panel 100/200/300/400 devices are 100% mounting compatible in the Horizontal2 format.

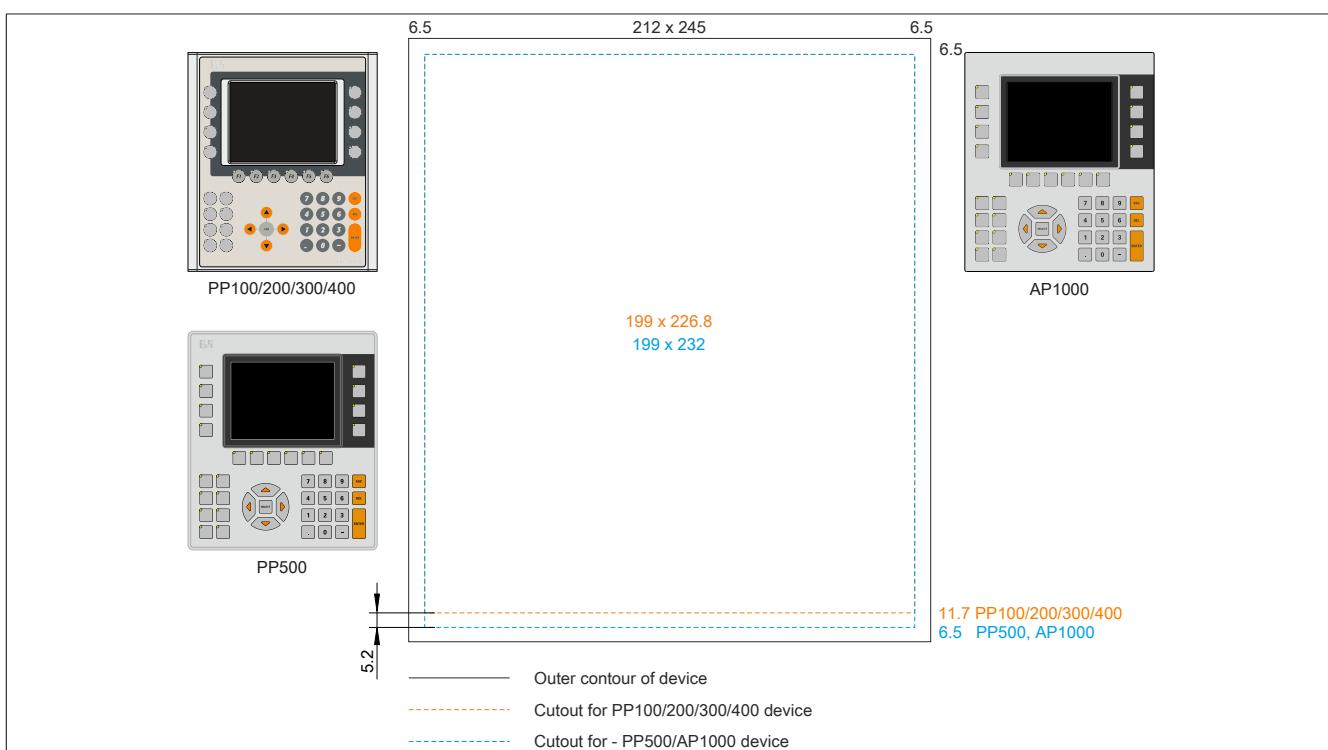


Figure 27: Mounting compatibility - 5.7" device - Vertical1

5.7" Automation Panel 1000 and Power Panel 500 devices are not 100% mounting compatible with Power Panel 100/200/300/400 devices in the Vertical1 format. Automation Panel 1000 and Power Panel 500 devices require a cutout that is 5.2 mm higher (bottom edge).

The larger cutout can be used for all devices under certain conditions:

- When mounting, make sure that the PP100/200/300/400 devices are placed and mounted as close to the center of the cutout as possible. Failure to do so can prevent the retaining clips from holding firmly, which means that a firm seal is no longer guaranteed with the gasket (IP65).

2.8.2.3 10.4" devices

Cutout tolerance values for the PP100/200, PP300/400, PP500, AP900, PPC700 and PPC800 are ± 0.5 mm. The cutout tolerance values from the AP1000 are +0 mm/-0.5 mm.

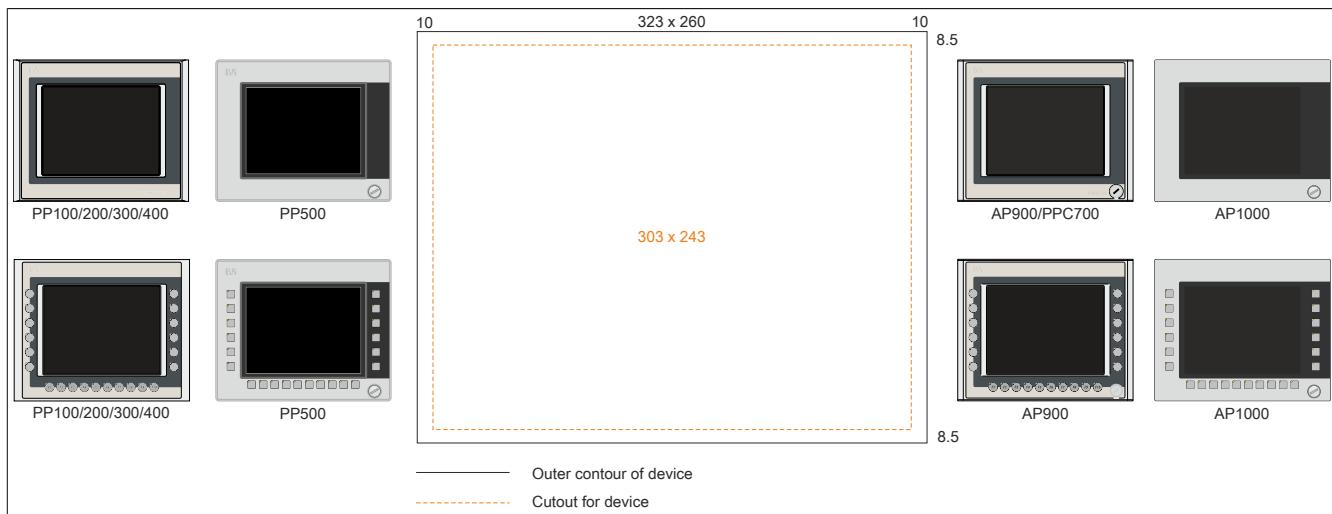


Figure 28: Mounting compatibility - 10.4" device - Horizontal1

10.4" Automation Panel 1000, Automation Panel 900, Panel PC 700, Power Panel 500 devices and Power Panel 100/200/300/400 devices are 100% mounting compatible in Horizontal1 format.

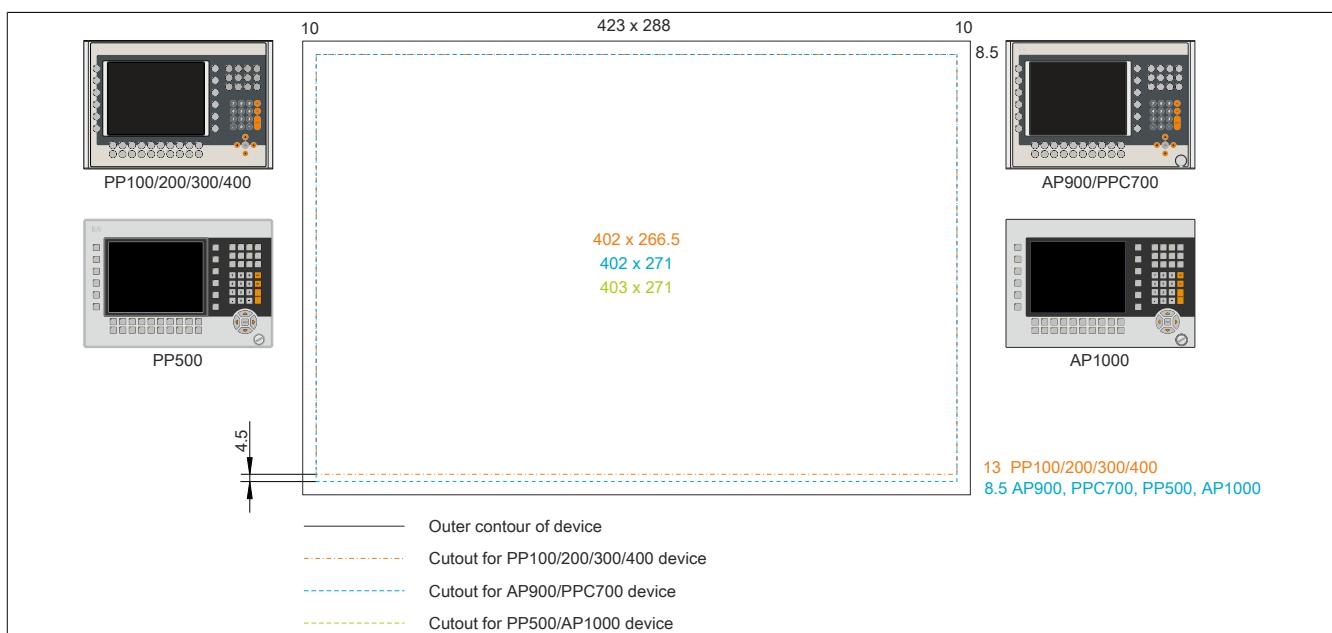


Figure 29: Mounting compatibility - 10.4" device - Horizontal2

10.4" Automation Panel 1000, Automation Panel 900, Panel PC 700 and Power Panel 500 devices are not 100% mounting compatible with Power Panel 100/200/300/400 devices in Horizontal2 format. Automation Panel 1000, Automation Panel 900, Panel PC 700 and Power Panel 500 devices require a cutout that is 4.5 mm higher (bottom edge).

The larger cutout can be used for all devices under certain conditions:

- When mounting, make sure that the PP100/200/300/400 devices are placed and mounted as close to the center of the cutout as possible. Failure to do so can prevent the retaining clips from holding firmly, which means that a firm seal is no longer guaranteed with the gasket (IP65).

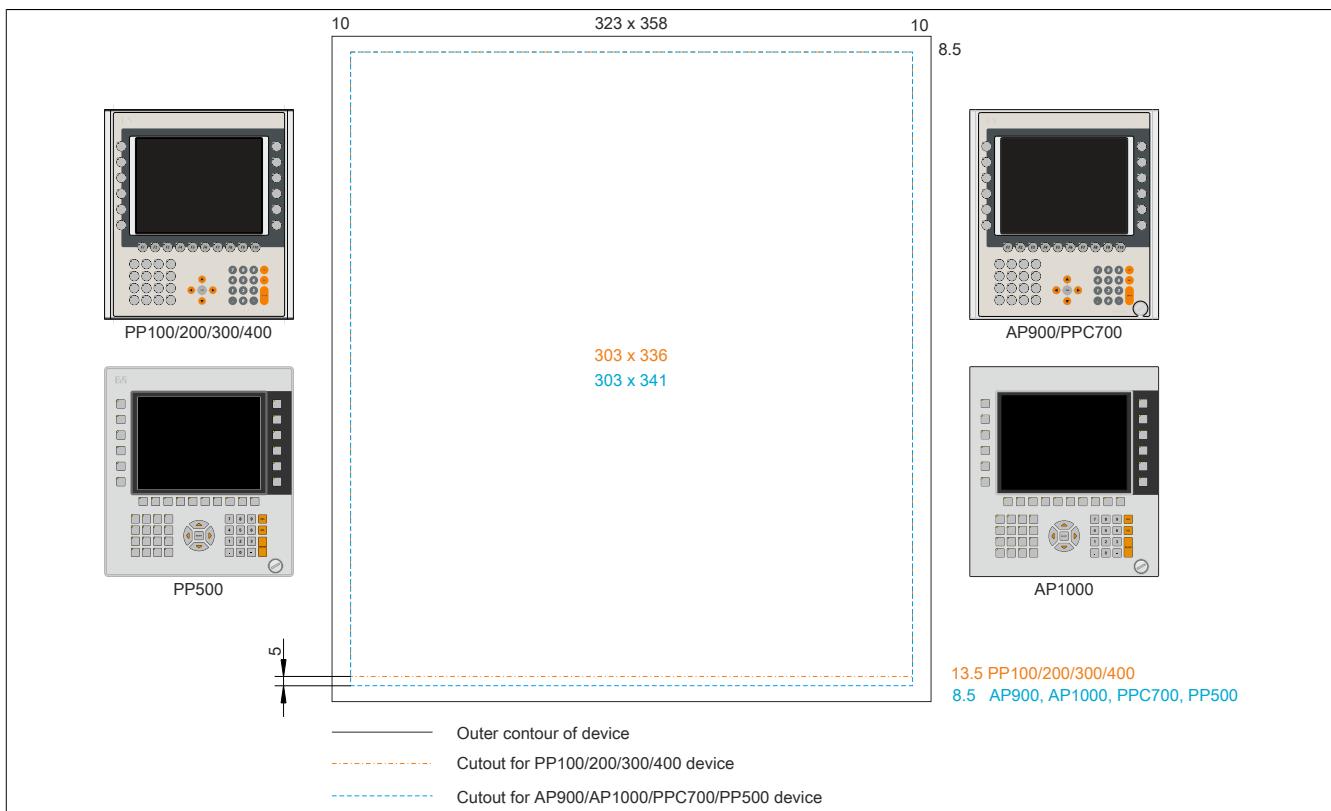


Figure 30: Mounting compatibility - 10.4" device - Vertical1

10.4" Automation Panel 1000, Automation Panel 900, Panel PC 700 and Power Panel 500 devices are not 100% mounting compatible with Power Panel 100/200/300/400 devices in Vertical1 format. Automation Panel 1000, Automation Panel 900, Panel PC 700 and Power Panel 500 devices require a cutout that is 5 mm higher (bottom edge).

The larger cutout can be used for all devices under certain conditions:

- When mounting, make sure that the PP100/200/300/400 devices are placed and mounted as close to the center of the cutout as possible. Failure to do so can prevent the retaining clips from holding firmly, which means that a firm seal is no longer guaranteed with the gasket (IP65).

2.8.2.4 12.1" devices

Cutout tolerance values for the PP100/200, PP300/400, PP500, AP900, PPC700 and PPC800 are ± 0.5 mm. The cutout tolerance values from the AP1000 are +0 mm/-0.5 mm.

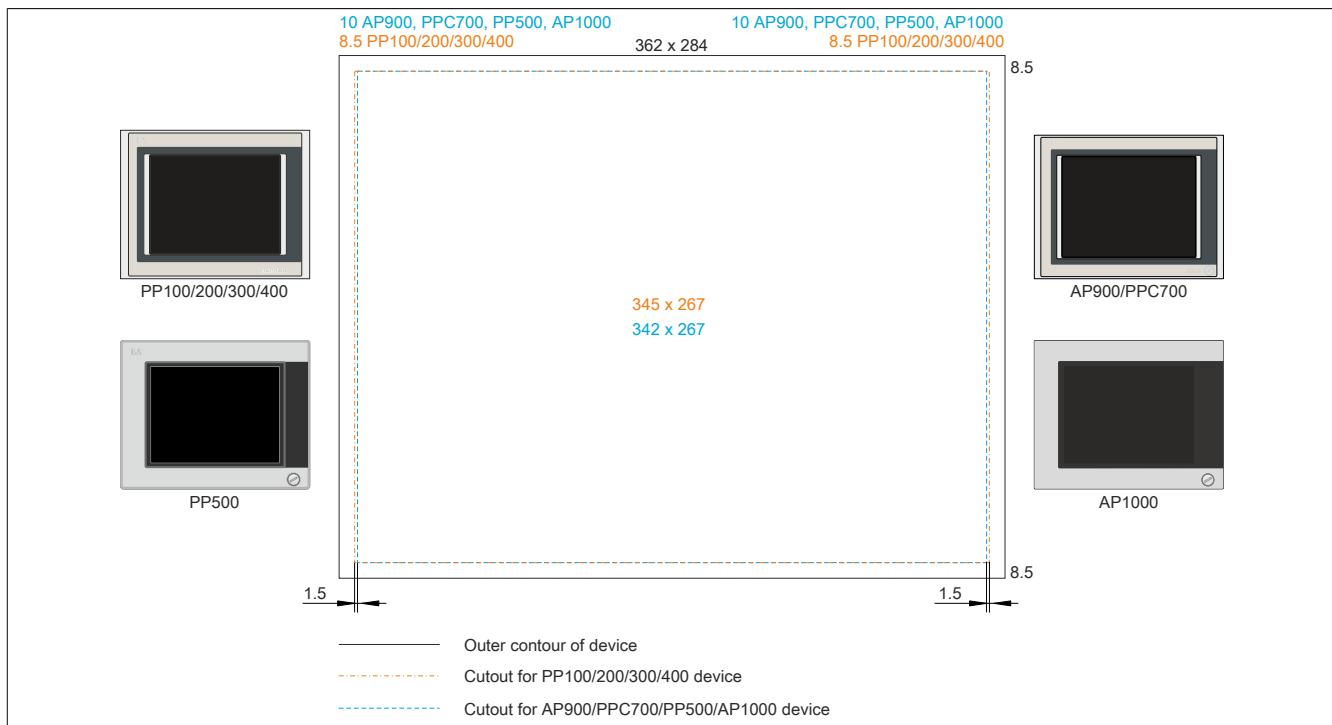


Figure 31: Mounting compatibility - 12.1" device - Horizontal1

12.1" Automation Panel 1000, Automation Panel 900, Panel PC 700 and Power Panel 500 devices are not 100% mounting compatible with Power Panel 100/200/300/400 devices in Horizontal1 format. The Power Panel 300/400 and Power Panel 100/200 devices require a cut that is 1.5 mm wider (left and right).

The larger cutout can be used for all devices under certain conditions:

- When mounting, make sure that the AP1000, AP900, PPC700 and PP500 devices are mounted as close to the center of the cutout as possible.

2.8.2.5 15" devices

Cutout tolerance values for the PP100/200, PP300/400, PP500, AP900, PPC700 and PPC800 are $\pm 0,5$ mm. The cutout tolerance values from the AP1000 are +0 mm/-0.5 mm.

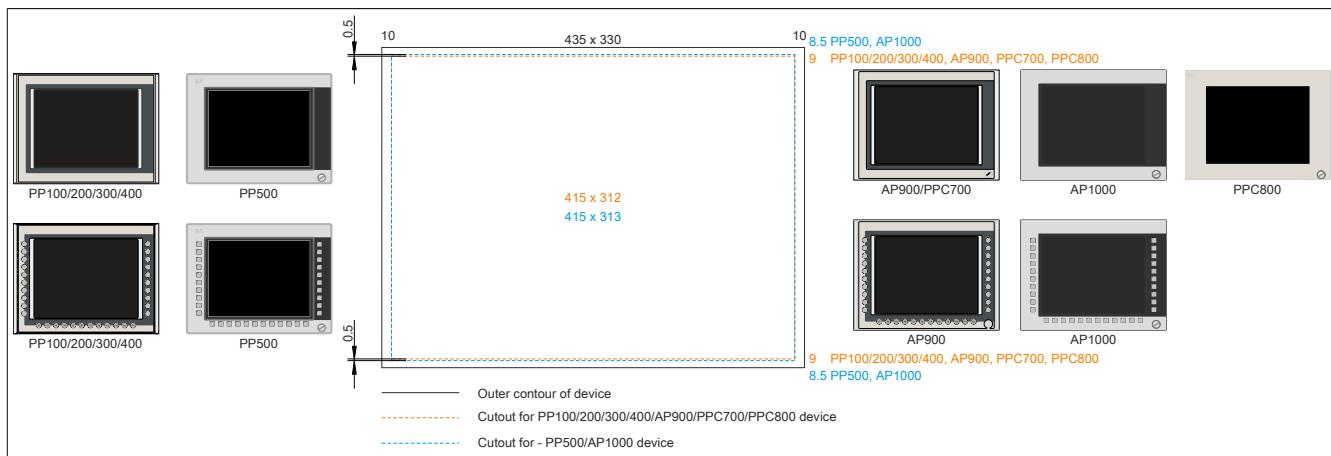


Figure 32: Mounting compatibility - 15" device - Horizontal1

15" Automation Panel 1000 and Power Panel 500 devices are not 100% mounting compatible with Power Panel 100/200/300/400, Automation Panel 900, Panel PC 700 and Panel PC 800 devices in the Vertical1 format. Automation Panel 1000 and Power Panel 500 devices require a cutout that is 0.5 mm higher (top and bottom edge).

The larger cutout can be used for all devices under certain conditions:

- When mounting, make sure that the PP100/200, PP300/400, AP900, PPC700 and PPC800 devices are placed and mounted as close to the center of the cutout as possible. Failure to do so can prevent the retaining clips from holding firmly, which means that a firm seal is no longer guaranteed with the gasket (IP65).

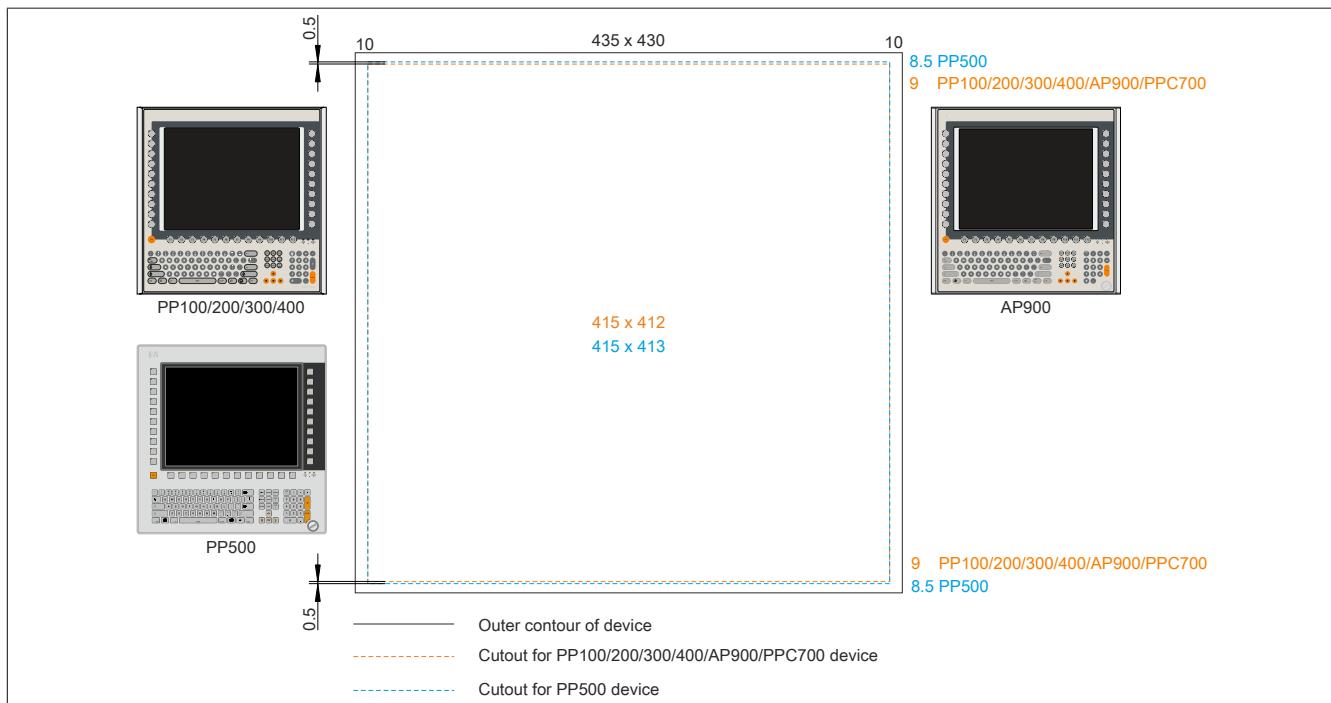


Figure 33: Mounting compatibility - 15" device - Vertical1

15" Power Panel 500 devices are not 100% mounting compatible with Power Panel 100/200/300/400, Automation Panel 900 and Panel PC 700 devices in the Vertical1 format. The Power Panel 500 devices require a cutout that is 0.5 mm higher (top and bottom edge).

The larger cutout can be used for all devices under certain conditions:

- When mounting, make sure that the PP100/200, PP300/400, AP900 and PPC700 devices are mounted as close to the center of the cutout as possible. Failure to do so can prevent the retaining clips from holding firmly, which means that a firm seal is no longer guaranteed with the gasket (IP65).

2.8.2.6 17" devices

Cutout tolerance values for the PP100/200, PP300/400, PP500, AP900, PPC700 and PPC800 are $\pm 0,5$ mm. The cutout tolerance values from the AP1000 are +0 mm/-0.5 mm.

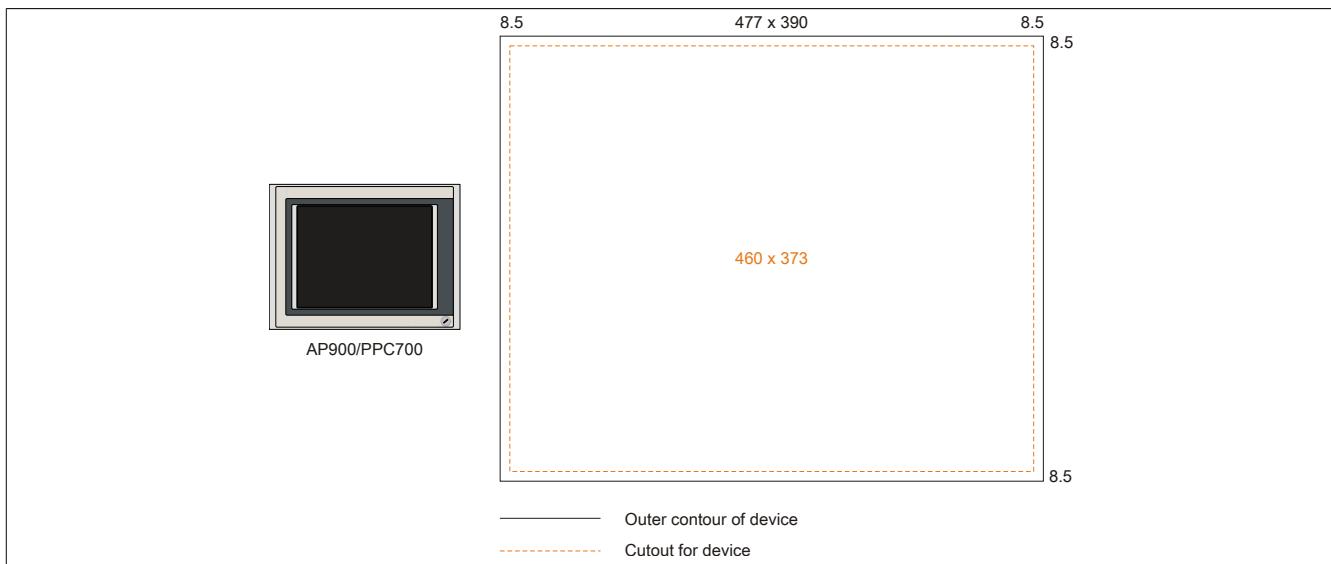


Figure 34: Mounting compatibility - 17" device - Horizontal1

17" Automation Panel 900 devices are 100% mounting compatible with Panel PC 700 devices in the Horizontal1 format.

2.8.2.7 19" devices

Cutout tolerance values for the PP100/200, PP300/400, PP500, AP900, PPC700 and PPC800 are $\pm 0,5$ mm. The cutout tolerance values from the AP1000 are +0 mm/-0.5 mm.

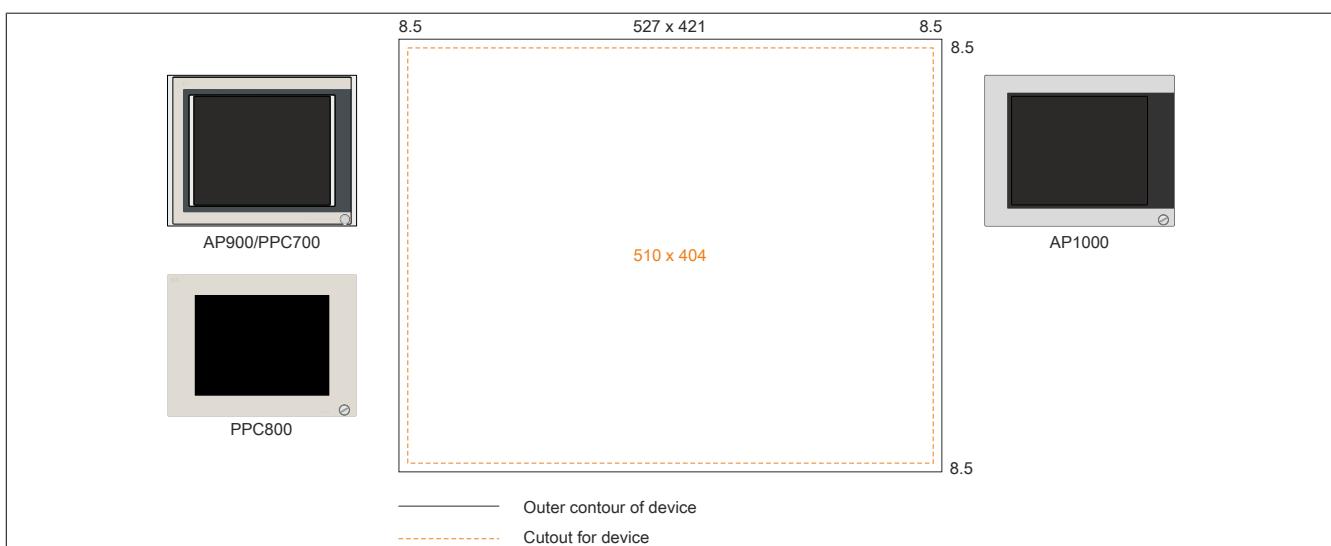


Figure 35: Mounting compatibility - 19" device - Horizontal1

19" Automation Panel 1000, Automation Panel 900, Panel PC 700 and Panel PC 800 are 100% mounting compatible in the Horizontal1 format.

2.8.2.8 21.3" devices

Cutout tolerance values for the PP100/200, PP300/400, PP500, AP900, PPC700 and PPC800 are ± 0.5 mm.
The cutout tolerance values from the AP1000 are +0 mm/-0.5 mm.

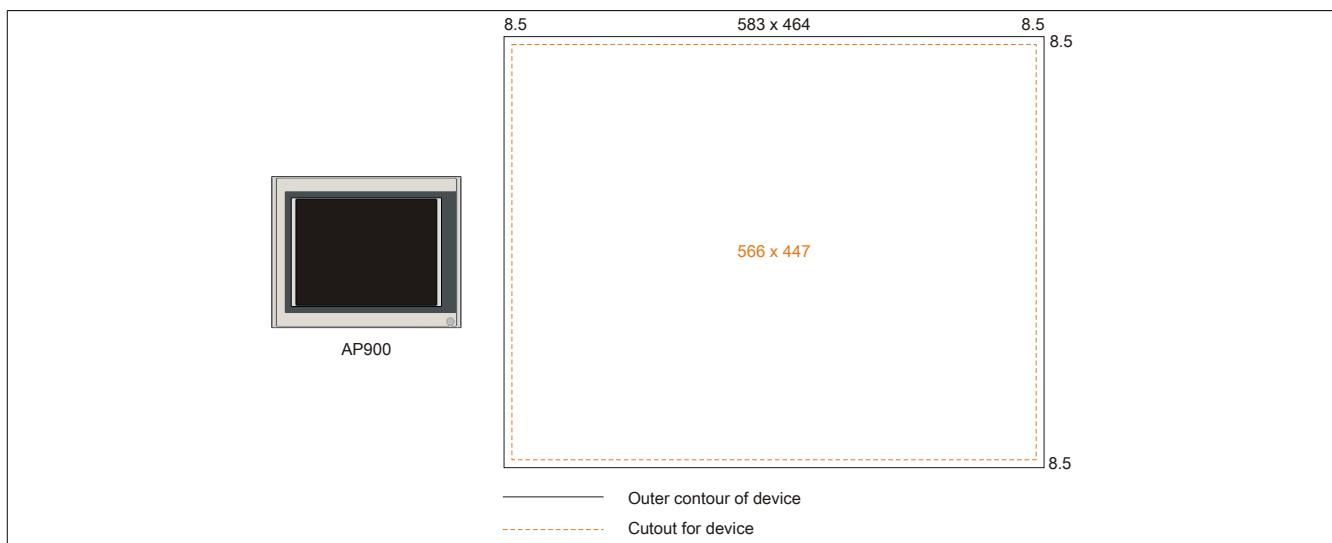


Figure 36: Mounting compatibility - 211" device - Horizontal1

3 Individual components

3.1 Display units

3.1.1 5AP1120.0573-000

3.1.1.1 General information

- Display unit for AP1000 or PPC2100
- 5.7" TFT VGA color display
- Single-touch (analog resistive)
- Control cabinet installation

3.1.1.2 Order data

| Model number | Short description | Figure |
|------------------|---|--------|
| 5AP1120.0573-000 | Automation Panel 5.7" VGA TFT - 640 x 480 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - For PPC2100 / Link modules - Installation compatible with 5PP520.0573-00 | |

Table 41: 5AP1120.0573-000 - Order data

3.1.1.3 Technical data

| Product ID | 5AP1120.0573-000 |
|------------------------------------|--|
| General information | |
| B&R ID code | 0xE7AA |
| Certification | |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Display | |
| Type | Color TFT |
| Display size | 5.7" |
| Colors | 262,144 |
| Resolution | VGA, 640 x 480 pixels |
| Contrast | 850:1 |
| Viewing angles | |
| Horizontal | Direction R = 80° / Direction L = 80° |
| Vertical | Direction U = 80° / Direction D = 80° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 20 to 400 cd/m² |
| Half-brightness time ¹⁾ | 50,000 h |
| Touch screen ²⁾ | |
| Type | AMT |
| Technology | Analog, resistive |
| Controller | B&R, serial, 12-bit |
| Transmittance | 81% ±3% |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |
| Mechanical characteristics | |
| Front ³⁾ | |
| Frame | Naturally anodized aluminum |
| Panel overlay | |
| Material | Polyester |
| Light background | RAL 9006 |
| Dark gray border around display | RAL 7024 |
| Gasket | 3 mm built-in seal |

Table 42: 5AP1120.0573-000 - Technical data

| Product ID | 5AP1120.0573-000 |
|------------|------------------|
| Dimensions | |
| Width | 212 mm |
| Height | 156 mm |
| Weight | 1100 g |

Table 42: 5AP1120.0573-000 - Technical data

- 1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
- 2) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
- 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.1.4 Dimensions

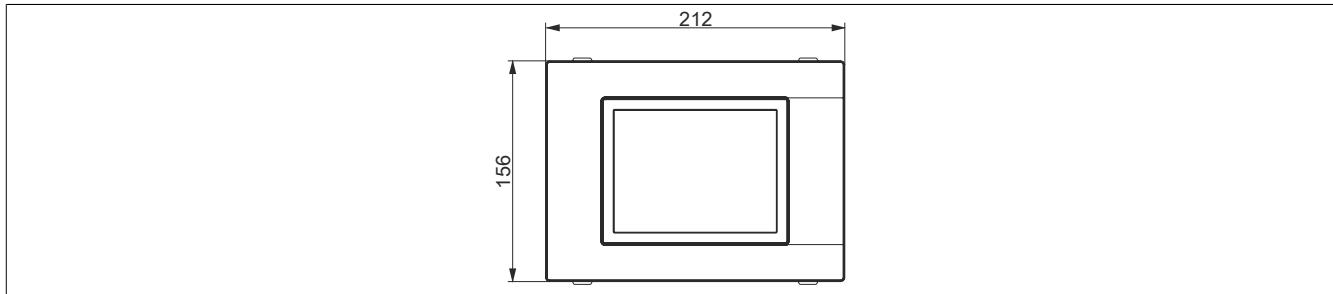


Figure 37: 5AP1120.0573-000 - Dimensions

3.1.1.5 Prerequisites and requirements

5.7" AP1000 display units are supported beginning with the following firmware versions:

- V3.11 for SDL/DVI receiver 5DLSLD.1001-00
- V4.08 for SDL3 receiver 5DLSD3.1001-00
- V1.03 for PPC2100 system unit 5PPC2100.BYxx-000

3.1.2 5AP1151.0573-000

3.1.2.1 General information

- Display unit for AP1000 or PPC2100
- 5.7" TFT VGA color display
- 22 function keys and 20 system keys
- Control cabinet installation

3.1.2.2 Order data

| Model number | Short description | Figure |
|----------------------|--|---|
| Display units | | |
| 5AP1151.0573-000 | Automation Panel 5.7" VGA TFT - 640 x 480 pixels (4:3) - Control cabinet installation - Portrait format - 22 function keys and 20 system keys - For PPC2100 / Link modules - Installation compatible with 5PP551.0573-00 |  |

Table 43: 5AP1151.0573-000 - Order data

3.1.2.3 Technical data

| Product ID | 5AP1151.0573-000 |
|------------------------------------|--|
| General information | |
| B&R ID code | 0xE7AB |
| Certification | |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Display | |
| Type | Color TFT |
| Display size | 5.7" |
| Colors | 262,144 |
| Resolution | VGA, 640 x 480 pixels |
| Contrast | 850:1 |
| Viewing angles | |
| Horizontal | Direction R = 80° / Direction L = 80° |
| Vertical | Direction U = 80° / Direction D = 80° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 20 to 400 cd/m² |
| Half-brightness time ¹⁾ | 50,000 h |
| Keys | |
| Function keys | 22 with LED (yellow) |
| System keys | Numeric keys, cursor block |
| Service life | >1,000,000 actuations at 1 ±0.3 N to 3 ±0.3 N actuating force |
| LED brightness | |
| Yellow | Typ. 38 mcd |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |
| Mechanical characteristics | |
| Front ²⁾ | |
| Frame | Naturally anodized aluminum |
| Panel overlay | |
| Material | Polyester |
| Light background | RAL 9006 |
| Dark gray border around display | RAL 7024 |
| Gasket | 3 mm built-in seal |

Table 44: 5AP1151.0573-000 - Technical data

| Product ID | 5AP1151.0573-000 |
|------------|------------------|
| Dimensions | |
| Width | 212 mm |
| Height | 245 mm |
| Weight | 1400 g |

Table 44: 5AP1151.0573-000 - Technical data

- 1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
 2) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.2.4 Dimensions

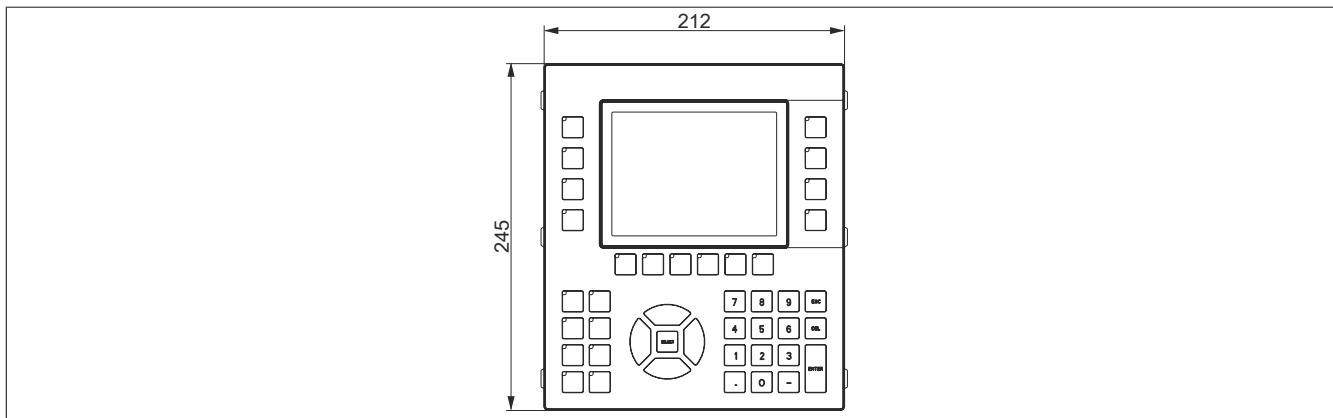


Figure 38: 5AP1151.0573-000 - Dimensions

3.1.2.5 Prerequisites and requirements

5.7" AP1000 display units are supported beginning with the following firmware versions:

- V3.11 for SDL/DVI receiver 5DLSLD.1001-00
- V4.08 for SDL3 receiver 5DLSD3.1001-00
- V1.03 for PPC2100 system unit 5PPC2100.BYxx-000

3.1.3 5AP1120.0702-000

3.1.3.1 General information

- Display unit for AP1000 or PPC2100
- 7.0" TFT WVGA color display
- Single-touch (analog resistive)
- Control cabinet installation

3.1.3.2 Order data

| Model number | Short description | Figure |
|------------------|---|--|
| 5AP1120.0702-000 | Automation Panel 7.0" WVGA TFT - 800 x 480 pixels (16:10) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - For PPC2100 / Link modules - Installation compatible with 5PP520.0702-00 |  |

Table 45: 5AP1120.0702-000 - Order data

3.1.3.3 Technical data

| | |
|------------------------------------|--|
| Product ID | 5AP1120.0702-000 |
| General information | |
| B&R ID code | 0xE7AC |
| Certification | |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Display | |
| Type | Color TFT |
| Display size | 7.0" |
| Colors | 16 million |
| Resolution | WVGA, 800 x 480 pixels |
| Contrast | 600:1 |
| Viewing angles | |
| Horizontal | Direction R = 70° / Direction L = 70° |
| Vertical | Direction U = 60° / Direction D = 60° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 80 to 500 cd/m ² |
| Half-brightness time ¹⁾ | 50,000 h |
| Touch screen ²⁾ | |
| Type | AMT |
| Technology | Analog, resistive |
| Controller | B&R, serial, 12-bit |
| Transmittance | 81% ±3% |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |
| Mechanical characteristics | |
| Front ³⁾ | |
| Frame | Naturally anodized aluminum |
| Panel overlay | |
| Material | Polyester |
| Light background | RAL 9006 |
| Dark gray border around display | RAL 7024 |
| Gasket | 3 mm built-in seal |
| Dimensions | |
| Width | 212 mm |
| Height | 156 mm |
| Weight | Approx. 900 g |

Table 46: 5AP1120.0702-000 - Technical data

1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.

2) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.

3) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.3.4 Dimensions

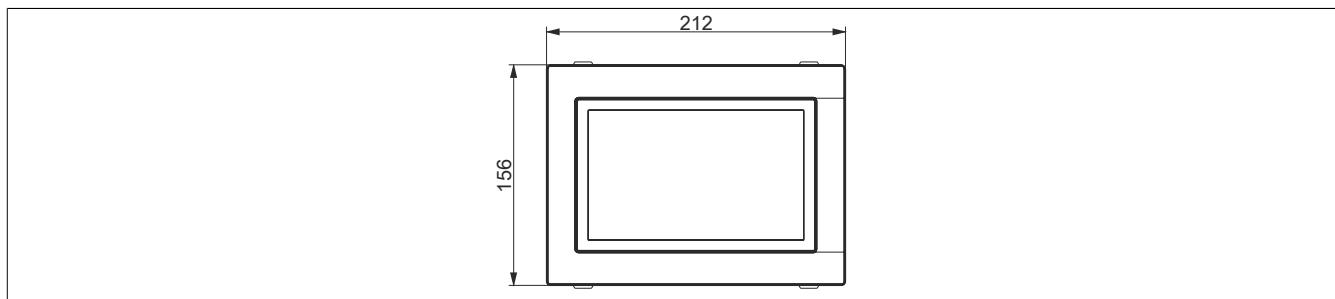


Figure 39: 5AP1120.0702-000 - Dimensions

3.1.4 5AP1120.101E-000

3.1.4.1 General information

- Display unit for AP1000 or PPC2100
- 10.1" TFT WXGA color display
- Single-touch (analog resistive)
- Control cabinet installation

3.1.4.2 Order data

| Model number | Short description | Figure |
|------------------|--|--|
| 5AP1120.101E-000 | Automation Panel 10.1" WXGA TFT - 1280 x 800 pixels (16:10) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - For PPC2100 / Link modules |  |

Table 47: 5AP1120.101E-000 - Order data

3.1.4.3 Technical data

| Product ID | 5AP1120.101E-000 |
|------------------------------------|--|
| General information | |
| B&R ID code | 0xE93D |
| Certification | |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Display | |
| Type | Color TFT |
| Display size | 10.1" |
| Colors | 16.2 million |
| Resolution | WXGA, 1280 x 800 pixels |
| Contrast | 1000:1 |
| Viewing angles | |
| Horizontal | Direction R = 85° / Direction L = 85° |
| Vertical | Direction U = 85° / Direction D = 85° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 25 to 500 cd/m² |
| Half-brightness time ¹⁾ | 50,000 h |
| Touch screen | |
| Type | AMT |
| Technology | Analog, resistive |
| Controller | B&R, serial, 12-bit |
| Transmittance | 81% ±3% |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |
| Mechanical characteristics | |
| Front | |
| Frame | Naturally anodized aluminum |
| Panel overlay | |
| Material | Polyester |
| Light background | RAL 9006 |
| Dark gray border around display | RAL 7024 |
| Gasket | 3 mm built-in seal |
| Dimensions | |
| Width | 279 mm |
| Height | 191 mm |
| Weight | 1,900 g |

Table 48: 5AP1120.101E-000 - Technical data

1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.

3.1.4.4 Dimensions

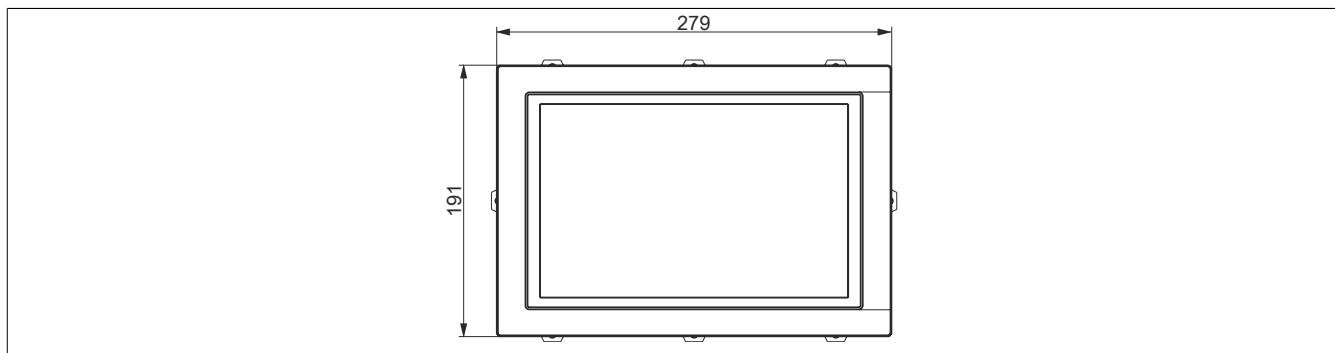


Figure 40: 5AP1120.101E-000 - Dimensions

3.1.5 5AP1120.1043-000

3.1.5.1 General information

- Display unit for AP1000, PPC900 or PPC2100
- 10.4" TFT VGA color display
- Single-touch (analog resistive)
- USB front interface
- Control cabinet installation

3.1.5.2 Order data

| Model number | Short description | Figure |
|------------------|--|--------|
| 5AP1120.1043-000 | Display units Automation Panel 10.4" VGA TFT - 640 x 480 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP520.1043-00 | |

Table 49: 5AP1120.1043-000 - Order data

3.1.5.3 Technical data

| Product ID | 5AP1120.1043-000 |
|------------------------------------|--|
| General information | |
| B&R ID code | 0xE7AD |
| Certification | |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Interfaces | |
| USB | |
| Quantity | 1 |
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load | Max. 500 mA |
| Display | |
| Type | Color TFT |
| Display size | 10.4" |
| Colors | 16.2 million |
| Resolution | VGA, 640 x 480 pixels |
| Contrast | 900:1 |
| Viewing angles | |
| Horizontal | Direction R = 80° / Direction L = 80° |
| Vertical | Direction U = 80° / Direction D = 80° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 22.5 to 450 cd/m ² |
| Half-brightness time ¹⁾ | 70,000 h |
| Touch screen ²⁾ | |
| Type | AMT |
| Technology | Analog, resistive |
| Controller | B&R, serial, 12-bit |
| Transmittance | 81% ±3% |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |

Table 50: 5AP1120.1043-000 - Technical data

| Product ID | 5AP1120.1043-000 |
|-----------------------------------|-----------------------------|
| Mechanical characteristics | |
| Front ³⁾ | |
| Frame | Naturally anodized aluminum |
| Panel overlay | |
| Material | Polyester |
| Light background | RAL 9006 |
| Dark gray border around display | RAL 7024 |
| Gasket | 3 mm built-in seal |
| Dimensions | |
| Width | 323 mm |
| Height | 260 mm |
| Weight | 2800 g |

Table 50: 5AP1120.1043-000 - Technical data

- 1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
 2) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.5.4 Dimensions

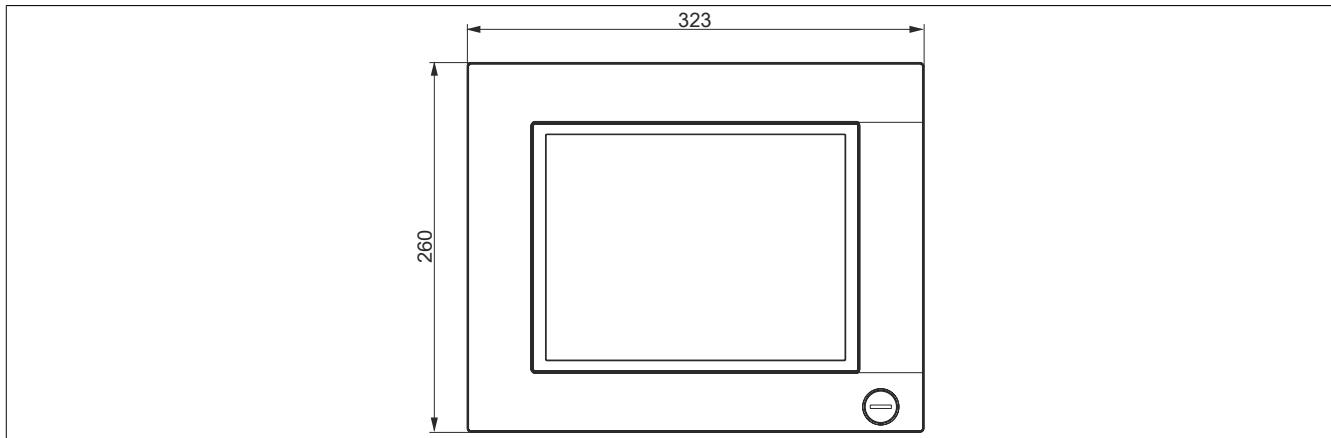


Figure 41: 5AP1120.1043-000 - Dimensions

3.1.5.5 Prerequisites and requirements

10.4" AP1000 display units are supported beginning with the following firmware versions:

- V3.11 for SDL/DVI receiver 5DLSLD.1001-00
- V4.08 for SDL3 receiver 5DLSD3.1001-00
- V1.03 for PPC2100 system unit 5PPC2100.BYxx-000
- V1.18 for PPC900 system unit 5PC901.TS77-xx

3.1.6 5AP1180.1043-000

3.1.6.1 General information

- Display unit for AP1000, PPC900 or PPC2100
- 10.4" TFT VGA color display
- Single-touch (analog resistive)
- 22 function keys
- USB front interface
- Control cabinet installation

3.1.6.2 Order data

| Model number | Short description | Figure |
|------------------|--|--|
| | Display units | |
| 5AP1180.1043-000 | Automation Panel 10.4" VGA TFT - 640 x 480 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - 22 function keys - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP580.1043-00/ 5AP980.1043-01 |  |

Table 51: 5AP1180.1043-000 - Order data

3.1.6.3 Technical data

| Product ID | 5AP1180.1043-000 |
|------------------------------------|---|
| General information | |
| B&R ID code | 0xE7AE |
| Certification | |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Interfaces | |
| USB | |
| Quantity | 1 |
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load | Max. 500 mA |
| Display | |
| Type | Color TFT |
| Display size | 10.4" |
| Colors | 16.2 million |
| Resolution | VGA, 640 x 480 pixels |
| Contrast | 900:1 |
| Viewing angles | |
| Horizontal | Direction R = 80° / Direction L = 80° |
| Vertical | Direction U = 80° / Direction D = 80° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 22.5 to 450 cd/m ² |
| Half-brightness time ¹⁾ | 70,000 h |
| Touch screen ²⁾ | |
| Type | AMT |
| Technology | Analog, resistive |
| Controller | B&R, serial, 12-bit |
| Transmittance | 81% ±3% |
| Keys | |
| Function keys | 22 with LED (yellow) |
| System keys | No |
| Service life | >1,000,000 actuations at 1 ±0.3 N to 3 ±0.3 N actuating force |
| LED brightness | |
| Yellow | Typ. 38 mcd |

Table 52: 5AP1180.1043-000 - Technical data

| | |
|-----------------------------------|--|
| Product ID | 5AP1180.1043-000 |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |
| Mechanical characteristics | |
| Front ³⁾ | Naturally anodized aluminum |
| Frame | Polyester |
| Panel overlay | RAL 9006 |
| Material | RAL 7024 |
| Light background | |
| Dark gray border around display | 3 mm built-in seal |
| Gasket | |
| Dimensions | |
| Width | 323 mm |
| Height | 260 mm |
| Weight | 2800 g |

Table 52: 5AP1180.1043-000 - Technical data

- 1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
 2) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.6.4 Dimensions

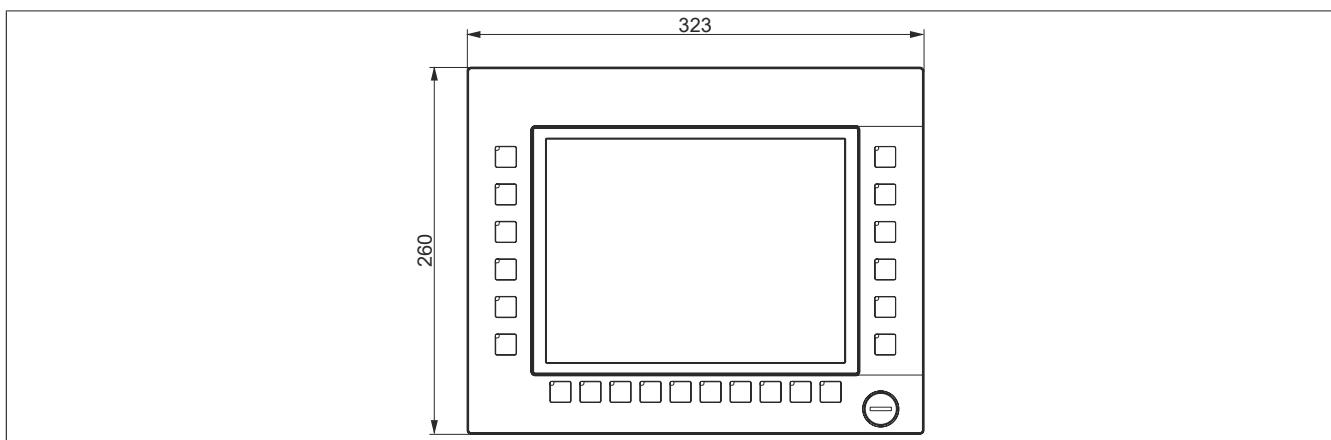


Figure 42: 5AP1180.1043-000 - Dimensions

3.1.6.5 Prerequisites and requirements

10.4" AP1000 display units are supported beginning with the following firmware versions:

- V3.11 for SDL/DVI receiver 5DLSLD.1001-00
- V4.08 for SDL3 receiver 5DLSD3.1001-00
- V1.03 for PPC2100 system unit 5PPC2100.BYxx-000
- V1.18 for PPC900 system unit 5PC901.TS77-xx

3.1.7 5AP1181.1043-000

3.1.7.1 General information

- Display unit for AP1000, PPC900 or PPC2100
- 10.4" TFT VGA color display
- Single-touch (analog resistive)
- 38 function keys and 20 system keys
- USB front interface
- Control cabinet installation

3.1.7.2 Order data

| Model number | Short description | Figure |
|------------------|--|---|
| | Display units | |
| 5AP1181.1043-000 | Automation Panel 10.4" VGA TFT - 640 x 480 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Portrait format - Front USB interface - 38 function keys and 20 system keys - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP581.1043-00 5AP981.1043-01/5PC781.1043-00 |  |

Table 53: 5AP1181.1043-000 - Order data

3.1.7.3 Technical data

| Product ID | 5AP1181.1043-000 |
|------------------------------------|---|
| General information | |
| B&R ID code | 0xE7AF |
| Certification | |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Interfaces | |
| USB | |
| Quantity | 1 |
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load | Max. 500 mA |
| Display | |
| Type | Color TFT |
| Display size | 10.4" |
| Colors | 16.2 million |
| Resolution | VGA, 640 x 480 pixels |
| Contrast | 900:1 |
| Viewing angles | |
| Horizontal | Direction R = 80° / Direction L = 80° |
| Vertical | Direction U = 80° / Direction D = 80° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 22.5 to 450 cd/m² |
| Half-brightness time ¹⁾ | 70,000 h |
| Touch screen ²⁾ | |
| Type | AMT |
| Technology | Analog, resistive |
| Controller | B&R, serial, 12-bit |
| Transmittance | 81% ±3% |
| Keys | |
| Function keys | 38 with LED (yellow) |
| System keys | Numeric keys, cursor block |
| Service life | >1,000,000 actuations at 1 ±0.3 N to 3 ±0.3 N actuating force |

Table 54: 5AP1181.1043-000 - Technical data

| Product ID | 5AP1181.1043-000 |
|-----------------------------------|--|
| LED brightness Yellow | Typ. 38 mcd |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |
| Mechanical characteristics | |
| Front ³⁾ | Naturally anodized aluminum |
| Frame | |
| Panel overlay | Polyester |
| Material | RAL 9006 |
| Light background | RAL 7024 |
| Dark gray border around display | |
| Gasket | 3 mm built-in seal |
| Dimensions | |
| Width | 323 mm |
| Height | 358 mm |
| Weight | 3400 g |

Table 54: 5AP1181.1043-000 - Technical data

- 1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
- 2) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
- 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.7.4 Dimensions

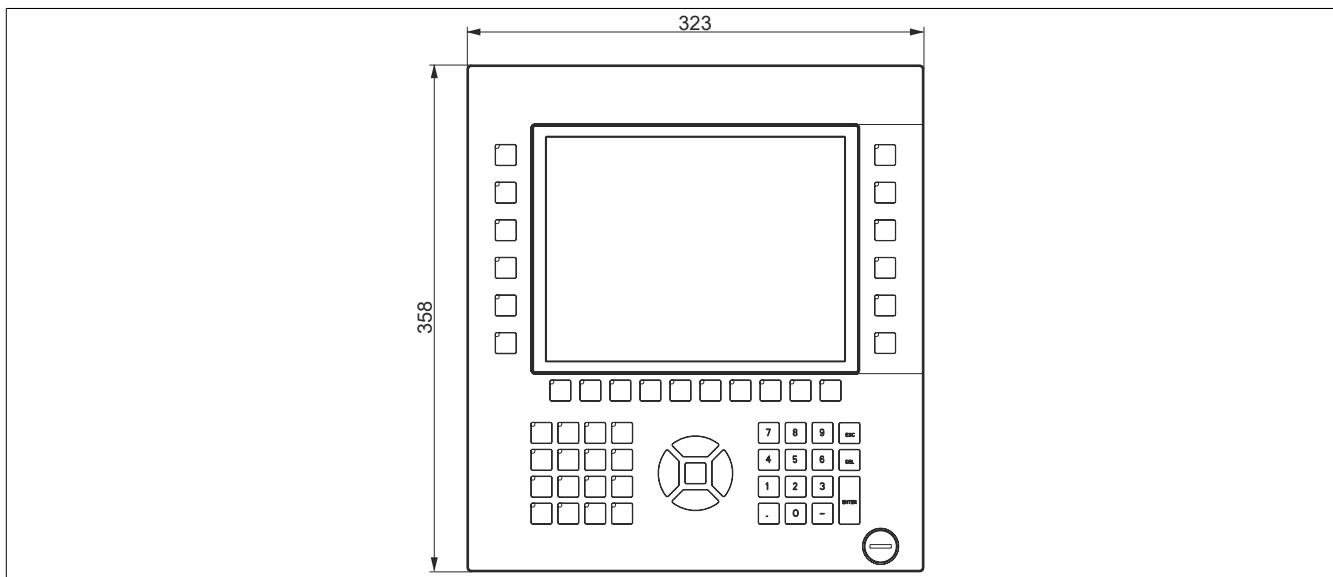


Figure 43: 5AP1181.1043-000 - Dimensions

3.1.7.5 Prerequisites and requirements

10.4" AP1000 display units are supported beginning with the following firmware versions:

- V3.11 for SDL/DVI receiver 5DLSLD.1001-00
- V4.08 for SDL3 receiver 5DLSD3.1001-00
- V1.03 for PPC2100 system unit 5PPC2100.BYxx-000
- V1.18 for PPC900 system unit 5PC901.TS77-xx

3.1.8 5AP1182.1043-000

3.1.8.1 General information

- Display unit for AP1000, PPC900 or PPC2100
- 10.4" TFT VGA color display
- Single-touch (analog resistive)
- 44 function keys and 20 system keys
- USB front interface
- Control cabinet installation

3.1.8.2 Order data

| Model number | Short description | Figure |
|------------------|---|--|
| | Display units | |
| 5AP1182.1043-000 | Automation Panel 10.4" VGA TFT - 640 x 480 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - 44 function keys and 20 system keys - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP582.1043-00 5AP982.1043-01/5PC782.1043-00 |  |

Table 55: 5AP1182.1043-000 - Order data

3.1.8.3 Technical data

| Product ID | 5AP1182.1043-000 |
|------------------------------------|--|
| General information | |
| B&R ID code | 0xE7B0 |
| Certification | |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Interfaces | |
| USB | |
| Quantity | 1 |
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load | Max. 500 mA |
| Display | |
| Type | Color TFT |
| Display size | 10.4" |
| Colors | 16.2 million |
| Resolution | VGA, 640 x 480 pixels |
| Contrast | 900:1 |
| Viewing angles | |
| Horizontal | Direction R = 80° / Direction L = 80° |
| Vertical | Direction U = 80° / Direction D = 80° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 22.5 to 450 cd/m² |
| Half-brightness time ¹⁾ | 70,000 h |
| Touch screen ²⁾ | |
| Type | AMT |
| Technology | Analog, resistive |
| Controller | B&R, serial, 12-bit |
| Transmittance | 81% ±3% |
| Keys | |
| Function keys | 44 with LED (yellow) |
| System keys | Numeric keys, cursor block |
| Service life | >1,000,000 actuations at 1 ±0.3 N to 3 ±0.3 N actuating force |
| LED brightness | |
| Yellow | Typ. 38 mcd |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |

Table 56: 5AP1182.1043-000 - Technical data

| Product ID | 5AP1182.1043-000 |
|---------------------------------|-----------------------------|
| Mechanical characteristics | |
| Front ³⁾ | |
| Frame | Naturally anodized aluminum |
| Panel overlay | |
| Material | Polyester |
| Light background | RAL 9006 |
| Dark gray border around display | RAL 7024 |
| Gasket | 3 mm built-in seal |
| Dimensions | |
| Width | 423 mm |
| Height | 288 mm |
| Weight | 3500 g |

Table 56: 5AP1182.1043-000 - Technical data

- 1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
 2) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.8.4 Dimensions

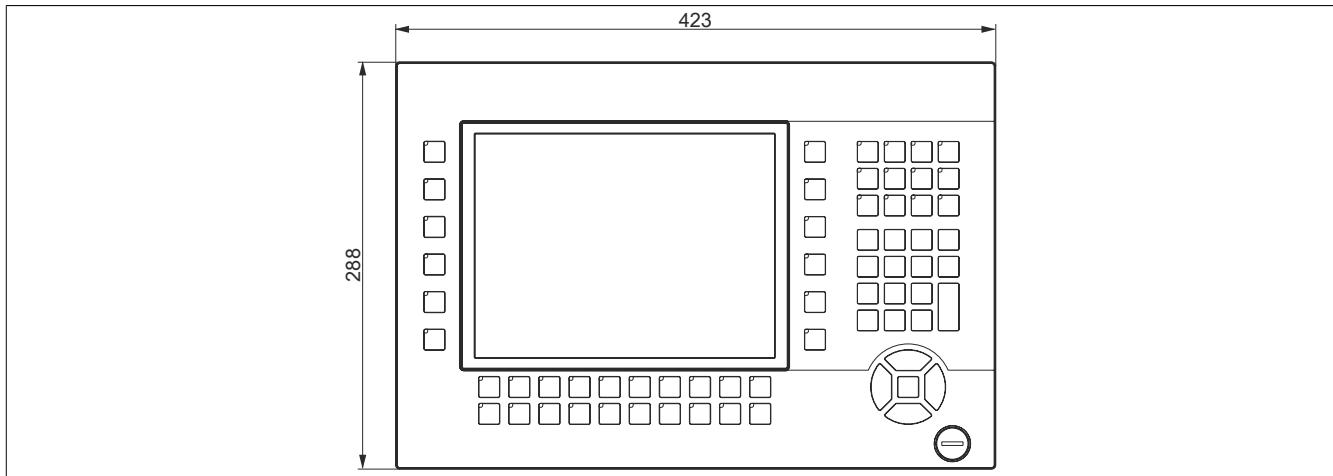


Figure 44: 5AP1182.1043-000 - Dimensions

3.1.8.5 Prerequisites and requirements

10.4" AP1000 display units are supported beginning with the following firmware versions:

- V3.11 for SDL/DVI receiver 5DLSLD.1001-00
- V4.08 for SDL3 receiver 5DLSD3.1001-00
- V1.03 for PPC2100 system unit 5PPC2100.BYxx-000
- V1.18 for PPC900 system unit 5PC901.TS77-xx

3.1.9 5AP1120.1214-000

3.1.9.1 General information

- Display unit for AP1000, PPC900 or PPC2100
- 12.1" TFT SVGA color display
- Single-touch (analog resistive)
- USB front interface
- Control cabinet installation

3.1.9.2 Order data

| Model number | Short description | Figure |
|------------------|--|--------|
| 5AP1120.1214-000 | Automation Panel 12.1" SVGA TFT - 800 x 600 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP520.1214-00 | |

Table 57: 5AP1120.1214-000 - Order data

3.1.9.3 Technical data

| Product ID | 5AP1120.1214-000 |
|------------------------------------|--|
| General information | |
| B&R ID code | 0xE7BB |
| Certification | |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Interfaces | |
| USB | |
| Quantity | 1 |
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load | Max. 500 mA |
| Display | |
| Type | Color TFT |
| Display size | 12.1" |
| Colors | 16.2 million |
| Resolution | SVGA, 800 x 600 pixels |
| Contrast | 1500:1 |
| Viewing angles | |
| Horizontal | Direction R = 89° / Direction L = 89° |
| Vertical | Direction U = 89° / Direction D = 89° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 22.5 to 450 cd/m² |
| Half-brightness time ¹⁾ | 50,000 h |
| Touch screen ²⁾ | |
| Type | AMT |
| Technology | Analog, resistive |
| Controller | B&R, serial, 12-bit |
| Transmittance | 81% ±3% |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |

Table 58: 5AP1120.1214-000 - Technical data

| Product ID | 5AP1120.1214-000 |
|---------------------------------|-----------------------------|
| Mechanical characteristics | |
| Front ³⁾ | |
| Frame | Naturally anodized aluminum |
| Panel overlay | |
| Material | Polyester |
| Light background | RAL 9006 |
| Dark gray border around display | RAL 7024 |
| Gasket | 3 mm built-in seal |
| Dimensions | |
| Width | 362 mm |
| Height | 284 mm |
| Weight | 3200 g |

Table 58: 5AP1120.1214-000 - Technical data

- 1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
 2) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.9.4 Dimensions

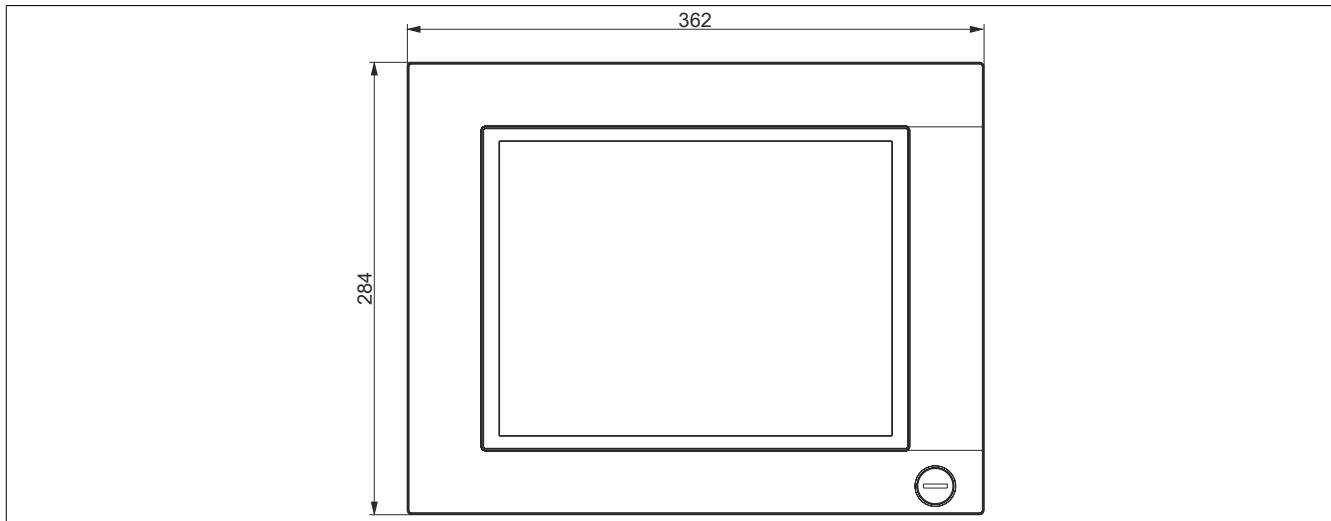


Figure 45: 5AP1120.1214-000 - Dimensions

3.1.10 5AP1120.121E-000

3.1.10.1 General information

- Display unit for AP1000 or PPC2100
- 12.1" TFT WXGA color display
- Single-touch (analog resistive)
- Control cabinet installation

3.1.10.2 Order data

| Model number | Short description | Figure |
|------------------|--|--------|
| Display units | | |
| 5AP1120.121E-000 | Automation Panel 12.1" WXGA TFT - 1280 x 800 pixels (16:10) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - For PPC2100 / Link modules | |

Table 59: 5AP1120.121E-000 - Order data

3.1.10.3 Technical data

| Product ID | 5AP1120.121E-000 |
|------------------------------------|--|
| General information | |
| B&R ID code | 0xE8E4 |
| Certification | |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Display | |
| Type | Color TFT |
| Display size | 12.1" |
| Colors | 16.2 million |
| Resolution | WXGA, 1280 x 800 pixels |
| Contrast | 900:1 |
| Viewing angles | |
| Horizontal | Direction R = 80° / Direction L = 80° |
| Vertical | Direction U = 65° / Direction D = 80° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 40 to 400 cd/m ² |
| Half-brightness time ¹⁾ | 50,000 h |
| Touch screen | |
| Type | AMT |
| Technology | Analog, resistive |
| Controller | B&R, serial, 12-bit |
| Transmittance | 81% ±3% |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |
| Mechanical characteristics | |
| Front | |
| Frame | Naturally anodized aluminum |
| Panel overlay | |
| Material | Polyester |
| Light background | RAL 9006 |
| Dark gray border around display | RAL 7024 |
| Gasket | 3 mm built-in seal |
| Dimensions | |
| Width | 324 mm |
| Height | 221.5 mm |
| Weight | 2300 g |

Table 60: 5AP1120.121E-000 - Technical data

1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.

3.1.10.4 Dimensions

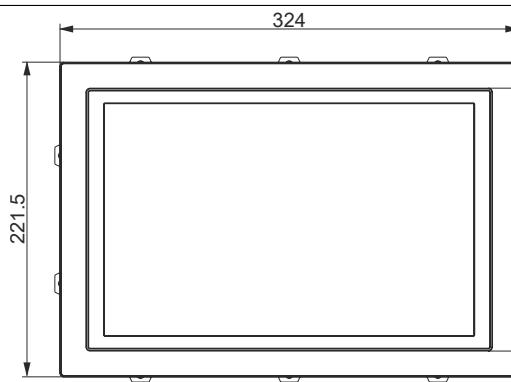


Figure 46: 5AP1120.121E-000 - Dimensions

3.1.11 5AP1120.1505-000

3.1.11.1 General information

- Display unit for AP1000, PPC900 or PPC2100
- 15.0" TFT XGA color display
- Single-touch (analog resistive)
- USB front interface
- Control cabinet installation

3.1.11.2 Order data

| Model number | Short description | Figure |
|------------------|--|--------|
| 5AP1120.1505-000 | Automation Panel 15.0" XGA TFT - 1024 x 768 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP520.1505-00/5AP920.1505-01/ 5PC720.1505-xx/5PC820.1505-00 | |

Table 61: 5AP1120.1505-000 - Order data

3.1.11.3 Technical data

| Product ID | 5AP1120.1505-000 |
|------------------------------------|--|
| General information | |
| B&R ID code | 0xE7BC |
| Certification | |
| CE | Yes |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Interfaces | |
| USB | |
| Quantity | 1 |
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load | Max. 500 mA |
| Display | |
| Type | Color TFT |
| Display size | 15.0" |
| Colors | 16.2 million |
| Resolution | XGA, 1024 x 768 pixels |
| Contrast | 700:1 |
| Viewing angles | |
| Horizontal | Direction R = 80° / Direction L = 80° |
| Vertical | Direction U = 70° / Direction D = 70° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 20 to 400 cd/m² |
| Half-brightness time ¹⁾ | 50,000 h |
| Touch screen ²⁾ | |
| Type | AMT |
| Technology | Analog, resistive |
| Controller | B&R, serial, 12-bit |
| Transmittance | 81% ±3% |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |

Table 62: 5AP1120.1505-000 - Technical data

| Product ID | 5AP1120.1505-000 |
|---------------------------------|-----------------------------|
| Mechanical characteristics | |
| Front ³⁾ | |
| Frame | Naturally anodized aluminum |
| Panel overlay | |
| Material | Polyester |
| Light background | RAL 9006 |
| Dark gray border around display | RAL 7024 |
| Gasket | 3 mm built-in seal |
| Dimensions | |
| Width | 435 mm |
| Height | 330 mm |
| Weight | 5000 g |

Table 62: 5AP1120.1505-000 - Technical data

- 1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
 2) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.11.4 Dimensions

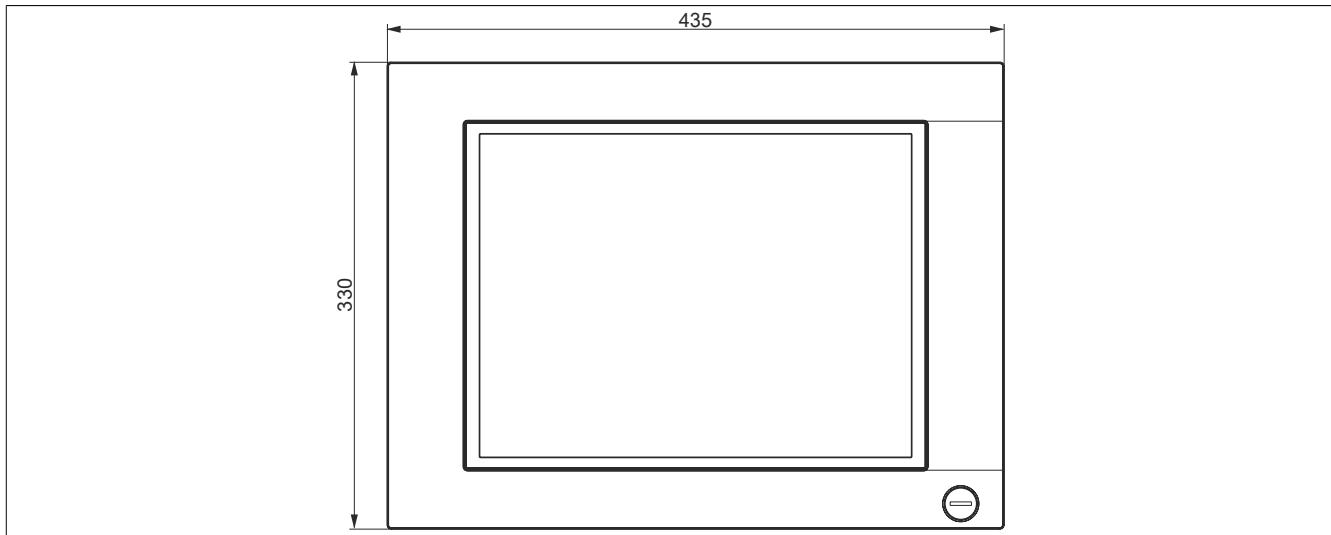


Figure 47: 5AP1120.1505-000 - Dimensions

3.1.12 5AP1180.1505-000

3.1.12.1 General information

- Display unit for AP1000, PPC900 or PPC2100
- 15.0" TFT XGA color display
- Single-touch (analog resistive)
- 32 function keys
- USB front interface
- Control cabinet installation

3.1.12.2 Order data

| Model number | Short description | Figure |
|------------------|--|--------|
| Display units | | |
| 5AP1180.1505-000 | Automation Panel 15.0" XGA TFT - 1024 x 768 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - 32 function keys - For PPC900 / PPC2100 / Link modules - Installation compatible with 5PP580.1505-00/5AP980.1505-01 | |

Table 63: 5AP1180.1505-000 - Order data

3.1.12.3 Technical data

| | |
|------------------------------------|---|
| Product ID | 5AP1180.1505-000 |
| General information | |
| B&R ID code | 0xE7BD |
| Certification | |
| CE | Yes |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Interfaces | |
| USB | |
| Quantity | 1 |
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load | Max. 500 mA |
| Display | |
| Type | Color TFT |
| Display size | 15.0" |
| Colors | 16.2 million |
| Resolution | XGA, 1024 x 768 pixels |
| Contrast | 700:1 |
| Viewing angles | |
| Horizontal | Direction R = 80° / Direction L = 80° |
| Vertical | Direction U = 70° / Direction D = 70° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 20 to 400 cd/m² |
| Half-brightness time ¹⁾ | 50,000 h |
| Touch screen ²⁾ | |
| Type | AMT |
| Technology | Analog, resistive |
| Controller | B&R, serial, 12-bit |
| Transmittance | 81% ±3% |
| Keys | |
| Function keys | 32 with LED (yellow) |
| System keys | No |
| Service life | >1,000,000 actuations at 1 ±0.3 N to 3 ±0.3 N actuating force |
| LED brightness | |
| Yellow | Typ. 38 mcd |

Table 64: 5AP1180.1505-000 - Technical data

| | |
|-----------------------------------|--|
| Product ID | 5AP1180.1505-000 |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |
| Mechanical characteristics | |
| Front ³⁾ | Naturally anodized aluminum |
| Frame | |
| Panel overlay | Polyester |
| Material | RAL 9006 |
| Light background | RAL 7024 |
| Dark gray border around display | |
| Gasket | 3 mm built-in seal |
| Dimensions | |
| Width | 435 mm |
| Height | 330 mm |
| Weight | 4900 g |

Table 64: 5AP1180.1505-000 - Technical data

- 1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
- 2) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
- 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.12.4 Dimensions

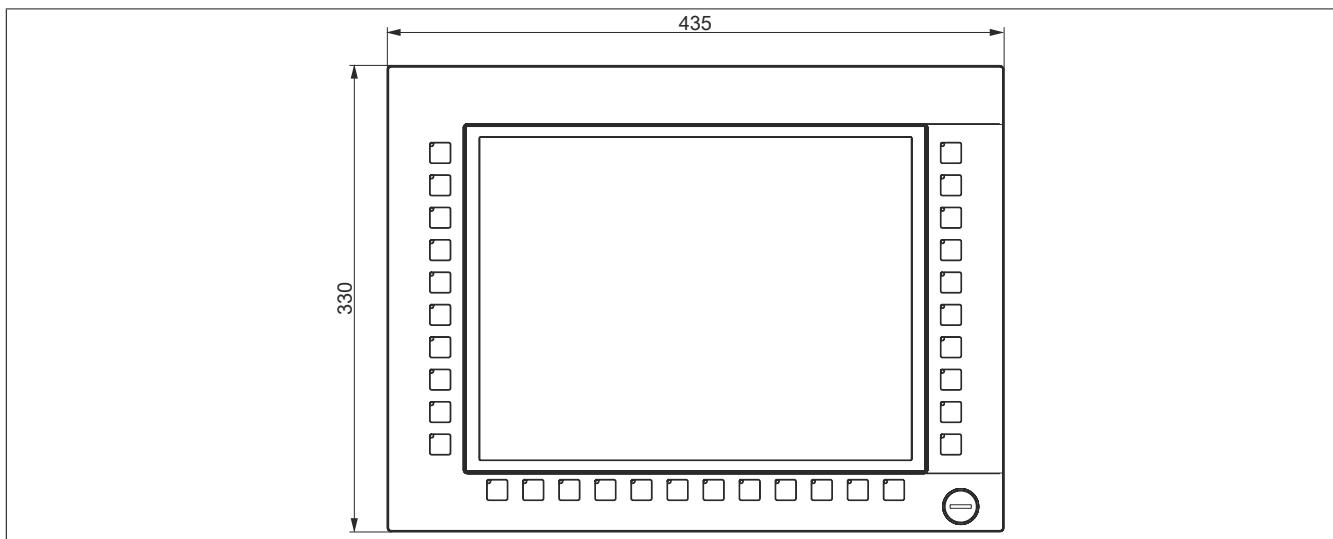


Figure 48: 5AP1180.1505-000 - Dimensions

3.1.13 5AP1120.156B-000

3.1.13.1 General information

- Display unit for AP1000, PPC900 or PPC2100
- 15.6" TFT HD color display
- Single-touch (analog resistive)
- Control cabinet installation

3.1.13.2 Order data

| Model number | Short description | Figure |
|----------------------|--|--------|
| Display units | | |
| 5AP1120.156B-000 | Automation Panel 15.6" HD TFT - 1366 x 768 pixels (16:9) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - For PPC900 / PPC2100 / Link modules | |

Table 65: 5AP1120.156B-000 - Order data

3.1.13.3 Technical data

| | |
|------------------------------------|--|
| Product ID | 5AP1120.156B-000 |
| General information | |
| B&R ID code | 0xE8E5 |
| Certification | |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Display | |
| Type | Color TFT |
| Display size | 15.6" |
| Colors | 16.2 million |
| Resolution | HD, 1366 x 768 pixels |
| Contrast | 500:1 |
| Viewing angles | |
| Horizontal | Direction R = 85° / Direction L = 85° |
| Vertical | Direction U = 80° / Direction D = 80° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 15 to 300 cd/m ² |
| Half-brightness time ¹⁾ | 50,000 h |
| Touch screen ²⁾ | |
| Type | AMT |
| Technology | Analog, resistive |
| Controller | B&R, serial, 12-bit |
| Transmittance | 81% ±3% |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |
| Mechanical characteristics | |
| Front ³⁾ | |
| Frame | Naturally anodized aluminum |
| Panel overlay | |
| Material | Polyester |
| Light background | RAL 9006 |
| Dark gray border around display | RAL 7024 |
| Gasket | 3 mm built-in seal |
| Dimensions | |
| Width | 414 mm |
| Height | 258.5 mm |
| Weight | 4200 g |

Table 66: 5AP1120.156B-000 - Technical data

1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.

2) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.

3) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.13.4 Dimensions

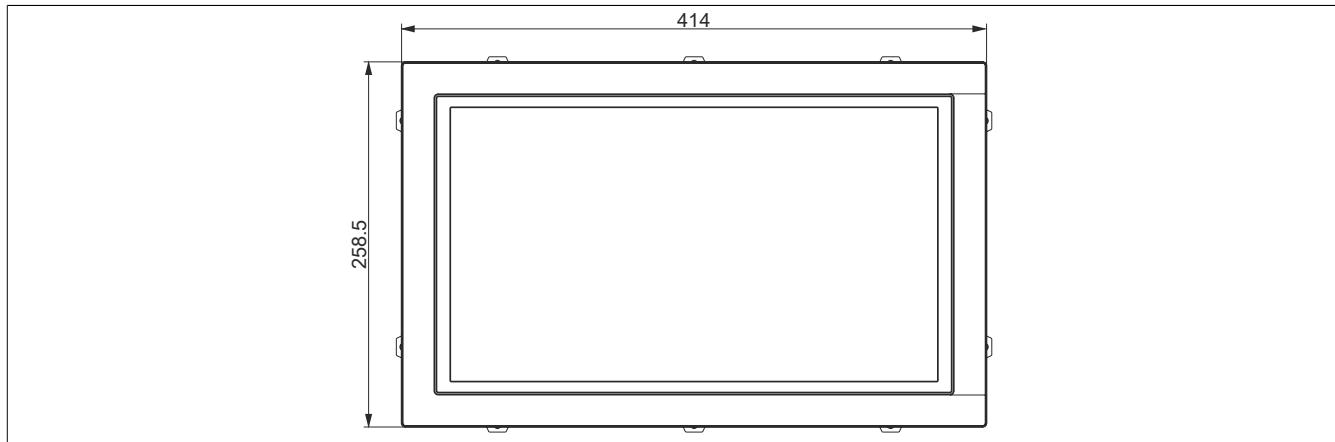


Figure 49: 5AP1120.156B-000 - Dimensions

3.1.14 5AP1120.1906-000

3.1.14.1 General information

- Display unit for AP1000, PPC900 or PPC2100
- 19.0" TFT SXGA color display
- Single-touch (analog resistive)
- USB front interface
- Control cabinet installation

3.1.14.2 Order data

| Model number | Short description | Figure |
|------------------|---|--|
| 5AP1120.1906-000 | Automation Panel 19.0" SXGA TFT - 1280 x 1024 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB interface - For PPC900 / PPC2100 / Link modules - Installation compatible with 5AP920.1906-01/ 5PC720.1906-00/5PC820.1906-00 |  |

Table 67: 5AP1120.1906-000 - Order data

3.1.14.3 Technical data

| Product ID | 5AP1120.1906-000 |
|------------------------------------|--|
| General information | |
| B&R ID code | 0xE7BE |
| Certification | |
| CE | Yes |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| Interfaces | |
| USB | |
| Quantity | 1 |
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load | Max. 500 mA |
| Display | |
| Type | Color TFT |
| Display size | 19.0" |
| Colors | 16.2 million |
| Resolution | SXGA, 1280 x 1024 pixels |
| Contrast | 1500:1 |
| Viewing angles | |
| Horizontal | Direction R = 85° / Direction L = 85° |
| Vertical | Direction U = 85° / Direction D = 85° |
| Backlight | |
| Type | LED |
| Brightness (dimmable) | Typ. 35 to 350 cd/m ² |
| Half-brightness time ¹⁾ | 70,000 h |
| Touch screen ²⁾ | |
| Type | AMT |
| Technology | Analog, resistive |
| Controller | B&R, serial, 12-bit |
| Transmittance | 81% ±3% |
| Operating conditions | |
| EN 60529 protection | Front: IP65 Back: IP20 (only with installed link module or installed system unit) |

Table 68: 5AP1120.1906-000 - Technical data

| Product ID | 5AP1120.1906-000 |
|---------------------------------|-----------------------------|
| Mechanical characteristics | |
| Front ³⁾ | |
| Frame | Naturally anodized aluminum |
| Panel overlay | |
| Material | Polyester |
| Light background | RAL 9006 |
| Dark gray border around display | RAL 7024 |
| Gasket | 3 mm built-in seal |
| Dimensions | |
| Width | 527 mm |
| Height | 421 mm |
| Weight | 7300 g |

Table 68: 5AP1120.1906-000 - Technical data

- 1) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
 2) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.14.4 Dimensions

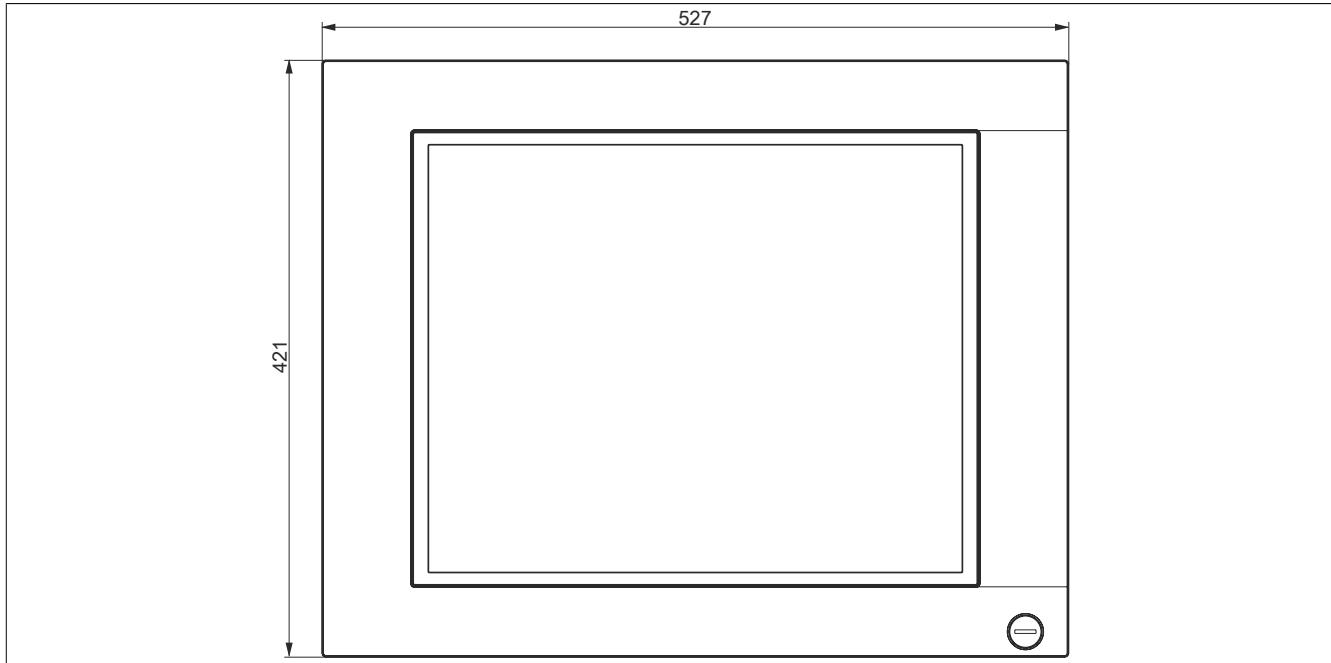


Figure 50: 5AP1120.1906-000 - Dimensions

3.2 Link modules

3.2.1 5DLSLDL.1001-00

3.2.1.1 General information

- Link module for Automation Panel 9x3/1000 systems
- 1x SDL/DVI Panel In interface
- 2x USB 2.0 type A
- 1x USB In (USB type B)
- 1x RS232 interface
- Display brightness buttons

3.2.1.2 Order data

| Model number | Short description | Figure |
|-----------------|---|--------|
| | Link modules | |
| 5DLSLDL.1001-00 | Automation Panel Link module SDL/DVI - Receiver - For Automation Panel 923/933/1000 | |
| | Required accessories | |
| | Terminal blocks | |
| 0TB103.9 | Connector 24 VDC - 3-pin female - Screw clamps 3.31 mm ² | |
| 0TB103.91 | Connector 24 VDC - 3-pin female - Cage clamp terminal block 3.31 mm ² | |

Table 69: 5DLSLDL.1001-00 - Order data

3.2.1.3 Technical data

| Product ID | 5DLSLDL.1001-00 |
|-----------------------------------|---|
| General information | |
| B&R ID code | 0xE1A4 |
| Brightness buttons | Yes ¹⁾ |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GOST-R | Yes |
| Interfaces | |
| COM | |
| Type | RS232, modem-capable, not electrically isolated |
| Design | 9-pin female DSUB connector |
| UART | 16550-compatible, 16-byte FIFO |
| Max. baud rate | 115 kbit/s |
| USB | |
| Quantity | 3 (2x Type A; 1x Type B) |
| Type | USB 2.0 ²⁾ |
| Design | 2x type A 1x type B |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load | Total max. 1 A ³⁾ |
| Panel In | |
| Design | DVI-D |
| Type | SDL/DVI |
| Electrical characteristics | |
| Nominal voltage | 24 VDC ±25% |
| Nominal current | Max. 3 A |
| Electrical isolation | Yes |
| Mechanical characteristics | |
| Dimensions | |
| Width | 190 mm |
| Height | 110 mm |
| Depth | 23.6 mm |
| Weight | 538 g |

Table 70: 5DLSLDL.1001-00 - Technical data

- 1) The brightness controls can be used to configure the brightness of the backlight on the Automation Panel in DVI mode.
- 2) In "SDL mode 1", USB 1.1 transfer rates are the highest possible.
- 3) For the 2 USB type A female connectors.

3.2.2 5DLSD3.1001-00

3.2.2.1 General information

- Link module for Automation Panel 9x3/1000 systems
- 1x SDL3 Panel In interface
- 2x USB 2.0 type A

3.2.2.2 Order data

| Model number | Short description | Figure |
|----------------|--|--------|
| | Link modules | |
| 5DLSD3.1001-00 | Automation Panel Link module - SDL3 Receiver - For Automation Panel 923/933/1000 | |
| | Required accessories | |
| | Terminal blocks | |
| 0TB103.9 | Connector 24 VDC - 3-pin female - Screw clamps 3.31 mm ² | |
| 0TB103.91 | Connector 24 VDC - 3-pin female - Cage clamp terminal block 3.31 mm ² | |
| | Optional accessories | |
| | SDL3 cables | |
| 5CASD3.0050-00 | SDL3 cable, 5 m | |
| 5CASD3.0100-00 | SDL3 cable, 10 m | |
| 5CASD3.0150-00 | SDL3 cable - 15 m | |
| 5CASD3.0200-00 | SDL3 cable - 20 m | |
| 5CASD3.0300-00 | SDL3 cable - 30 m | |
| 5CASD3.0500-00 | SDL3 cable - 50 m | |
| 5CASD3.1000-00 | SDL3 cable - 100 m | |

Table 71: 5DLSD3.1001-00 - Order data

3.2.2.3 Technical data

| Product ID | 5DLSD3.1001-00 |
|-----------------------------------|--|
| General information | |
| LED status indicators | Status, Link |
| B&R ID code | 0xE3FC |
| Certification | |
| CE | Yes |
| cULus | Yes |
| Interfaces | |
| USB | |
| Quantity | 2 |
| Type | USB 2.0 |
| Design | 2x type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (30 Mbit/s) |
| Current load | Total max. 1 A |
| SDL3 In | |
| Design | Shielded RJ45 |
| Type | SDL3 |
| Electrical characteristics | |
| Nominal voltage | 24 VDC ±25% |
| Nominal current | Max. 3 A |
| Electrical isolation | Yes |
| Mechanical characteristics | |
| Dimensions | |
| Width | 190 mm |
| Height | 110 mm |
| Depth | 23.6 mm |
| Weight | 527 g |

Table 72: 5DLSD3.1001-00 - Technical data

Chapter 3 • Installation

1 Installation

Danger!

- All supplied power must be disconnected before removing device covers or components or installing/removing accessories, hardware or cables.
- The power cable must be disconnected from the device and from the voltage supply.
- All covers, components, accessories, hardware and cables must be installed or connected before the device can be connected to the power supply and turned on.

1.1 Important installation information

- Environmental conditions must be taken into consideration.
- When installed in an enclosure, enough space must be available for air to circulate sufficiently.
- This device must be installed on a flat, clean and burr-free surface.
- This device is only certified for operation in enclosed rooms.
- This device must not be subjected to direct sunlight.
- Ventilation holes must not be covered.
- This device must be installed using one of the approved mounting orientations.
- The wall or control cabinet must be able to withstand four times the total weight of the device.
- The flex radius of connected cables (DVI, SDL, USB, etc.) must not be exceeded.
- This device must be installed in a position that minimizes glare on the screen.
- This device must be installed in a position and orientation that make viewing as easy as possible for the operator.

1.2 Mounting an Automation Panel 1000 with retaining clips

The Automation Panel 1000 is mounted in the cutout using retaining clips. The number of retaining clips depends on the display unit.

The following Automation Panel 1000 systems are mounted using retaining clips.

- 5AP1120.0573-000
- 5AP1151.0573-000
- 5AP1120.0702-000
- 5AP1120.101E-000
- 5AP1120.1043-000
- 5AP1180.1043-000
- 5AP1120.121E-000
- 5AP1120.156B-000

The thickness of the wall or cabinet plate must be between 1 mm and 6 mm.

A 2.5 mm hex socket screwdriver is needed to tighten and loosen the screws on the retaining clips. The maximum tightening torque for the retaining clips is 1 Nm.

Devices must be installed on a flat, clean and burr-free surface; uneven areas can cause damage to the display when the screws are tightened or the intrusion of dust and water.

Procedure

- Check whether the included mounting screws are screwed into the retaining clips. If not, then the mounting screws must be screwed into the retaining clips with a 2.5 mm hex key screwdriver. The mounting screws only need to be screwed in far enough that they no longer protrude above the retaining clip.

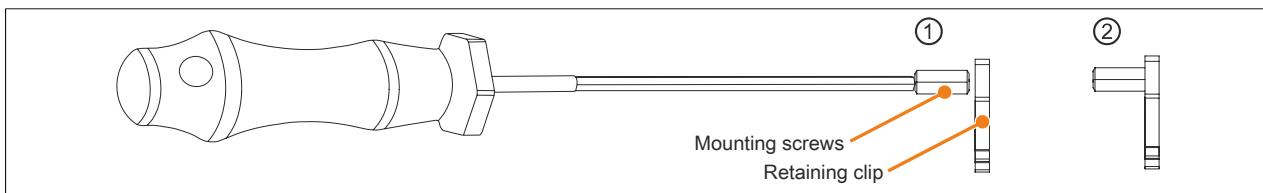


Figure 51: Preparing the retaining clips

- Insert the device into the front side of the smooth, flat installation cutout. The dimensions for the cutout can be found in section Tab. 8 "AP1000 display units with retaining clips - Installation diagrams" on page 22.
- Install the retaining clips on the device. This is done by inserting the clips into the openings on the sides of the device (indicated by the orange circles). The number of retaining clips may vary depending on the display unit. The exact number can be found in Tab. 8 "AP1000 display units with retaining clips - Installation diagrams" on page 22.

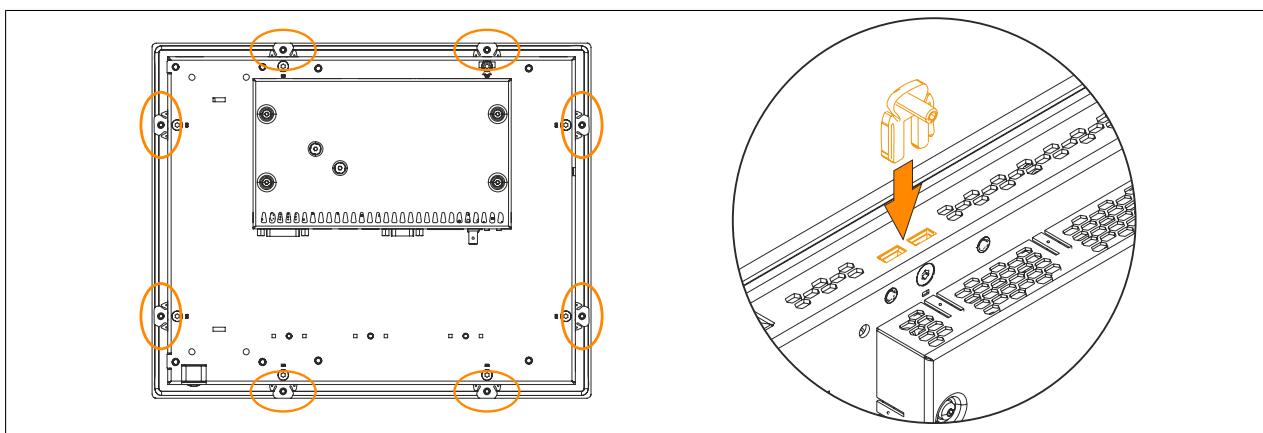


Figure 52: Inserting the retaining clips

- Fasten the retaining clips to the wall or control cabinet by alternately tightening the screws with a 2.5 hex key screwdriver. The tightening torque should be max. 1 Nm to provide an optimal seal.

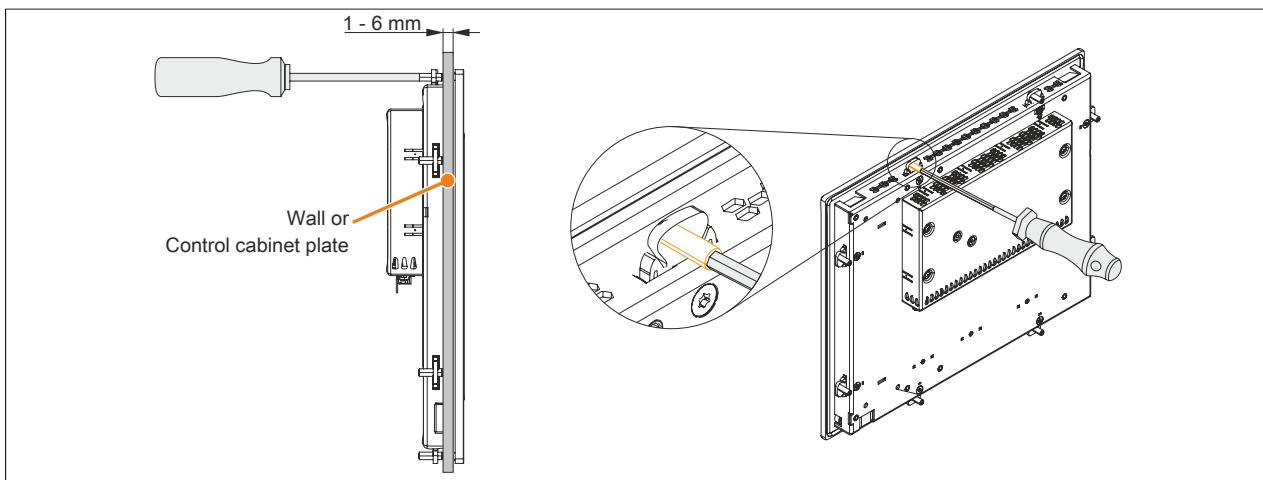


Figure 53: Fastening the retaining clips

1.3 Mounting an Automation Panel 1000 with clamping blocks

The Automation Panel 1000 is mounted in the cutout using clamping blocks. The number of clamping blocks depends on the display unit.

The following Automation Panel 1000 systems are mounted using clamping blocks.

- 5AP1181.1043-000
- 5AP1182.1043-000
- 5AP1120.1214-000
- 5AP1120.1505-000
- 5AP1180.1505-000
- 5AP1120.1906-000

The thickness of the wall or cabinet plate must be between 2 mm and 10 mm.

A 3 mm hex socket screwdriver is needed to tighten and loosen the screw on the clamping block. The maximum tightening torque for the screw is 0.5 Nm.

Devices must be installed on a flat, clean and burr-free surface; uneven areas can cause damage to the display when the screws are tightened or the intrusion of dust and water.

Procedure

1. Insert the device into the front side of the smooth, flat installation cutout. The dimensions for the cutout can be found in section Tab. 9 "AP1000 display units with clamping blocks - Installation diagrams" on page 23. The number of clamping blocks may vary depending on the display unit. The exact number can be found in Tab. 9 "AP1000 display units with clamping blocks - Installation diagrams" on page 23.

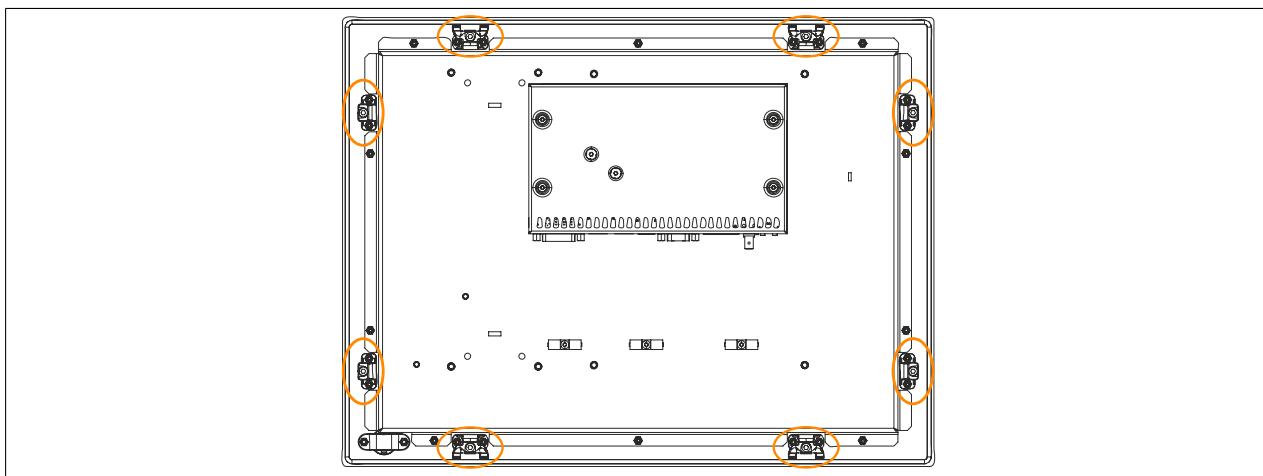


Figure 54: Position of the clamping blocks

2. Fasten the clamping blocks to the wall or control cabinet by alternately tightening the screws with a 3 mm hex key screwdriver. Tightening the screw presses down the integrated clamping lever to hold the device securely in place. The tightening torque should be max. 0.05 Nm to provide an optimal seal.

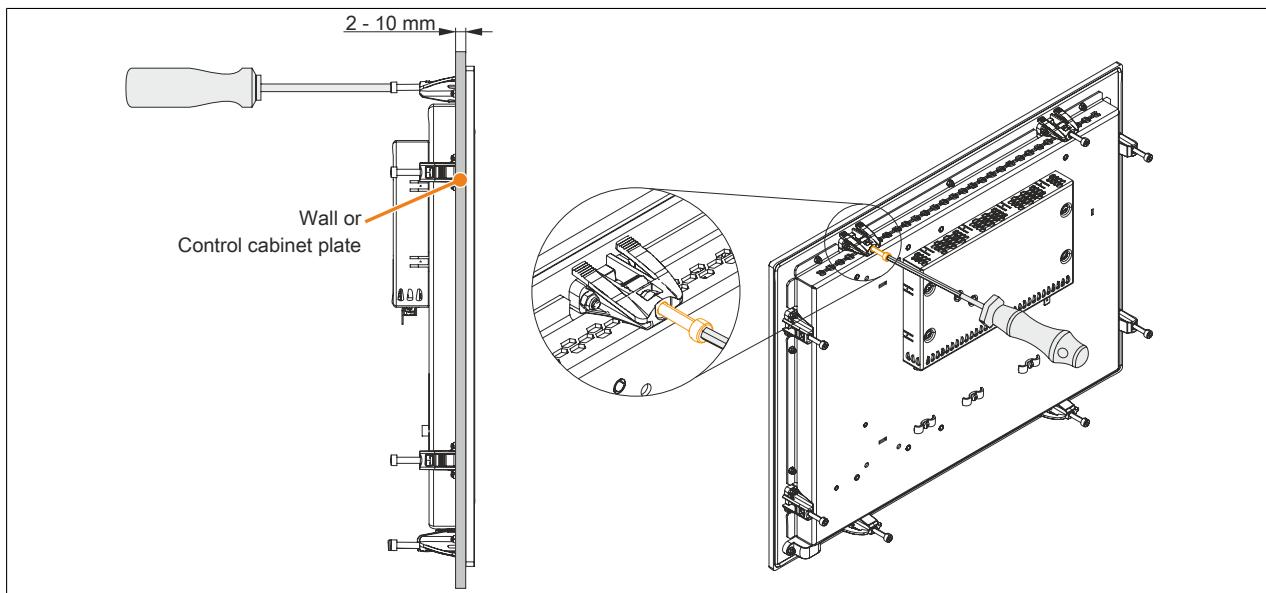


Figure 55: Fastening the clamping blocks

1.4 Replacing link modules

1. Disconnect the power supply to the Automation Panel (disconnect the power cable). Isolate the system from all potential sources of electrical power!
2. Discharge any electrostatic charge on the ground connection.
3. Remove the Automation Panel from the control cabinet by following the installation steps in reverse order.
4. Place the Automation Panel on a clean, flat surface.
5. Remove the Torx screws (T10) indicated in the following image.

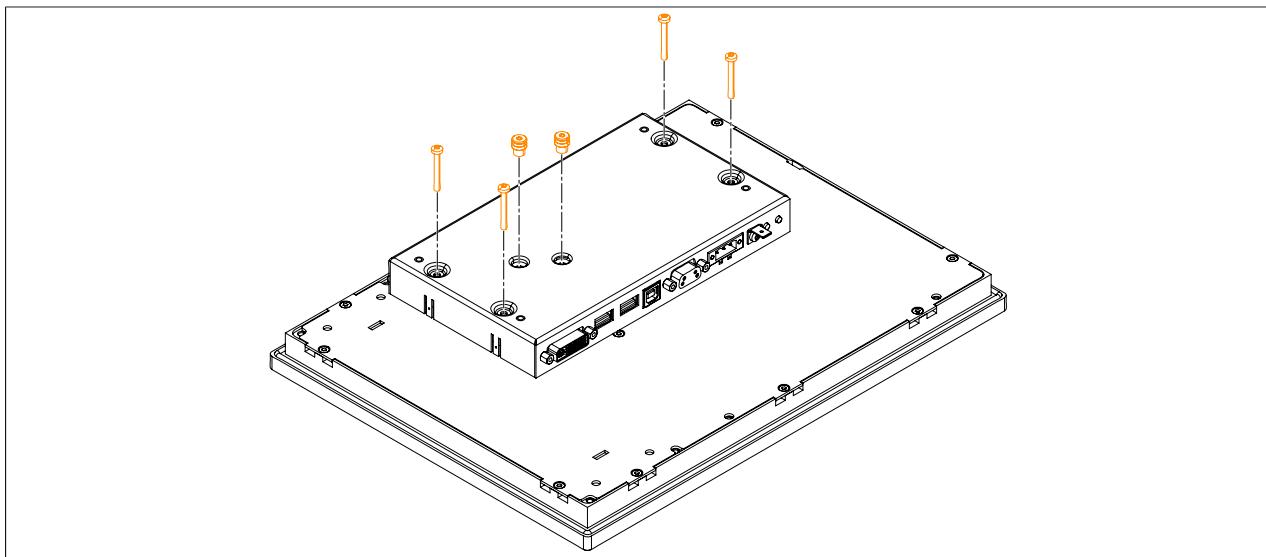


Figure 56: Removing the Torx screws

6. The link module can now be removed by pulling it straight up.

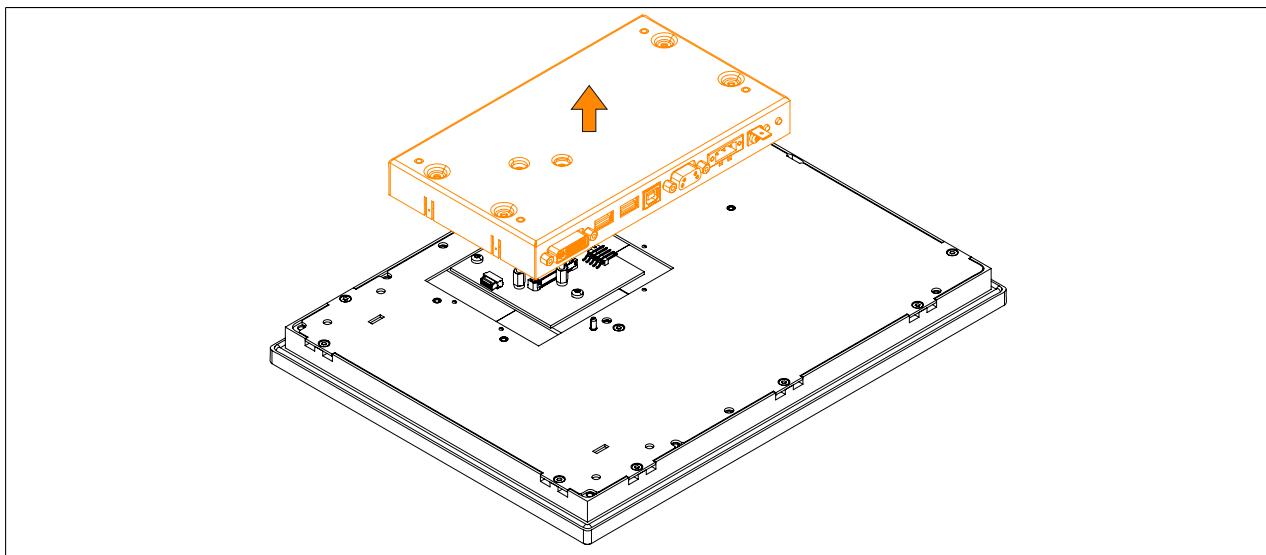


Figure 57: Removing the link module

7. The link module can now be replaced by following these steps in reverse order. The maximum tightening torque of the Torx screws (T10) is 0.5 Nm.

2 Connecting to the power mains

Danger!

- All supplied power must be disconnected before removing device covers or components or installing/removing accessories, hardware or cables.
- The power cable must be disconnected from the device and from the voltage supply.
- All covers, components, accessories, hardware and cables must be installed or connected before the device can be connected to the power supply and turned on.

2.1 Installing the DC power cable

Danger!

All supplied power to the B&R Industrial PC must be completely disconnected. Before connecting the DC power cable, it is important to make absolutely sure that it has been disconnected from the power source (e.g. power supply).

2.1.1 Wiring

The DC power cable must be secured in the terminal block (power connector) as shown in the image. Wires with a cross section of 0.75 mm² to 1.5 mm² and wire end sleeves must be used.

Installing the 0TB103.9 screw clamp terminal block

Insert the wires with the wire end sleeves into the terminal contacts ② as shown in the image and tighten the screw clamps ① with a screwdriver (max. torque of 0.4 Nm).

Please note the pinout of the power supply connector on the device!

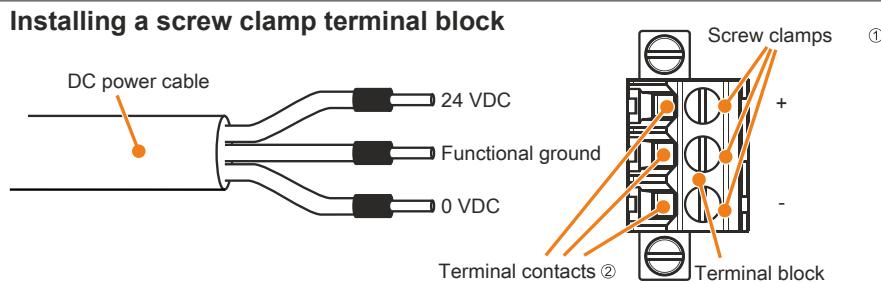


Figure 58: Installing a screw clamp terminal block

Installing the 0TB103.91 cage clamp terminal block

Insert a screwdriver into the cage clamp terminal ① and fasten the wires with wire end sleeves in the terminal contacts ② as shown in the image below. Close the terminal contact by removing the screwdriver.

Please note the pinout of the power supply connector on the device!

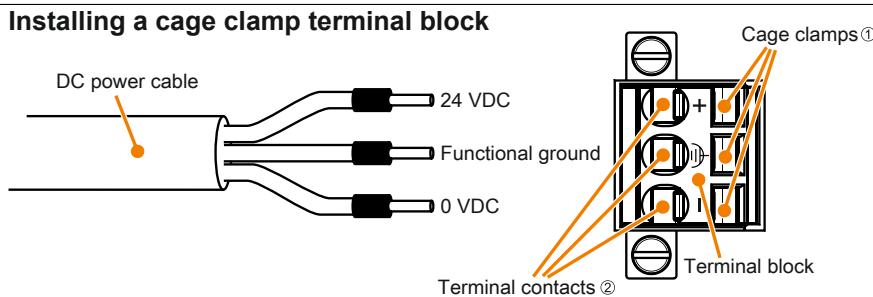


Figure 59: Installing a cage clamp terminal block

2.2 Connecting the power supply to a B&R device

Danger!

The voltage supply to the B&R device must be completely disconnected. Before connecting the power cable, it is important to make absolutely sure that it has been disconnected from the power source (e.g. power supply).

1. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
2. Connect the power supply connector to the B&R device and tighten the fastening screws (max. tightening torque 0.5 Nm).

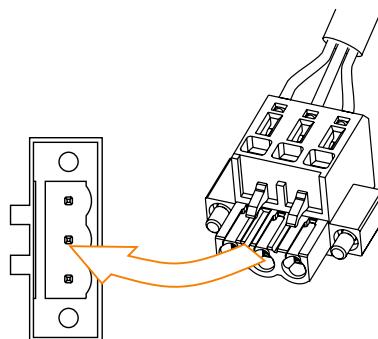


Figure 60: Connecting the power supply connector to a B&R device

2.3 Functional ground - Grounding concept

Functional ground is a current path of low impedance between electrical circuits and ground. It is used, for example, to improve immunity to disturbances and not necessarily as a protective measure. It therefore serves only to deflect disturbances, not to provide any kind of protection against electric shock.

This device comes equipped with two functional ground connections:

- Power supply
- Ground connection

To guarantee safe conductance of electric disturbances, the following points must be observed:

- The device must be connected to the central grounding point in the control cabinet using the shortest route possible.
- A cable with a minimum cross section of 2.5 mm^2 per connection should be used. If a cable with wire end sleeves is connected to the 0TB103.9 or 0TB103.91 terminal block, then a cable with maximum 1.5 mm^2 per connection is possible.
- Note the line shielding concept. All data cables connected to the device must be shielded.

Symbol indicating functional ground on the B&R device:

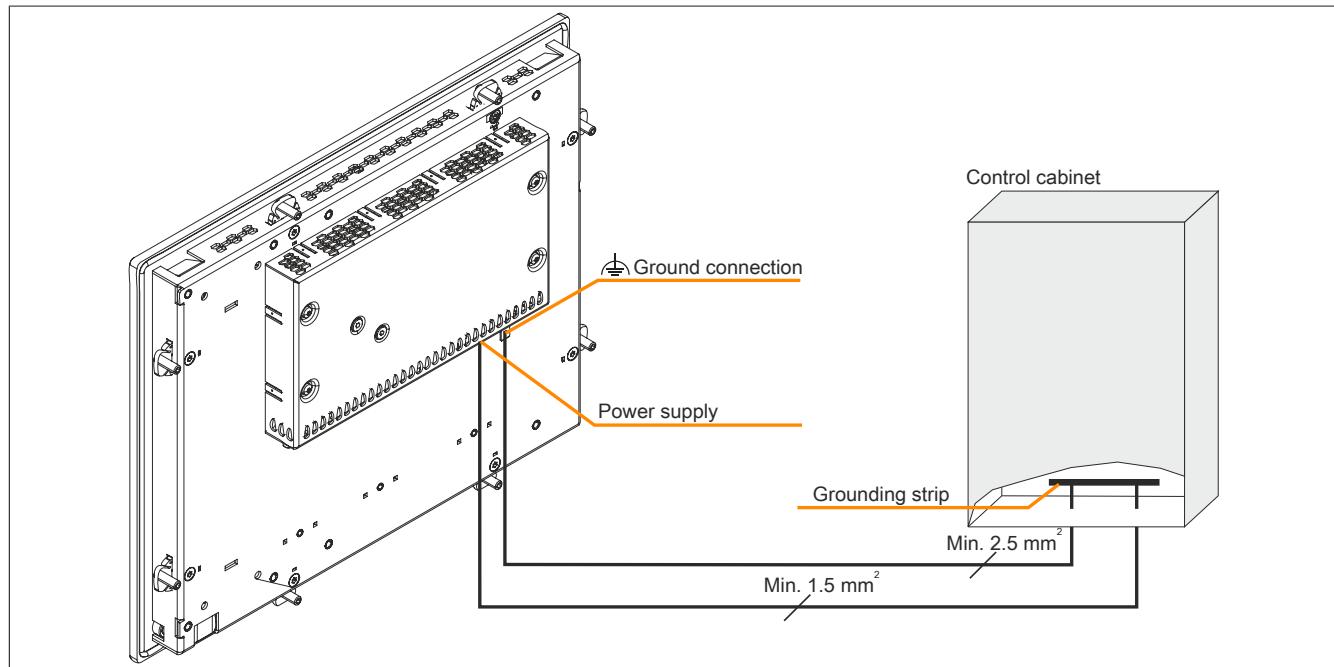


Figure 61: Automation Panel 1000 - Grounding concept

3 Cable connections

Flex radius specifications must be taken into account when installing or connecting cables.

Information:

The maximum torque for the locating screws is 0.5 Nm.

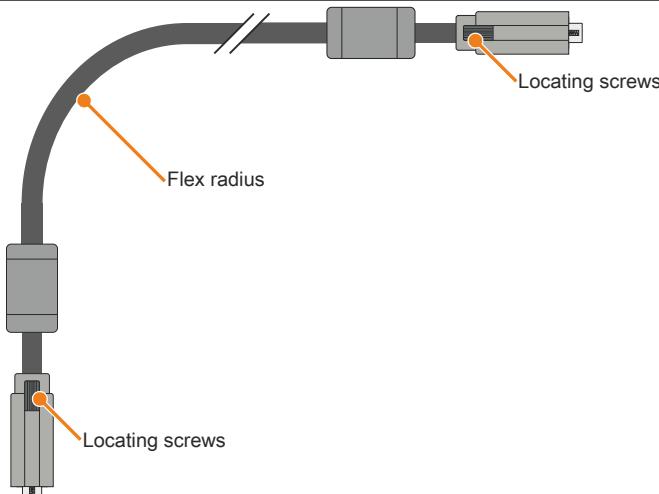


Figure 62: Flex radius - Cable connection

Information:

The specified flex radius is listed in the technical data for the respective cable.

4 Switching on the device for the first time

4.1 General information before switching on the device

Checklist

The following items must be checked before the device is put into operation for the first time:

- Have the installation notes as specified in "Installation" on page 88 been observed.
- Have the permitted environmental conditions been taken into consideration for the device?
- Is the power supply connected correctly, and have the associated values been checked?
- Is the ground cable connected correctly to the ground connection?
- The device must be put into operation first before additional hardware is installed.

Caution!

Before the device is put into operation, it must first be acclimated to room temperature! It should not be immediately subjected to thermal radiation.

If transported at low temperatures or if there are large temperature fluctuations, the device must not be subjected to any type of moisture.

Prerequisites and requirements

The following requirements must be fulfilled before the device is switched on for the first time:

- The protective film has been removed from the display unit.
- The functional ground connections must be kept as short as possible and connected to the central grounding point using the largest possible wire cross section.
- All connection cables must be connected correctly.
- A USB keyboard and USB mouse are connected (optional).
- An Automation PC or Panel PC is connected (via DVI, SDL or SDL3).

4.2 Switching on the Automation Panel

Procedure

1. Connect and switch on the voltage supply (e.g. power supply).
2. The device is operational.

5 Touch screen calibration

B&R touch screen devices are equipped with a B&R touch controller that supports hardware calibration. As a result, devices are pre-calibrated when delivered. This is an advantageous feature when replacing devices of the same model or type since it avoids having to recalibrate the new device. Nevertheless, calibrating the device is still recommended in order to achieve the best results and to better adapt the touch screen to the user's preferences.

5.1 Single-touch (analog resistive)

5.1.1 Windows Embedded 8.1 Industry Pro

After starting Windows Embedded 8.1 Industry Pro on the Panel PC for the first time, the corresponding touch screen driver is installed automatically.

On all other devices, the touch screen driver must be installed in order to operate the touch screen. The necessary driver is available in the Downloads section of the B&R website (www.br-automation.com).

5.1.2 Windows 7 Professional / Ultimate

After installing Windows 7 on the device, the touch screen driver must be installed in order to operate the touch screen. The necessary driver is available in the Downloads section of the B&R website (www.br-automation.com).

5.1.3 Windows Embedded Standard 7 Embedded / Premium

A touch screen driver will be installed automatically if a touch controller is detected during the Windows Embedded Standard 7 installation.

The touch screen driver must be installed manually if a touch controller was not detected during the Windows Embedded Standard 7 setup or if an Automation Panel has been connected after setup. The necessary driver is available in the Downloads section of the B&R website (www.br-automation.com).

5.1.4 Windows XP Professional

After installing Windows XP Professional on the device, the touch screen driver must be installed in order to operate the touch screen. The necessary driver is available in the Downloads section of the B&R website (www.br-automation.com).

5.1.5 Windows Embedded Standard 2009

After starting Windows Embedded Standard 2009 on the Panel PC or Power Panel for the first time (first boot agent), the corresponding touch screen driver is installed automatically.

On all other devices, the touch screen driver must be installed in order to operate the touch screen. The necessary driver is available in the Downloads section of the B&R website (www.br-automation.com).

6 Adjusting the display brightness

In SDL or SDL3 mode, the brightness of the display can be configured using the Control Center on the connected B&R Industrial PC. In DVI mode, the brightness can only be controlled using the two brightness controls provided on the SDL/DVI receiver.

6.1 Adjusting in SDL/SDL3 mode

1. Open the **Control Center** in the Control Panel.
2. Select the **Display** tab.
3. Select the Automation Panel from the list.
4. Set the desired brightness using the slider control.

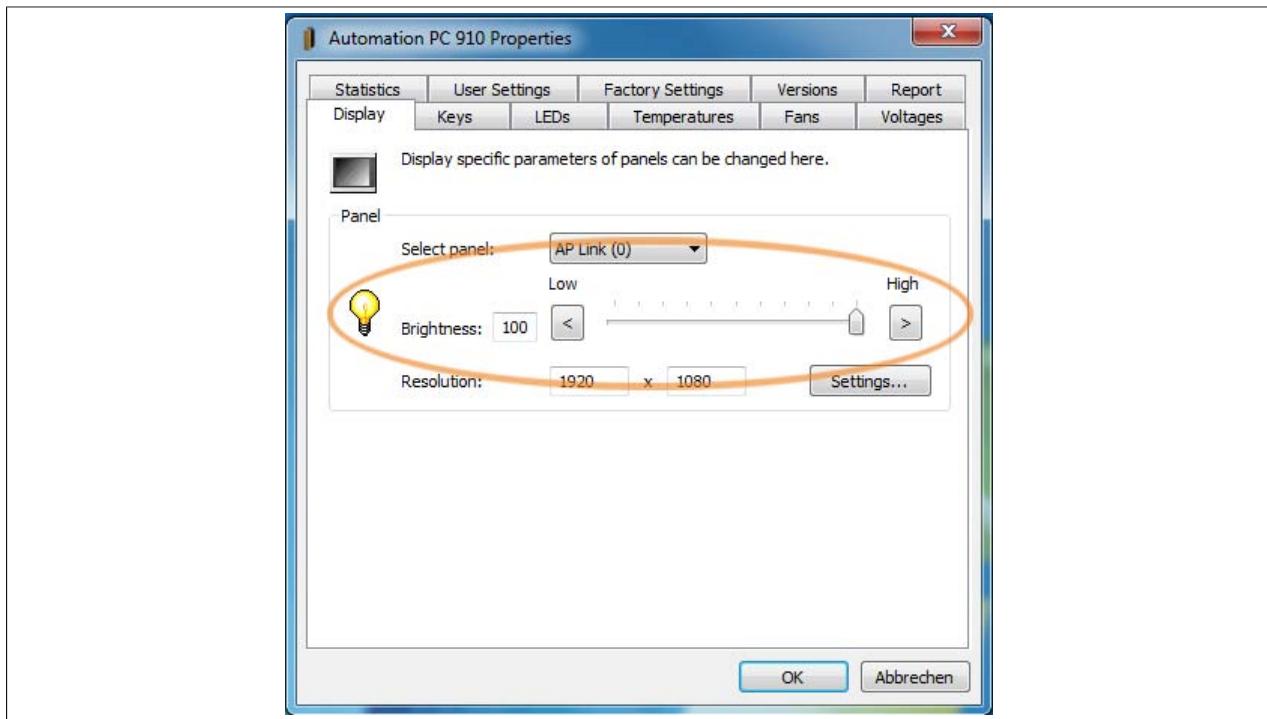


Figure 63: Adjusting the display brightness

Information:

Changes to these settings are displayed online but are only applied by the system (and applied during the next restart) if the Control Center is closed with **OK**.

The configured brightness is separate from the value configured in BIOS Setup, i.e. the value in BIOS is used until Windows boots. The value from BIOS is only applied the first time the Control Center is launched.

6.2 Adjusting in DVI mode

1. Use the two brightness controls on the SDL/DVI receiver to set the brightness.

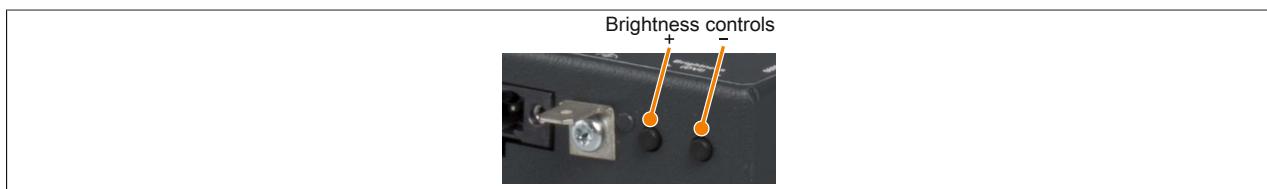


Figure 64: Brightness controls

Chapter 4 • Software

1 Upgrade information

Warning!

The BIOS and firmware on B&R devices must be kept current. New versions can be downloaded from the B&R website (www.br-automation.com).

1.1 Firmware upgrade

The Automation Panel firmware can be updated by updating the firmware of the B&R Industrial PC to which the panel is connected.

The latest firmware upgrade is available in the Downloads section of the B&R website (www.br-automation.com).

2 B&R Automation Device Interface (ADI) - Control Center

The ADI (Automation Device Interface) enables access to specific functions on B&R devices. Settings for devices can be read and configured using the B&R Control Center applet in the Control Panel.

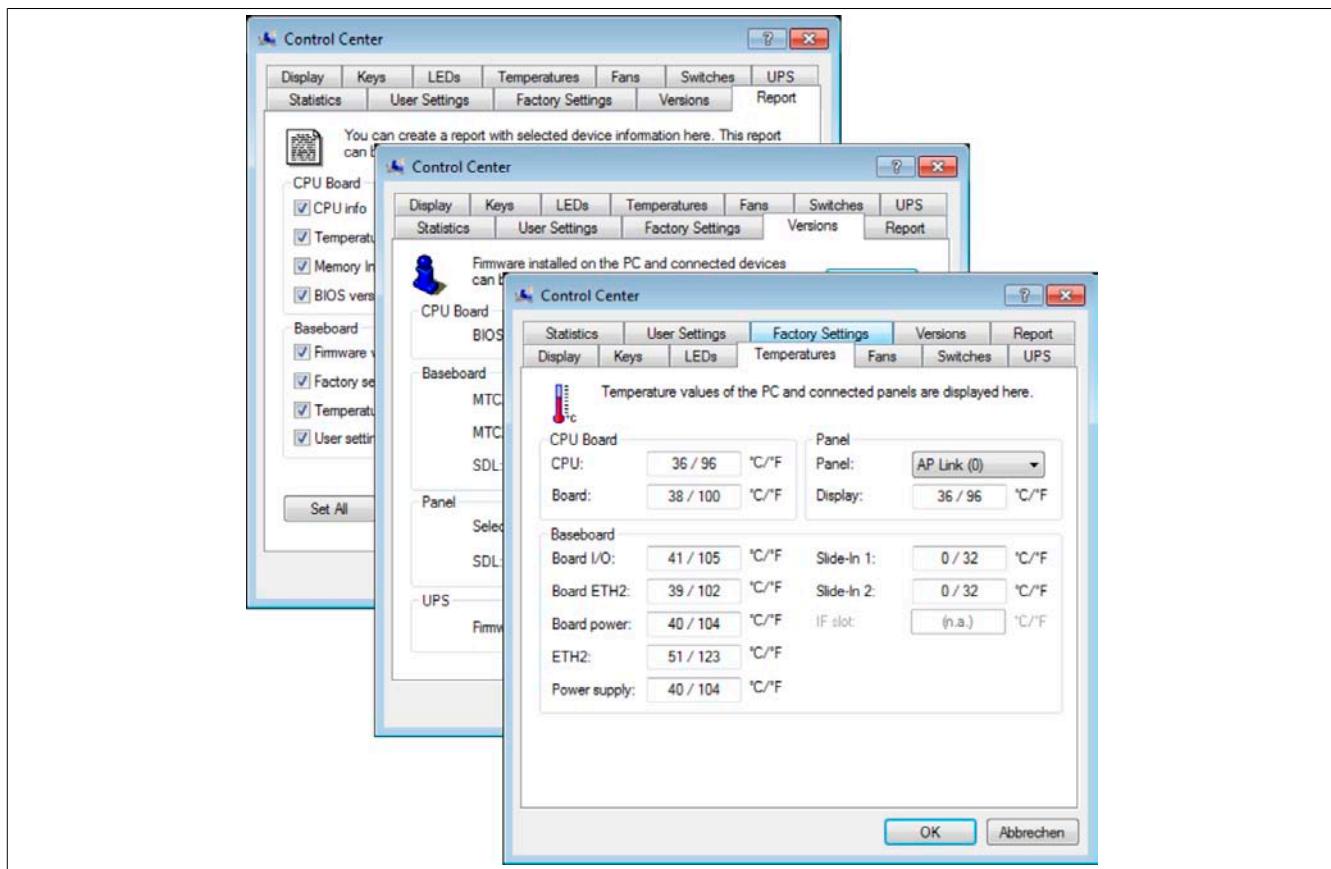


Figure 65: ADI Control Center screenshots - Examples

Information:

The temperature and voltage values (e.g. CPU temperature, core voltage, battery voltage) shown in the corresponding ADI window represent uncalibrated values for informational purposes. They cannot be used to draw any conclusions about hardware alarms or error conditions. The hardware components used have automatic diagnostic functions that can be applied in the event of error.

2.1 Functions

Information:

The functions provided by the Automation Device Interface (ADI) - Control Center vary according to the device series.

- Changing display-specific parameters
- Reading device-specific keys
- Updating the key configuration
- Enabling device-specific LEDs on a membrane keypad or keys
- Reading and calibrating control devices (e.g. key switches, handwheels, joysticks, potentiometers)
- Reading temperatures, fan speeds, statistical data and switch settings
- Reading operating hours (power-on hours)
- Reading user and factory settings
- Reading software versions
- Updating and backing up BIOS and firmware
- Creating reports about the current system (support assistance)
- Setting the SDL equalizer value when adjusting SDL cables
- Changing the user serial ID

Supports the following systems:

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Automation PC 2100
- Panel PC 300
- Panel PC 700
- Panel PC 725
- Panel PC 800
- Panel PC 900
- Panel PC 2100
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200
- Connected Automation Panel 800
- Connected Automation Panel 900
- Connected Automation Panel 1000

2.2 Installation

A detailed description of the Control Center can be found in the integrated help system. The B&R Automation Device Interface (ADI) driver (also includes the Control Center) is available at no charge in the Downloads section of the B&R website (www.br-automation.com).

1. Download and unzip the .zip archive.
2. Close all applications.
3. Run the Setup.exe file (e.g. double-click on it in Explorer).

Information:

The ADI driver is already included in B&R images of embedded operating systems.

If a more current ADI driver version exists (see the Downloads section of the B&R website), it can be installed later. It is important that Enhanced Write Filter (EWF) is disabled for this.

3 B&R Automation Device Interface (ADI) Development Kit

This software can be used to access B&R Automation Device Interface (ADI) functions directly from Windows applications created in one of the following development environments:

- Microsoft Visual C++ 6.0
- Microsoft Visual Basic 6.0
- Microsoft Embedded Visual C++ 4.0
- Microsoft Visual Studio 2008 (or newer)

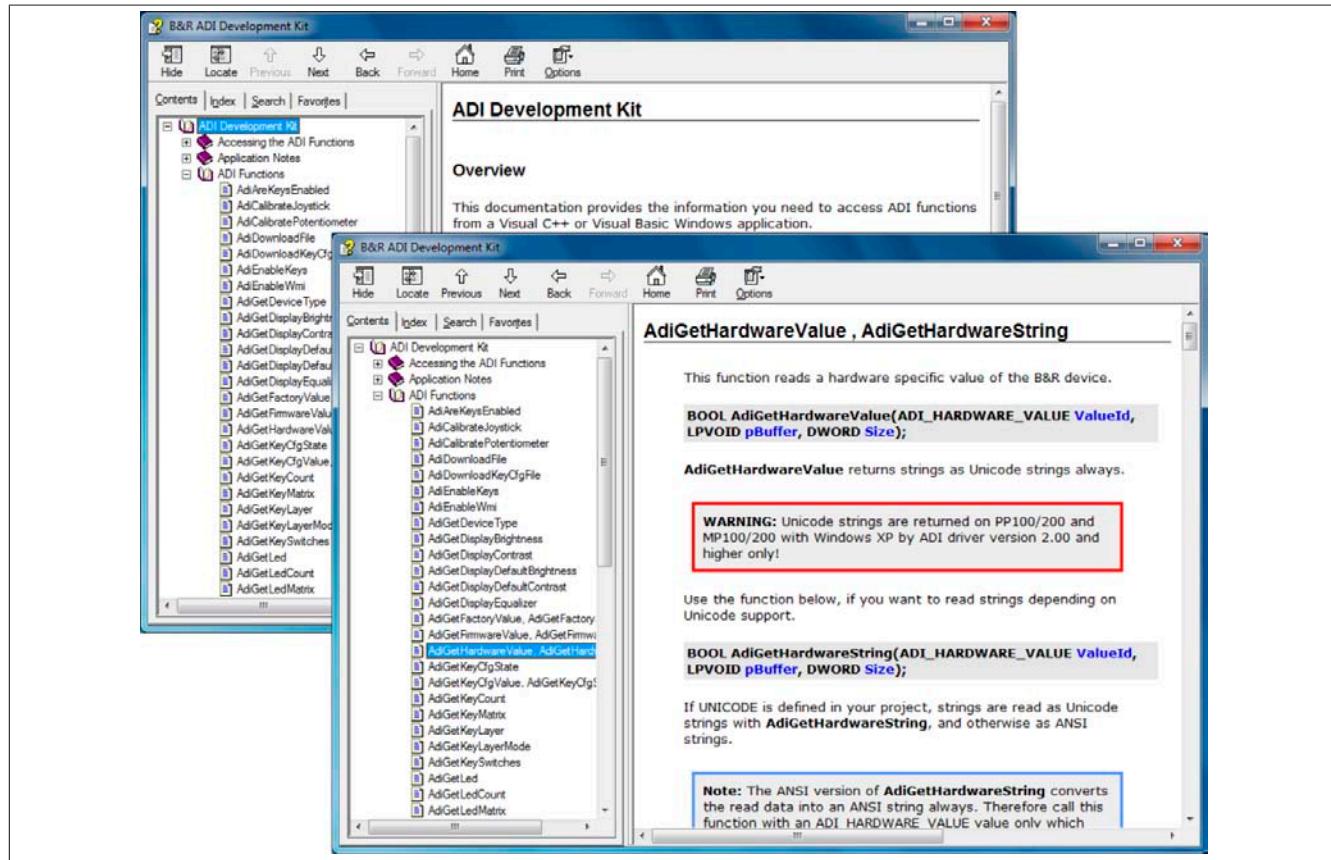


Figure 66: ADI Development Kit Screenshots (Version 3.70)

Features:

- One Microsoft Visual Basic module with ADI function declarations
- Header files and import libraries for Microsoft Visual C++
- Help files for Visual Basic and Visual C++
- Sample projects for Visual Basic and Visual C++
- ADI DLL (for application testing if no ADI driver is installed)

The following systems are supported (version 3.70 and higher):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Automation PC 2100
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Panel PC 900
- Panel PC 2100

- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200

The ADI driver installed on the stated product series must be suitable for that device. The ADI driver is already included in B&R images of embedded operating systems.

A detailed description of how to use ADI functions can be found in the help system.

The B&R Automation Device Interface (ADI) development kit is available at no cost in the Downloads section of the B&R website (www.br-automation.com).

4 B&R Automation Device Interface (ADI) .NET SDK

This software can be used to access B&R Automation Device Interface (ADI) functions directly from .NET applications created using Microsoft Visual Studio 2005 or later.

Supported programming languages:

- Visual Basic
- Visual C++
- Visual C#

System requirements

- Development system: PC with Windows XP or Windows 7 and
 - Microsoft Visual Studio 2005 (or newer)
 - Microsoft .NET Framework 2.0 and/or Microsoft .NET Compact Framework 2.0 (or newer)

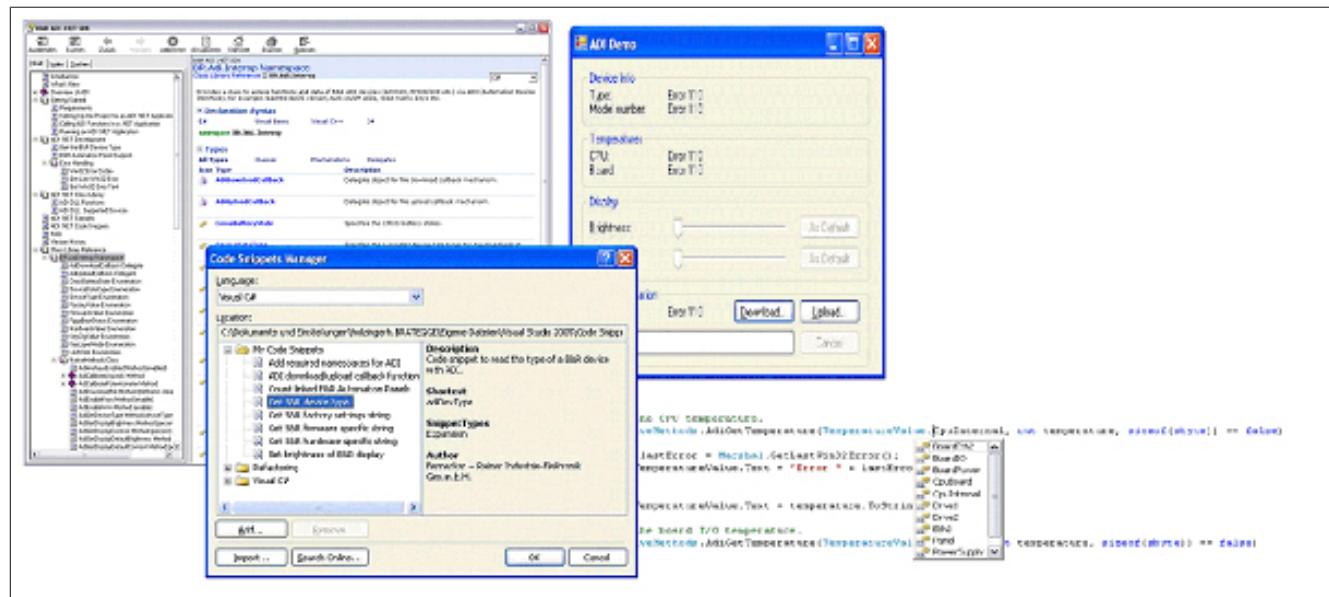


Figure 67: ADI .NET SDK screenshots (version 2.10)

Features (version 2.10 and higher)

- ADI .NET class library
- Help files in HTML Help 1.0 format (.chm), MS Help 2.0 format (.HxS) and MS Help Viewer format (.MSHC) (help documentation is in English only)
- Sample projects and code snippets for Visual Basic, Visual C++ and Visual C#
- ADI DLL (for application testing if no ADI driver is installed)

The following systems are supported (version 2.10 and higher):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Automation PC 2100
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Panel PC 900
- Panel PC 2100
- Power Panel 100/200
- Power Panel 300/400

- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200

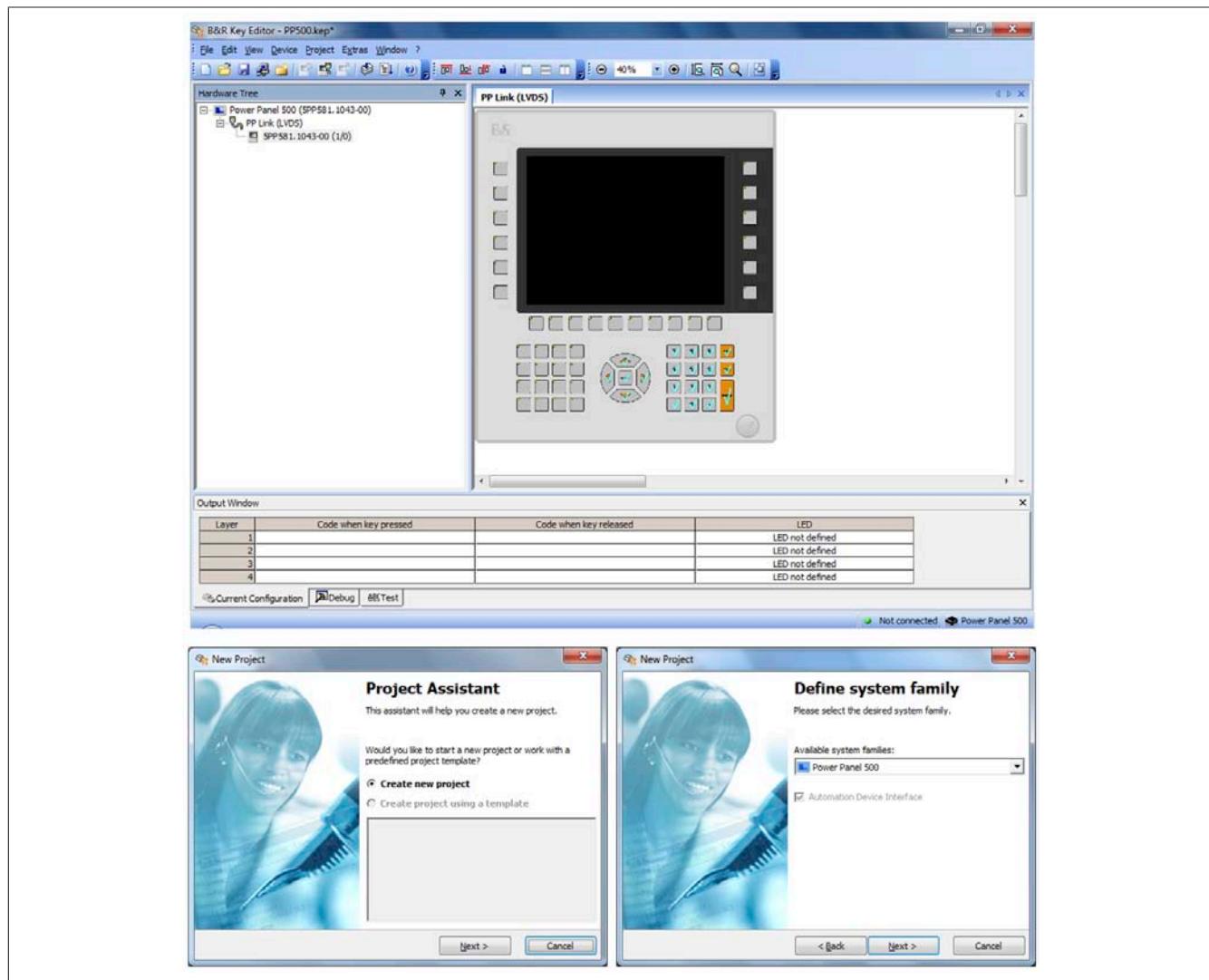
The ADI driver installed on the stated product series must be suitable for that device. The ADI driver is already included in B&R images of embedded operating systems.

A detailed description of how to use ADI functions can be found in the help system.

The ADI .NET SDK is available in the Downloads section of the B&R website (www.br-automation.com).

5 B&R Key Editor

On display devices, it is often necessary to adapt the function keys and LEDs directly to the application software being used. The B&R Key Editor makes it quick and easy to implement a unique configuration for the application.



Chapter 4
Software

Figure 68: B&R Key Editor screenshots (version 3.60)

Features:

- Configuration of normal keyboard keys (A, B, C, etc.)
- Keyboard shortcuts (CTRL+C, SHIFT+DEL, etc.) using only one key
- Special key functions (change brightness, etc.)
- Assignment of functions to LEDs (HDD access, power, etc.)
- 4 assignments possible per key (using layers)
- Configuration of the panel locking time when multiple Automation Panel 900 devices are connected to Automation PC and Panel PC devices.

The following systems are supported (version 3.60 and higher):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Automation PC 2100
- Automation Panel 800
- Automation Panel 830

- Automation Panel 900
- Automation Panel 9x3
- Automation Panel 9xD
- Automation Panel 1000
- IPC2000, IPC2001, IPC2002
- IPC5000, IPC5600
- IPC5000C, IPC5600C
- Mobile Panel 40/50
- Mobile Panel 100/200
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Panel PC 900
- Panel PC 2100
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500

A detailed guide for configuring keys and LEDs as well as installing the key configuration on the target system can be found in the B&R Key Editor's help system. The B&R Key Editor is available at no cost in the Downloads section of the B&R website (www.br-automation.com).

6 B&R KCF Editor

The B&R KCF Editor can be used as a simple alternative to the B&R Key Editor. The function keys and LEDs can also be adjusted to the application software with it. Unlike B&R Key Editor, operation does not take place via the graphic display, but via a simple Windows dialog box. Therefore the B&R KCF Editor can be used for devices that are not yet supported in the B&R Key Editor. The B&R KCF Editor is a portable application and can be started on the target device without prior installation e.g. directly from a USB flash drive. An installed ADI driver is required for the full range of functions.

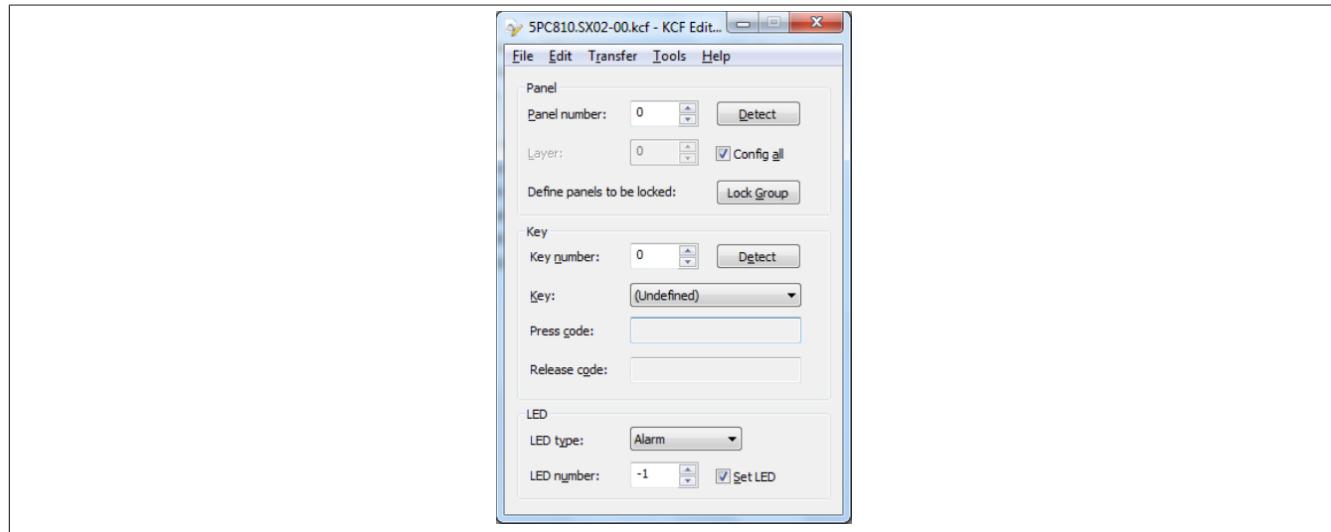


Figure 69: B&R KCF Editor screenshot (version 1.0)

Features

- Configuration of normal keyboard keys (A, B, C, etc.)
- Special key functions (change brightness, etc.)
- Assignment of LED functions (HDD access, power, etc.)
- 4 assignments possible per key (using layers)
- Configuration of the panel locking time when multiple Automation Panel devices are connected to B&R PCs.
- Export and import of the configuration (using .ini files)
- Saving the configuration as a report (as a text file)

Additional features if the KCF Editor is executed on the target device³⁾

- Panel and key detection
- LED test
- Downloading/uploading the configuration

The following systems are supported (version 1.0 and higher)

- Automation PCs
- Panel PCs
- Automation Panels
- Power Panels
- Mobile panels

A detailed guide for configuring keys and LEDs can be found in the user's manual of the B&R KCF Editor. The B&R KCF Editor and user's manual are available at no cost in the Downloads section of the B&R website (www.br-automation.com).

³⁾ For these features the ADI driver must be installed on the B&R PC.

Chapter 5 • Standards and certifications

1 Standards and guidelines

1.1 CE mark



Product complies with all applicable directives and their harmonized EN standards.

1.2 EMC directive

These devices meet the requirements of EC directive "2004/108/EC Electromagnetic compatibility" and are designed for the following areas:

| | |
|--------------------|---|
| EN 61131-2:2007 | Programmable logic 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 |

1.3 Low voltage directive

These devices satisfy the requirements of EC directive "2006/95/EC Low voltage directive" and are designed for the following areas:

| | |
|---------------------------|---|
| EN 61131-2:2007 | Programmable logic controllers - Part 2: Equipment requirements and tests |
| EN 60204-1:2006 + A1:2009 | Safety of machinery - Electrical equipment of machines - Part 1: General requirements |

2 Certifications

Danger!

A complete system can only receive certification if ALL of the individual components it includes have the applicable certifications. If an individual component is being used that DOES NOT have an applicable certification, then the complete system WILL NOT receive certification.

B&R products and services comply with applicable standards. This includes 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 are committed to ensuring the reliability of our products in an industrial environment.

Unless otherwise specified, the following certifications apply:

2.1 UL certification



Ind.Cont.Eq.
E115267

Products with this mark have been tested by Underwriters Laboratories and are listed as "Industrial Control Equipment". This mark is valid for the USA and Canada and simplifies the certification of your machines and systems in these areas.

Underwriters Laboratories (UL) in accordance with the UL508 standard - 17th Edition Canadian (CSA) standard in accordance with C22.2 No. 142-M1987

2.2 GOST-R



Products with this mark have been certified by an accredited testing laboratory and have been approved for import to the Russian Federation (based on CE compliance).

Chapter 6 • Accessories

The following accessories have successfully completed functional testing at B&R and are approved for use with this device. Nevertheless, it is important to observe any limitations that may apply to the complete system when operated with other individual components. When operating the complete system, the specifications for the individual components must be observed.

All components listed in this manual have been subjected to extensive system and compatibility testing and are approved for use. B&R can make no guarantee regarding the functionality of non-approved accessories.

1 Power connectors

1.1 0TB103.9x

1.1.1 General information

This single-row, 3-pin 0TB103 terminal block is used to connect the voltage supply.

1.1.2 Order data

| Model number | Short description | Figure |
|------------------------|--|--------|
| Terminal blocks | | |
| 0TB103.9 | Connector 24 VDC - 3-pin female - Screw clamps 3.31 mm ² | |
| 0TB103.91 | Connector 24 VDC - 3-pin female - Cage clamp terminal block 3.31 mm ² | |

Table 73: 0TB103.9, 0TB103.91 - Order data

1.1.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the complete system. The data specifications for the complete system take precedence over those of individual components.

| Product ID | 0TB103.9 | 0TB103.91 |
|--|---|--|
| General information | | |
| Certification | | |
| CE | Yes | |
| cULus | Yes | |
| cULus HazLoc Class 1 Division 2 | Yes ¹⁾ | |
| GL | Yes ²⁾ | |
| Terminal block | | |
| Note | Protected against vibration by the screw flange Nominal values according to UL | |
| Number of pins | 3 (female) | |
| Type of terminal clamp | Screw clamps | Cage clamp terminal blocks ³⁾ |
| Cable type | Only copper wires (no aluminum wires!) | |
| Distance between contacts | 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 mm ² | |
| Solid wires | 0.20 to 2.50 mm ² | |
| Fine strand wires | 0.20 to 1.50 mm ² | 0.20 to 2.50 mm ² |
| With wire end sleeves | 0.20 to 1.50 mm ² | |
| Tightening torque | 0.4 Nm | - |

Table 74: 0TB103.9, 0TB103.91 - Technical data

| Product ID | 0TB103.9 | 0TB103.91 |
|-----------------------------------|----------------|-----------|
| Electrical characteristics | | |
| Nominal voltage | 300 V | |
| Nominal current ⁴⁾ | 10 A / contact | |
| Contact resistance | ≤5 mΩ | |

Table 74: 0TB103.9, 0TB103.91 - Technical data

- 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, although applies only if all components installed within the complete system have this certification.
- 3) Cage clamp terminal blocks cannot be used side-by-side.
- 4) The limit data for each I/O module must be taken into consideration.

2 USB flash drives

2.1 5MMUSB.xxxx-01

2.1.1 General information

USB flash drives are data storage devices that are easy to exchange. Because of their high-speed data transfer (USB 2.0), USB flash drives are ideal for use as portable data storage. Without requiring additional drivers ("hot plugging", except in the case of Windows 98SE), the USB flash drive can immediately act as an additional drive for reading or writing data.

Information:

Due to the large number of USB flash drives available on the market as well as their short product life cycle, we reserve the right to supply alternative products at any time. The following measures may therefore be necessary in order to boot from these flash drives as well:

- The flash drive must be reformatted or in some cases even repartitioned (set active partition).
- The flash drive must be the first bootable device in the BIOS boot order; alternatively, the IDE controllers can be disabled in BIOS. This can be avoided in most cases if the "fdisk /mbr" command is additionally executed on the USB flash drive.

2.1.2 Order data

| Model number | Short description | Figure |
|------------------------|-----------------------------------|---|
| USB accessories | | |
| 5MMUSB.2048-01 | USB 2.0 flash drive, 2048 MB, B&R | |
| 5MMUSB.4096-01 | USB 2.0 flash drive, 4096 MB, B&R |  |

Table 75: 5MMUSB.2048-01, 5MMUSB.4096-01 - Order data

2.1.3 Technical data

| Product ID | 5MMUSB.2048-01 | 5MMUSB.4096-01 |
|----------------------------|---|----------------|
| General information | | |
| Capacity | 2 GB | 4 GB |
| LED status indicators | 1 LED (green) ¹⁾ | |
| MTBF | >3,000,000 hours | |
| Type | USB 1.1, USB 2.0 | |
| Maintenance | None | |
| Default file system | FAT16 | FAT32 |
| Certification | | |
| CE | Yes | |
| GOST-R | Yes | |
| Interfaces | | |
| USB | | |
| Type | USB 1.1, USB 2.0 | |
| Connection | To any USB type A interface | |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) | |
| Sequential reading | Full speed max. 1 MB/s, High speed max. 32 MB/s | |
| Sequential writing | Full speed max. 0.9 MB/s, High speed max. 23 MB/s | |
| Endurance | | |
| SLC flash | Yes | |
| Data retention | >10 years | |
| Data reliability | <1 unrecoverable error in 10 ¹⁴ bit read accesses | |
| Connection cycles | >1,500 | |
| Support | | |
| Operating systems | | |
| Windows 7 | Yes | |
| Windows XP Professional | Yes | |
| Windows XP Embedded | Yes | |
| Windows ME | Yes | |
| Windows 2000 | Yes | |
| Windows CE 5.0 | Yes | |
| Windows CE 4.2 | Yes | |

Table 76: 5MMUSB.2048-01, 5MMUSB.4096-01 - Technical data

| Product ID | 5MMUSB.2048-01 | 5MMUSB.4096-01 |
|-----------------------------------|--|----------------|
| Electrical characteristics | | |
| Current consumption | Max. 500 µA sleep mode, max. 120 mA read/write | |
| Environmental conditions | | |
| Temperature Operation | 0 to 70°C | |
| Storage | -50 to 100°C | |
| Transport | -50 to 100°C | |
| Relative humidity Operation | 85%, non-condensing | |
| Storage | 85%, non-condensing | |
| Transport | 85%, non-condensing | |
| Vibration Operation | 20 to 2000 Hz: 20 g (peak) | |
| Storage | 20 to 2000 Hz: 20 g (peak) | |
| Transport | 20 to 2000 Hz: 20 g (peak) | |
| Shock Operation | Max. 1500 g (peak) | |
| Storage | Max. 1500 g (peak) | |
| Transport | Max. 1500 g (peak) | |
| Elevation Operation | Max. 3048 m | |
| Storage | Max. 12192 m | |
| Transport | Max. 12192 m | |
| Mechanical characteristics | | |
| Dimensions Width | 17.97 mm | |
| Length | 67.85 mm | |
| Height | 8.35 mm | |

Table 76: 5MMUSB.2048-01, 5MMUSB.4096-01 - Technical data

1) Indicates data being transferred (sending and receiving).

2.1.4 Temperature/Humidity diagram

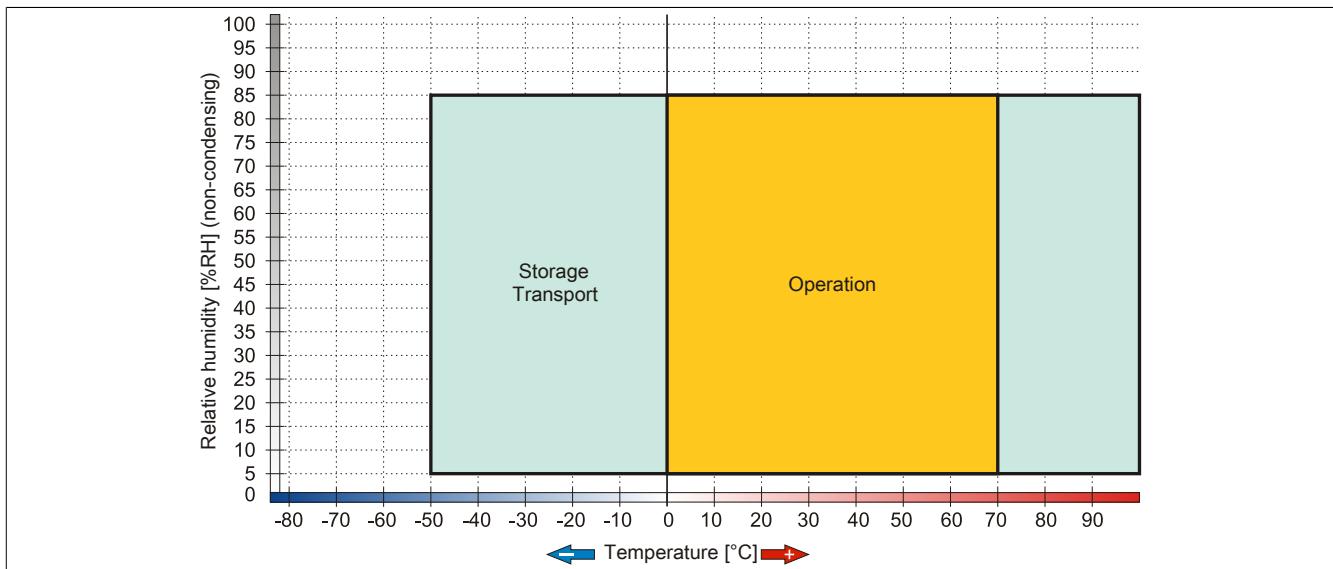


Figure 70: 5MMUSB.xxxx-01 - Temperature/Humidity diagram

3 Cables

3.1 DVI cables

3.1.1 5CADVI.0xxx-00

3.1.1.1 General information

5CADVI.0xxx-00 DVI cables are designed for use in inflexible applications.

Caution!

Power must be disconnected before connecting or disconnecting cables.

3.1.1.2 Order data

| Model number | Short description | Figure |
|-------------------|---------------------|--------|
| DVI cables | | |
| 5CADVI.0018-00 | DVI-D cable - 1.8 m | |
| 5CADVI.0050-00 | DVI-D cable - 5 m | |
| 5CADVI.0100-00 | DVI-D cable - 10 m | |

Table 77: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Order data

3.1.1.3 Technical data

| Product ID | 5CADVI.0018-00 | 5CADVI.0050-00 | 5CADVI.0100-00 |
|-----------------------------------|--|---|----------------|
| General information | | | |
| Certification | | | |
| CE | | Yes | |
| cULus | | Yes | |
| GOST-R | | Yes | |
| GL | | Yes ¹⁾ | |
| Cable construction | | | |
| Wire cross section | | AWG 28 | |
| Shield | | Individual cable pairs, entire cable | |
| Complete shielding | | Tinned copper braiding, optical coverage >86% | |
| Outer sheathing | | | |
| Material | | PVC | |
| Color | | Beige | |
| Labeling | | AWM STYLE 20276 80°C 30V VW1 DVI DIGITAL SINGLE LINK DER AN | |
| Connector | | | |
| Type | | 2x DVI-D (18+1), male | |
| Connection cycles | | 100 | |
| Locating screw tightening torque | | Max. 0.5 Nm | |
| Electrical characteristics | | | |
| Conductor resistance | | Max. 237 Ω/km | |
| Insulation resistance | | Min. 100 MΩ/km | |
| Mechanical characteristics | | | |
| Dimensions | | | |
| Length | 1.8 m ±50 mm | 5 m ±80 mm | 10 m ±100 mm |
| Diameter | | Max. 8.5 mm | |
| Flex radius | ≥5x cable diameter (male connector - ferrite bead and ferrite bead - ferrite bead) | | |
| Weight | Approx. 260 g | Approx. 460 g | Approx. 790 g |

Table 78: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Technical data

1) Yes, although applies only if all components installed within the complete system have this certification.

3.1.1.4 Flex radius specifications

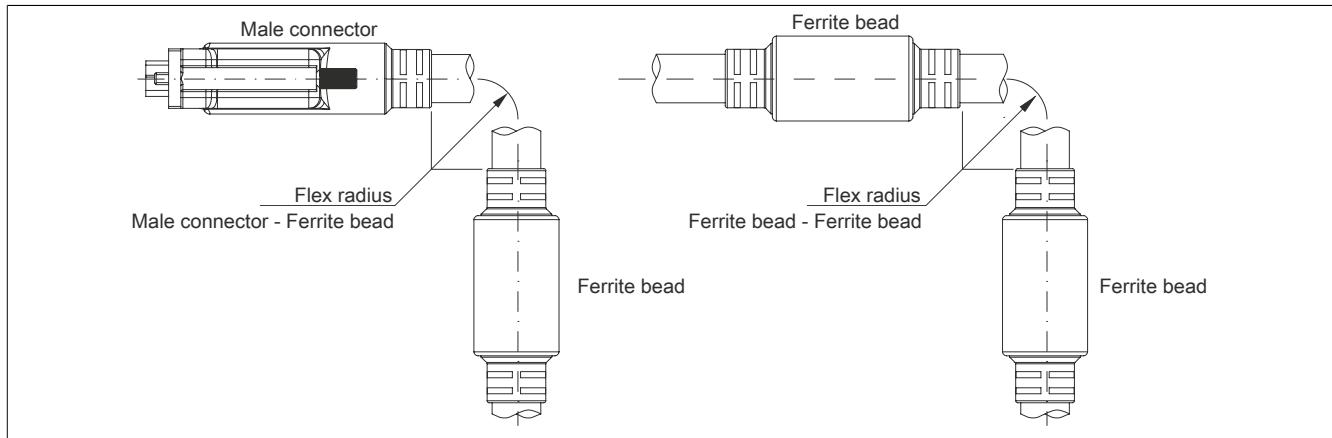


Figure 71: Flex radius specifications

3.1.1.5 Dimensions

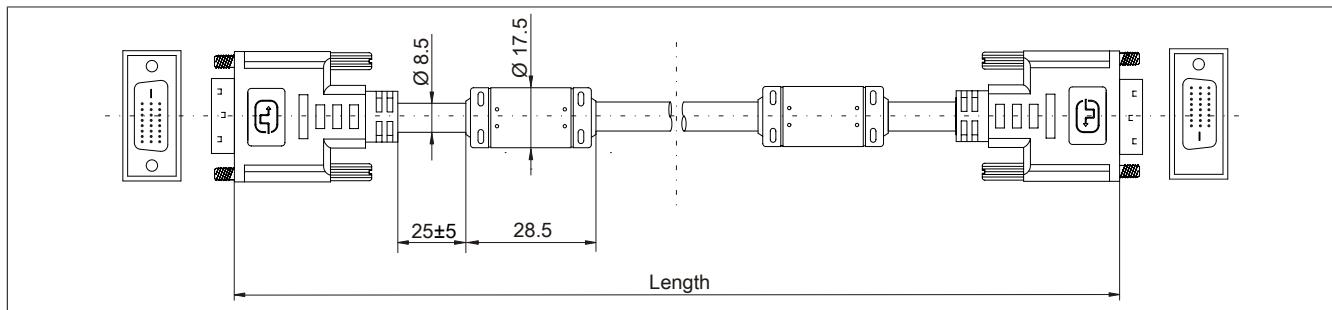


Figure 72: 5CADVI.0xxx-00 - Dimensions

3.1.1.6 Cable pinout

Warning!

Field-assembled cables must be wired according to these specifications.

If a field-assembled cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly, however.

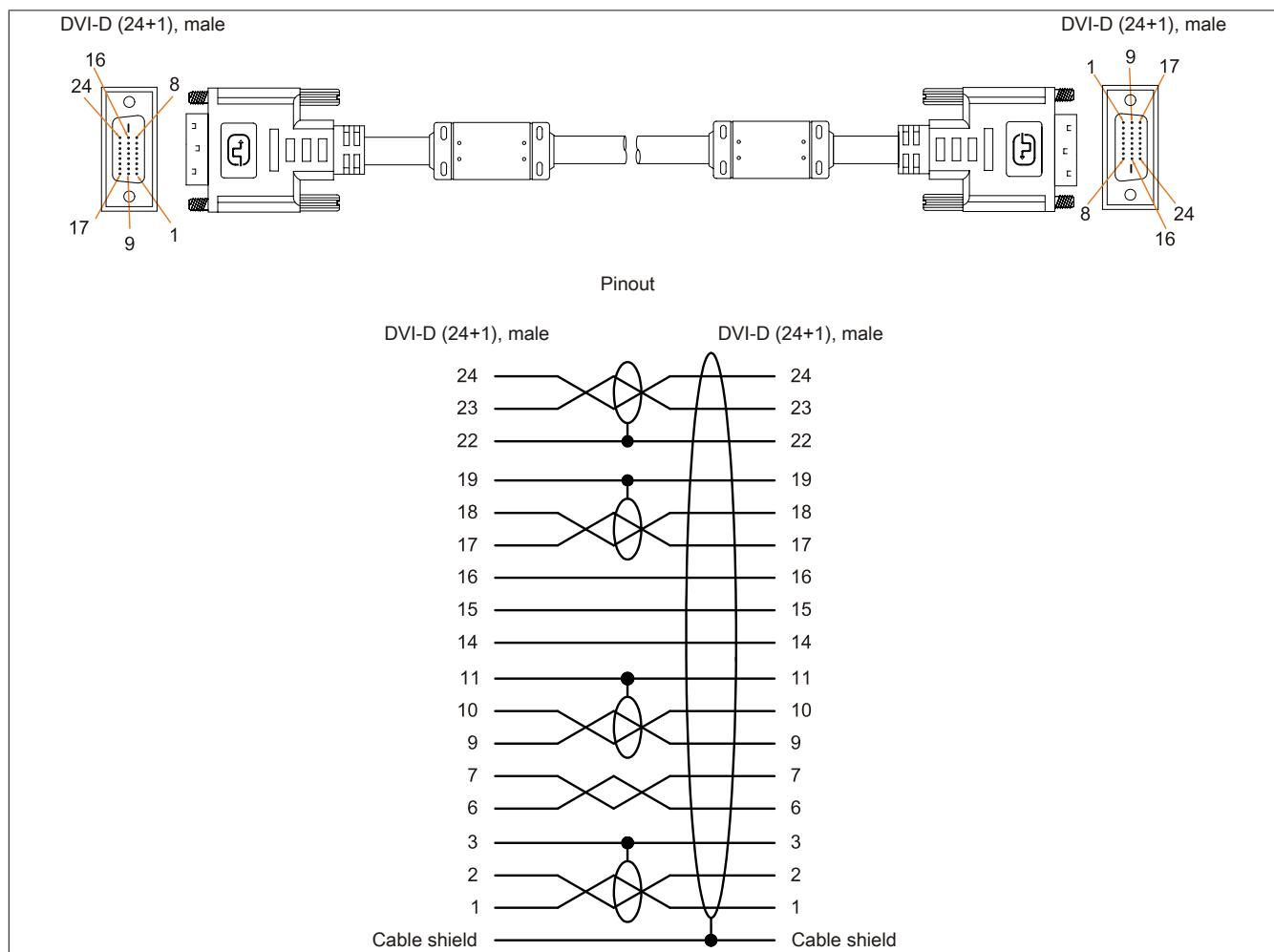


Figure 73: 5CADVI.0xxx-00 - Pinout

3.2 SDL cables

3.2.1 5CASDL.0xxx-00

3.2.1.1 General information

5CASDL.0xxx-00 SDL cables are designed for use in inflexible applications. 5CASDL.0xxx-03 SDL flex cables are required for flexible applications (e.g. swing arm systems).

Caution!

Power must be disconnected before connecting or disconnecting cables.

3.2.1.2 Order data

| Model number | Short description | Figure |
|----------------|-------------------|--------|
| | 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.0100-00 | SDL cable - 10 m | |
| 5CASDL.0150-00 | SDL cable - 15 m | |
| 5CASDL.0200-00 | SDL cable - 20 m | |
| 5CASDL.0250-00 | SDL cable - 25 m | |
| 5CASDL.0300-00 | SDL cable - 30 m | |

Table 79: 5CASDL.0008-00, 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Order data

3.2.1.3 Technical data

| Product ID | 5CASDL.0008-00 | 5CASDL.0018-00 | 5CASDL.0050-00 | 5CASDL.0100-00 | 5CASDL.0150-00 | 5CASDL.0200-00 | 5CASDL.0250-00 | 5CASDL.0300-00 | | | | | |
|-----------------------------------|---|------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--|--|--|--|--|
| General information | | | | | | | | | | | | | |
| Certification | | | | | Yes | | | | | | | | |
| CE | | | | | Yes | | | | | | | | |
| cULus | | | | | | | | | | | | | |
| GOST-R | | | | | Yes | | | | | | | | |
| GL | - | | | | Yes ¹⁾ | | | | | | | | |
| Cable construction | | | | | | | | | | | | | |
| Wire cross section | AWG 28 | | | AWG 24 | | | | | | | | | |
| Shield | Individual cable pairs, entire cable | | | | | | | | | | | | |
| Complete shielding | Tinned copper braiding, optical coverage >85% | | | | | | | | | | | | |
| Outer sheathing | | | | | | | | | | | | | |
| Material | PVC | | | | | | | | | | | | |
| Color | Black | | | | | | | | | | | | |
| Labeling | E74020-C (UL) AWM STYLE 20176 80°C 30V VW-1 DVI DIGITAL LINK | | | | | | | | | | | | |
| Connector | | | | | | | | | | | | | |
| Type | 2x DVI-D (24+1), male | | | | | | | | | | | | |
| Connection cycles | 100 | | | | | | | | | | | | |
| Contacts | Gold-plated | | | | | | | | | | | | |
| Mechanical protection | Metal cover with crimped stress relief | | | | | | | | | | | | |
| Locating screw tightening torque | Max. 0.5 Nm | | | | | | | | | | | | |
| Electrical characteristics | | | | | | | | | | | | | |
| Conductor resistance | | | | | | | | | | | | | |
| AWG 24 | - | | | | | | | | | | | | |
| AWG 28 | $\leq 237 \Omega/\text{km}$ | | | | | | | | | | | | |
| Insulation resistance | Min. 10 MΩ/km | | | | | | | | | | | | |
| Mechanical characteristics | | | | | | | | | | | | | |
| Dimensions | | | | | | | | | | | | | |
| Length | 0.8 m ±25 mm | 1.8 m ±30 mm | 5 m ±30 mm | 10 m ±50 mm | 15 m ±100 mm | 20 m ±100 mm | 25 m ±100 mm | 30 m ±100 mm | | | | | |
| Diameter | Typ. 8.6 ±0.2 mm Max. 9 mm | | | | | | | | | | | | |
| Flex radius | $\geq 5 \times$ cable diameter (male connector - ferrite bead and ferrite bead - ferrite bead) | | | | | | | | | | | | |
| Flexibility | Limited flexibility, valid for ferrite bead - ferrite bead (tested 100 cycles with 5x cable diameter, 20 cycles/minute) | | | | | | | | | | | | |
| Weight | Approx. 206 g | Approx. 300 g | Approx. 580 g | Approx. 1500 g | Approx. 2250 g | Approx. 2880 g | Approx. 4800 g | Approx. 5520 g | | | | | |

Table 80: 5CASDL.0008-00, 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Technical data

1) Yes, although applies only if all components installed within the complete system have this certification.

3.2.1.4 Flex radius specifications

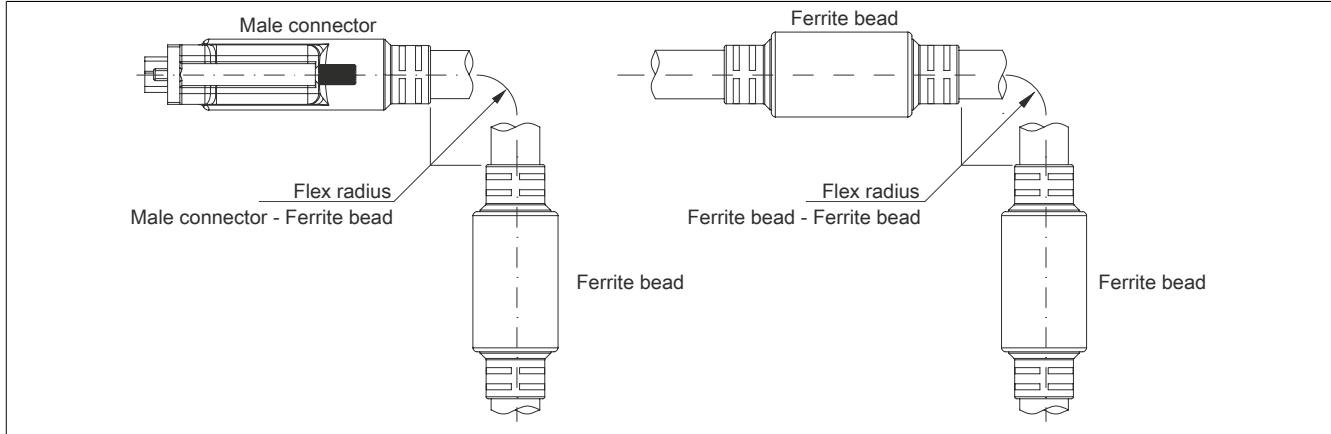


Figure 74: Flex radius specifications

3.2.1.5 Dimensions

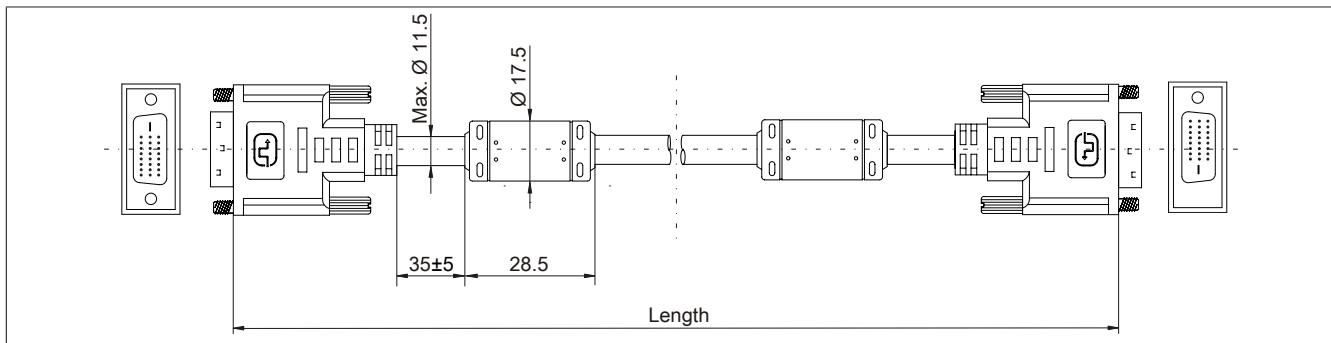


Figure 75: 5CSDL.0xxx-00- Dimensions

3.2.1.6 Cable pinout

Warning!

Field-assembled cables must be wired according to these specifications.

If a field-assembled cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly, however.

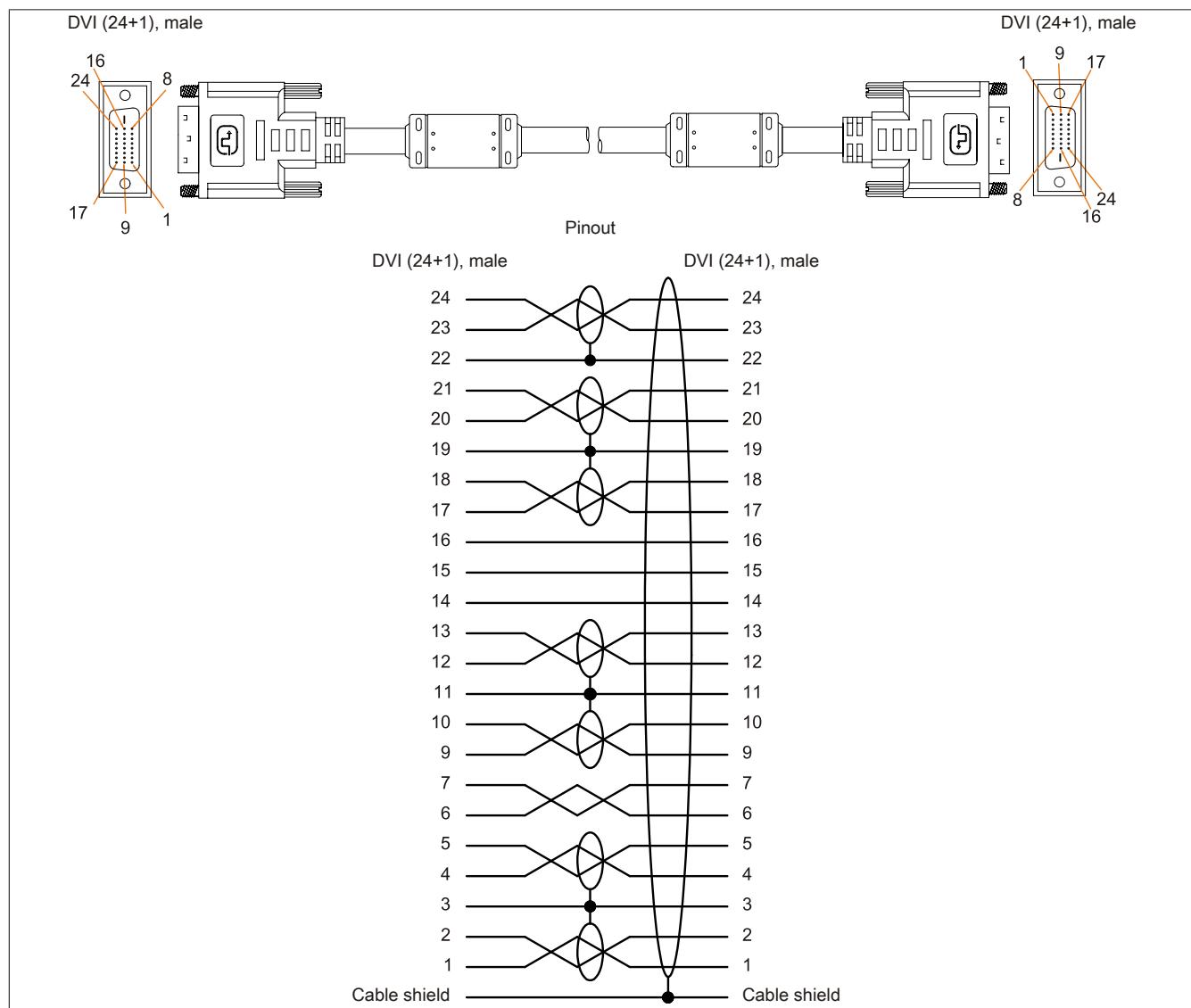


Figure 76: 5CASDL.0xxx-00 - Pinout

3.3 SDL cables with 45° male connector

3.3.1 5CASDL.0xxx-01

3.3.1.1 General information

5CASDL.0xxx-01 SDL cables with a 45° connector are designed for use in inflexible applications.

Caution!

Power must be disconnected before connecting or disconnecting cables.

3.3.1.2 Order data

| Model number | Short description | Figure |
|---------------------------------------|--|---|
| SDL cables with 45° connectors | | |
| 5CASDL.0018-01 | SDL cable - 45 degree connection - 1.8 m | |
| 5CASDL.0050-01 | SDL cable - 45 degree connection - 5 m | |
| 5CASDL.0100-01 | SDL cable - 45 degree connection - 10 m | |
| 5CASDL.0150-01 | SDL cable - 45 degree connection - 15 m |  |

Table 81: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Order data

3.3.1.3 Technical data

| Product ID | 5CASDL.0018-01 | 5CASDL.0050-01 | 5CASDL.0100-01 | 5CASDL.0150-01 |
|-----------------------------------|----------------|---|-------------------|----------------|
| General information | | | | |
| Certification | | | | |
| CE | | | Yes | |
| cULus | | | Yes | |
| GOST-R | | | Yes | |
| GL | | | Yes ¹⁾ | |
| Cable construction | | | | |
| Wire cross section | AWG 28 | | AWG 24 | |
| Shield | | Individual cable pairs, entire cable | | |
| Complete shielding | | Tinned copper braiding, optical coverage >85% | | |
| Outer sheathing | | | | |
| Material | | PVC | | |
| Color | | Black | | |
| Connector | | | | |
| Type | | 2x DVI-D (24+1), male | | |
| Connection cycles | | 100 | | |
| Contacts | | Gold-plated | | |
| Mechanical protection | | Metal cover with crimped stress relief | | |
| Locating screw tightening torque | | Max. 0.5 Nm | | |
| Electrical characteristics | | | | |
| Conductor resistance | | | | |
| AWG 24 | - | | ≤93 Ω/km | |
| AWG 28 | ≤237 Ω/km | | - | |
| Insulation resistance | | Min. 10 MΩ/km | | |
| Mechanical characteristics | | | | |
| Dimensions | | | | |
| Length | 1.8 m ±30 mm | 5 m ±50 mm | 10 m ±100 mm | 15 m ±100 mm |
| Diameter | Max. 9 mm | | | Max. 11.5 mm |
| Flex radius | | ≥5x cable diameter (male connector - ferrite bead and ferrite bead - ferrite bead) | | |
| Fixed installation | | | | |
| Flexibility | | Limited flexibility, valid for ferrite bead - ferrite bead (tested 100 cycles with 5x cable diameter, 20 cycles/minute) | | |
| Weight | Approx. 300 g | Approx. 590 g | Approx. 2800 g | Approx. 2860 g |

Table 82: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Technical data

1) Yes, although applies only if all components installed within the complete system have this certification.

3.3.1.4 Flex radius specifications

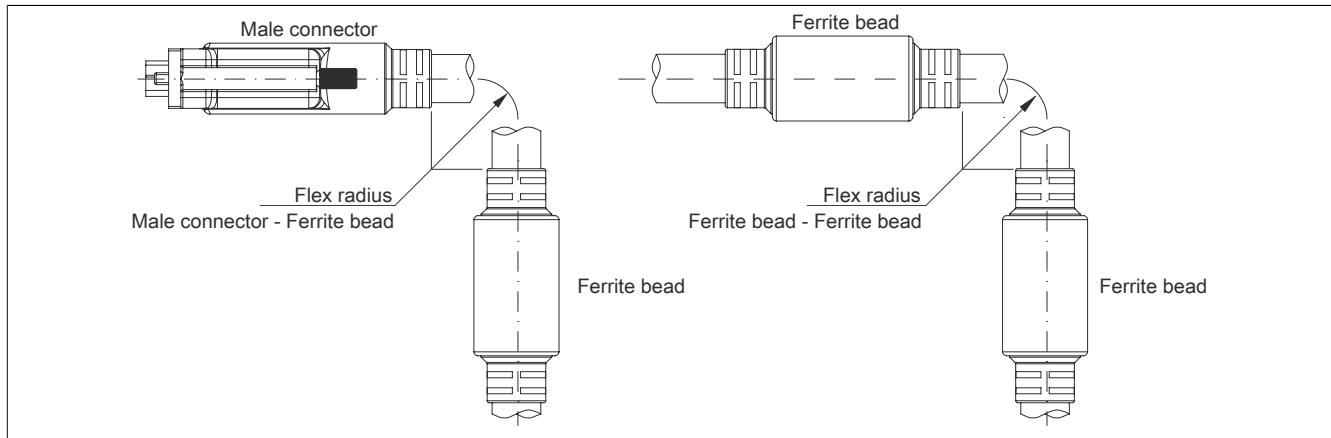


Figure 77: Flex radius specifications

3.3.1.5 Dimensions

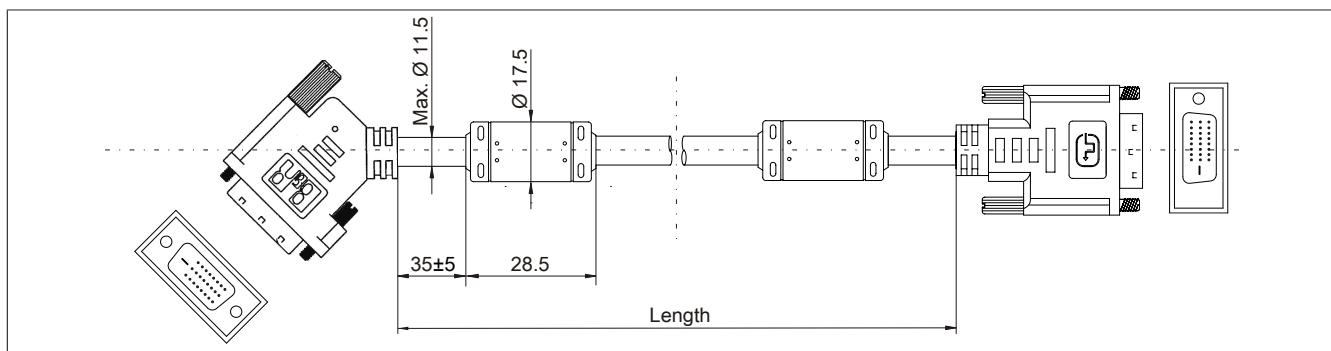


Figure 78: 5CSDL.0xx-01 - Dimensions

3.3.1.6 Cable pinout

Warning!

Field-assembled cables must be wired according to these specifications.

If a field-assembled cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly, however.

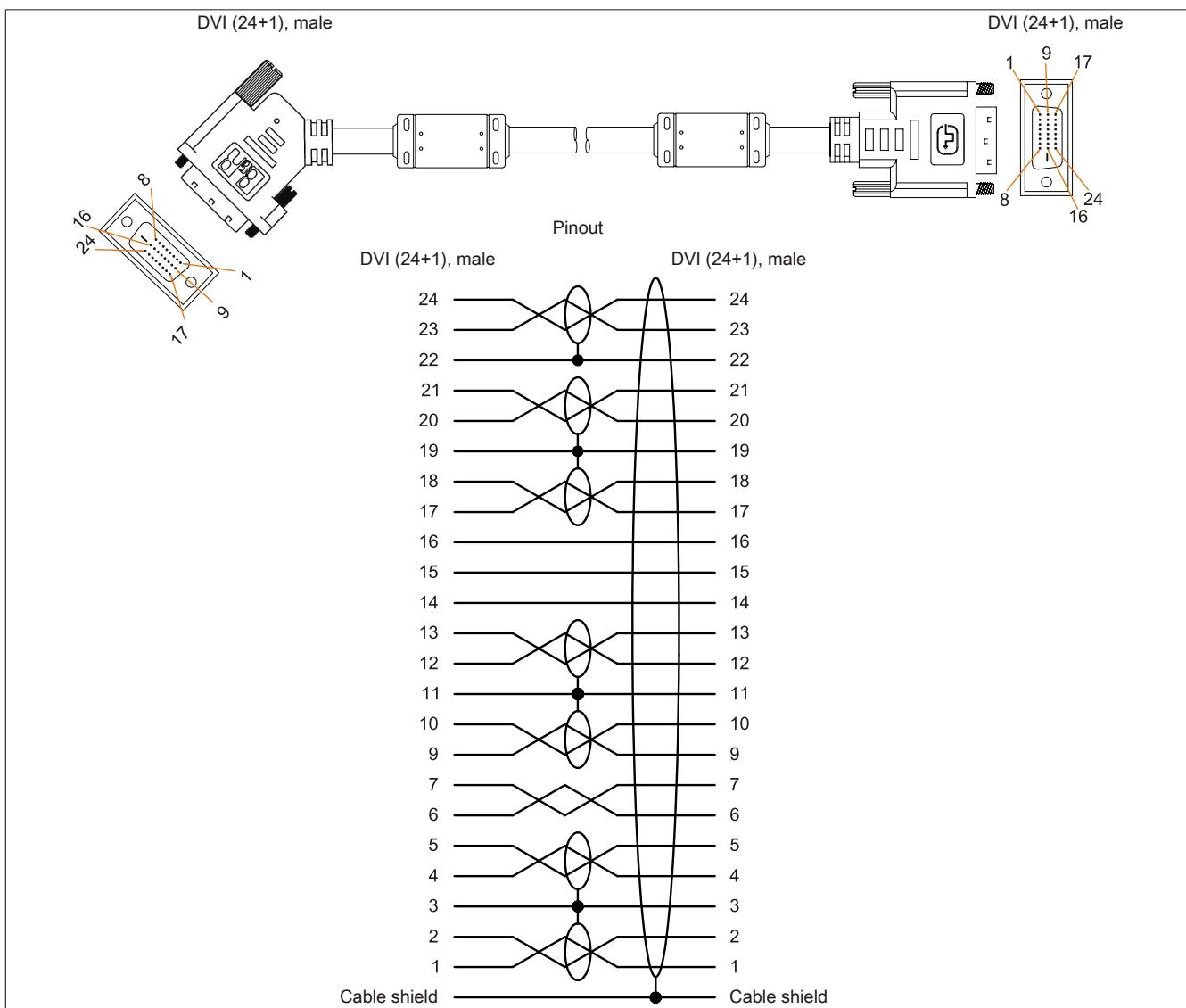


Figure 79: 5CASDL.0xxx-01 - Pinout

3.4 SDL flex cables

3.4.1 5CASDL.0xxx-03

3.4.1.1 General information

5CASDL.0xxx-03 SDL flex cables are designed for use in both inflexible and flexible applications (e.g. swing arm systems).

Caution!

Power must be disconnected before connecting or disconnecting cables.

3.4.1.2 Order data

| Model number | Short description | Figure |
|----------------|------------------------|--------|
| | 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 | |
| 5CASDL.0150-03 | SDL flex cable - 15 m | |
| 5CASDL.0200-03 | SDL flex cable - 20 m | |
| 5CASDL.0250-03 | SDL flex cable - 25 m | |
| 5CASDL.0300-03 | SDL flex cable - 30 m | |

Table 83: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Order data

3.4.1.3 Technical data

| Product ID | 5CASDL. 0018-03 | 5CASDL. 0050-03 | 5CASDL. 0100-03 | 5CASDL. 0150-03 | 5CASDL. 0200-03 | 5CASDL. 0250-03 | 5CASDL. 0300-03 |
|-----------------------------------|--------------------|--------------------|--------------------|--|--------------------|--------------------|--------------------|
| General information | | | | | | | |
| Certification | | | | | | | |
| CE | | | | Yes | | | |
| cULus | | | | Yes | | | |
| GOST-R | | | | Yes | | | |
| GL | | | | Yes ¹⁾ | | | |
| Cable construction | | | | | | | |
| Wire cross section | | | | AWG 24 (control wires) AWG 26 (DVI, USB, data) | | | |
| Features | | | | Silicone- and halogen-free | | | |
| Shield | | | | Individual cable pairs, entire cable | | | |
| Complete shielding | | | | Aluminum-clad foil and tinned copper braiding | | | |
| Outer sheathing | | | | | | | |
| Material | | | | Special semi-glossy TMPU | | | |
| Color | | | | Black | | | |
| Labeling | | | | (B&R) SDL Cable (UL) AWM 20236 80°C 30V E 63216 | | | |
| Connector | | | | | | | |
| Type | | | | 2x DVI-D (24+1), male | | | |
| Connection cycles | | | | Min. 200 | | | |
| Contacts | | | | Gold-plated | | | |
| Mechanical protection | | | | Metal cover with crimped stress relief | | | |
| Locating screw tightening torque | | | | Max. 0.5 Nm | | | |
| Electrical characteristics | | | | | | | |
| Operating voltage | | | | ≤30 V | | | |
| Test voltage | | | | | | | |
| Wire/Wire | | | | 1 kV | | | |
| Wire/Shield | | | | 0.5 kV | | | |
| Wave impedance | | | | 100 ±10 Ω | | | |
| Conductor resistance | | | | | | | |
| AWG 24 | | | | ≤95 Ω/km | | | |
| AWG 26 | | | | ≤145 Ω/km | | | |
| Insulation resistance | | | | >200 MΩ/km | | | |
| Operating conditions | | | | | | | |
| Approbation | | | | UL AWM 20236 80°C 30 V | | | |
| Flame-retardant | | | | In accordance with UL758 (cable vertical flame test) | | | |
| Oil and hydrolysis resistance | | | | In accordance with VDE 0282-10 | | | |

Table 84: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Technical data

| Product ID | 5CASDL. 0018-03 | 5CASDL. 0050-03 | 5CASDL. 0100-03 | 5CASDL. 0150-03 | 5CASDL. 0200-03 | 5CASDL. 0250-03 | 5CASDL. 0300-03 |
|-----------------------------------|---|--------------------|--------------------|---|----------------------------|--------------------|--------------------|
| Environmental conditions | | | | | | | |
| Temperature | | | | -20 to 80°C | | | |
| Storage | | | | -20 to 80°C | | | |
| Fixed installation | | | | -5 to 60°C | | | |
| Flexible installation | | | | | | | |
| Mechanical characteristics | | | | | | | |
| Dimensions | | | | | | | |
| Length | 1.8 m ±20 mm | 5 m ±45 mm | 10 m ±90 mm | 15 m ±135 mm | 20 m ±180 mm | 25 m ±225 mm | 30 m ±270 mm |
| Diameter | | | | | Max. 12 mm | | |
| Flex radius | | | | | | | |
| Fixed installation | | | | ≥6x cable diameter (from male connector - ferrite bead) | | | |
| Flexible installation | | | | ≥10x cable diameter (from ferrite bead - ferrite bead) | | | |
| | | | | ≥15x cable diameter (from ferrite bead - ferrite bead) | | | |
| Flexibility | Flexible, valid for ferrite bead - ferrite bead (tested 300,000 cycles with 15x cable diameter, 4800 cycles/hour) | | | | | | |
| Drag chain data | | | | | | | |
| Flex cycles | | | | | 300,000 | | |
| Speed | | | | | 4800 cycles/hour | | |
| Flex radius | | | | | 180 mm, 15x cable diameter | | |
| Hub | | | | | 460 mm | | |
| Weight | Approx. 460 g | Approx. 1020 g | Approx. 1940 g | Approx. 2840 g | Approx. 3740 g | Approx. 4560 g | Approx. 5590 g |
| Tension | | | | | | | |
| During operation | | | | | ≤50 N | | |
| During installation | | | | | ≤400 N | | |

Table 84: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03,
5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Technical data

1) Yes, although applies only if all components installed within the complete system have this certification.

3.4.1.4 Flex radius specifications

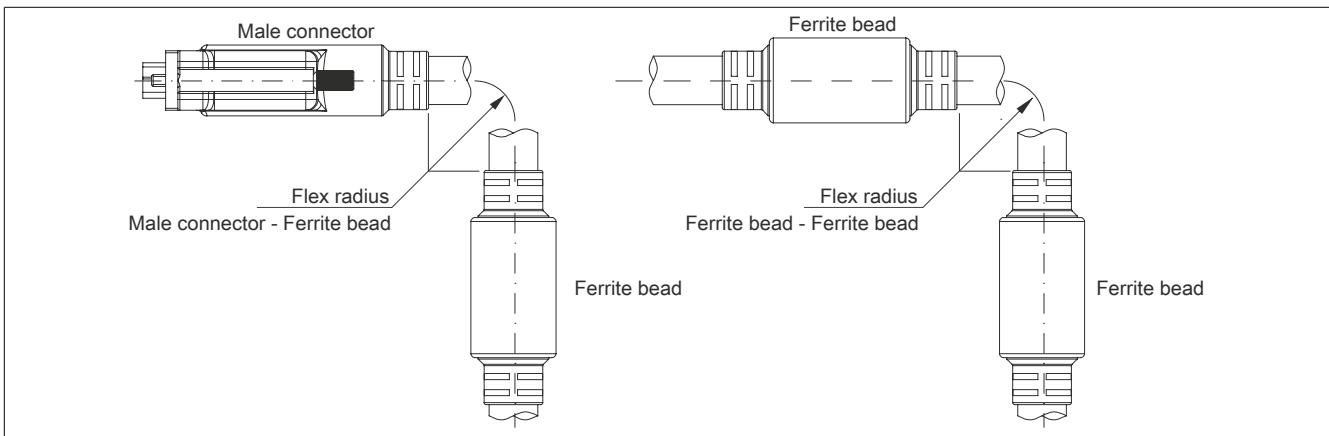


Figure 80: Flex radius specifications

3.4.1.5 Dimensions

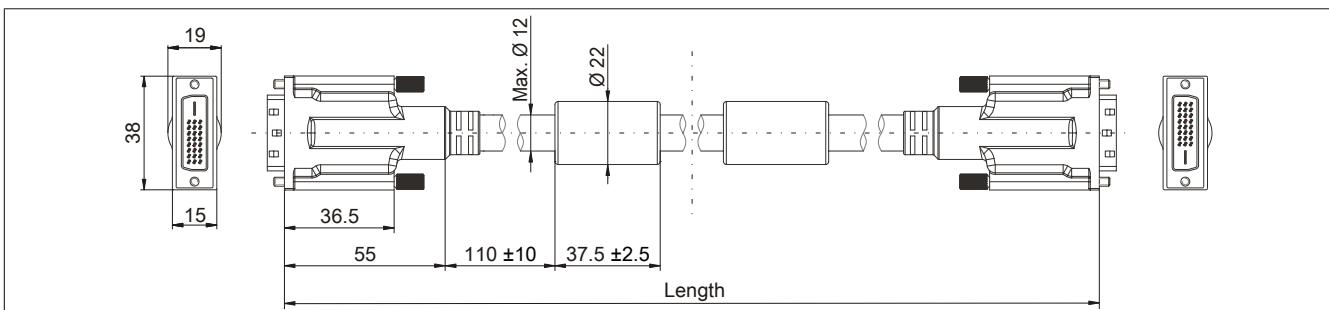


Figure 81: 5CASDL.0xx-03 - Dimensions

3.4.1.6 Design

| Element | Assignment | Cross section | |
|---------------|-----------------|---------------|--|
| DVI | TMDS data 0 | 26 AWG | TMDS data 1 |
| | TMDS data 1 | 26 AWG | TMDS data 0 |
| | TMDS data 2 | 26 AWG | Control wires |
| | TMDS cycle | 26 AWG | - DDC clock - DDC data - +5 V - Ground - Hot plug detect |
| USB | XUSB0 | 26 AWG | |
| | XUSB1 | 26 AWG | |
| Data | SDL | 26 AWG | |
| Control wires | DDC cycle | 24 AWG | |
| | DDC data | 24 AWG | |
| | +5 V | 24 AWG | |
| | Ground | 24 AWG | |
| | Hot plug detect | 24 AWG | |

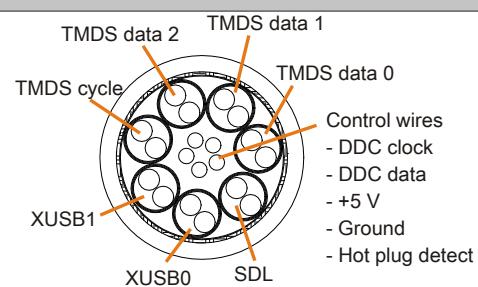


Table 85: 5CASDL.0xxx-03 SDL flex cables - Structure

3.4.1.7 Cable pinout

Warning!

Field-assembled cables must be wired according to these specifications.

If a field-assembled cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly, however.

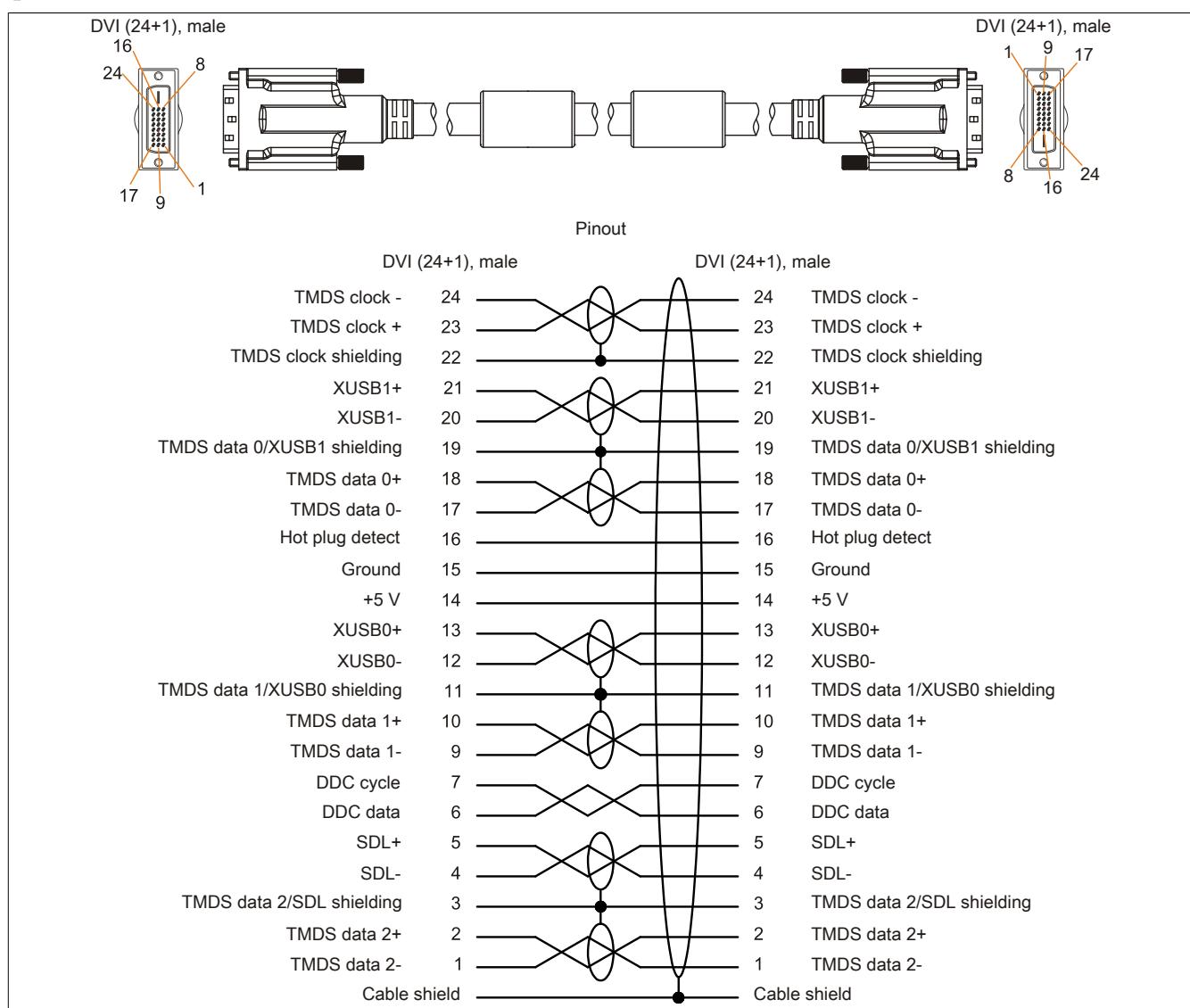


Figure 82: 5CASDL.0xxx-03 - Pinout

3.5 SDL flex cables with extender

3.5.1 5CASDL.0xx0-13

3.5.1.1 General information

5CASDL.0xx0-13 SDL flex cables with an extender are designed for use in both inflexible and flexible applications (e.g. swing arm systems).

Caution!

Power must be disconnected before connecting or disconnecting cables.

3.5.1.2 Order data

| Model number | Short description | Figure |
|----------------|-------------------------------------|--------|
| | SDL flex cables | |
| 5CASDL.0300-13 | SDL flex cable with extender - 30 m | |
| 5CASDL.0400-13 | SDL flex cable with extender - 40 m | |
| 5CASDL.0430-13 | SDL flex cable with extender - 43 m | |

Table 86: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Order data

3.5.1.3 Technical data

| Product ID | 5CASDL.0300-13 | 5CASDL.0400-13 | 5CASDL.0430-13 |
|-----------------------------------|----------------|--|----------------|
| General information | | | |
| Certification | | | |
| CE | | Yes | |
| cULus | | Yes | |
| GOST-R | | Yes | |
| GL | | Yes ¹⁾ | |
| Cable construction | | | |
| Wire cross section | | AWG 24 (control wires) AWG 26 (DVI, USB, data) | |
| Features | | Silicone- and halogen-free | |
| Shield | | Individual cable pairs, entire cable | |
| Complete shielding | | Aluminum-clad foil and tinned copper braiding | |
| Outer sheathing | | | |
| Material | | Special semi-glossy TMPU | |
| Color | | Black | |
| Labeling | | (B&R) SDL cable (UL) AWM 20236 80°C 30V E63216 | |
| Connector | | | |
| Type | | 2x DVI-D (24+1), male | |
| Connection cycles | | Min. 200 | |
| Contacts | | Gold-plated | |
| Mechanical protection | | Metal cover with crimped stress relief | |
| Locating screw tightening torque | | Max. 0.5 Nm | |
| Electrical characteristics | | | |
| Operating voltage | | ≤30 V | |
| Test voltage | | | |
| Wire/Wire | | 1 kV | |
| Wire/Shield | | 0.5 kV | |
| Wave impedance | | 100 ±10 Ω | |
| Conductor resistance | | | |
| AWG 24 | | ≤95 Ω/km | |
| AWG 26 | | ≤145 Ω/km | |
| Insulation resistance | | >200 MΩ/km | |
| Operating conditions | | | |
| Approbation | | UL AWM 20236 80°C 30 V | |
| Flame-retardant | | In accordance with UL758 (cable vertical flame test) | |
| Oil and hydrolysis resistance | | In accordance with VDE 0282-10 | |
| Environmental conditions | | | |
| Temperature | | | |
| Storage | | -20 to 60°C | |
| Fixed installation | | -20 to 60°C | |
| Flexible installation | | -5 to 60°C | |

Table 87: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

| Product ID | 5CSDL.0300-13 | 5CSDL.0400-13 | 5CSDL.0430-13 |
|-----------------------------------|----------------|---|----------------|
| Mechanical characteristics | | | |
| Dimensions | | | |
| Length | 30 m ±280 mm | 40 m ±380 mm | 43 m ±410 mm |
| Diameter | | Max. 12 mm | |
| Extender box | | | |
| Width | | 35 mm | |
| Length | | 125 mm | |
| Height | | 18.5 mm | |
| Flex radius | | | |
| Fixed installation | | ≥6x cable diameter (from male connector - ferrite bead) ≥10x cable diameter (from ferrite bead - ferrite bead) ≥15x cable diameter (from ferrite bead - ferrite bead) | |
| Flexible installation | | | |
| Flexibility | | Flexible, valid for ferrite bead - ferrite bead (tested 300,000 cycles with 15x cable diameter, 4800 cycles/hour) | |
| Drag chain data | | | |
| Flex cycles | | 300,000 | |
| Speed | | 4800 cycles/hour | |
| Flex radius | | 180 mm, 15x cable diameter | |
| Hub | | 460 mm | |
| Weight | Approx. 5430 g | Approx. 7200 g | Approx. 7790 g |
| Tension | | | |
| During operation | | ≤50 N | |
| During installation | | ≤400 N | |

Table 87: 5CSDL.0300-13, 5CSDL.0400-13, 5CSDL.0430-13 - Technical data

1) Yes, although applies only if all components installed within the complete system have this certification.

3.5.1.4 Flex radius specifications

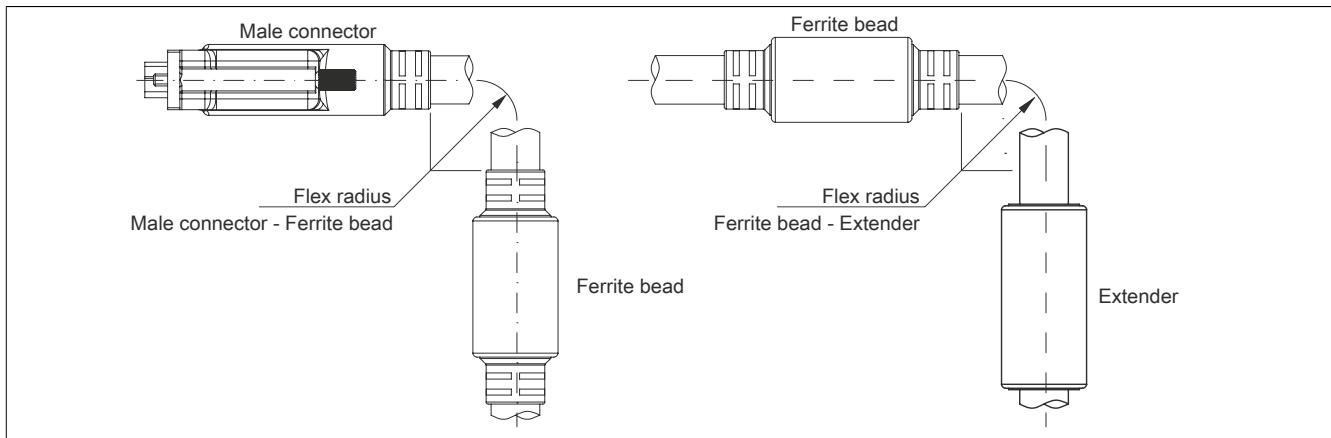


Figure 83: Flex radius specification with extender

3.5.1.5 Dimensions

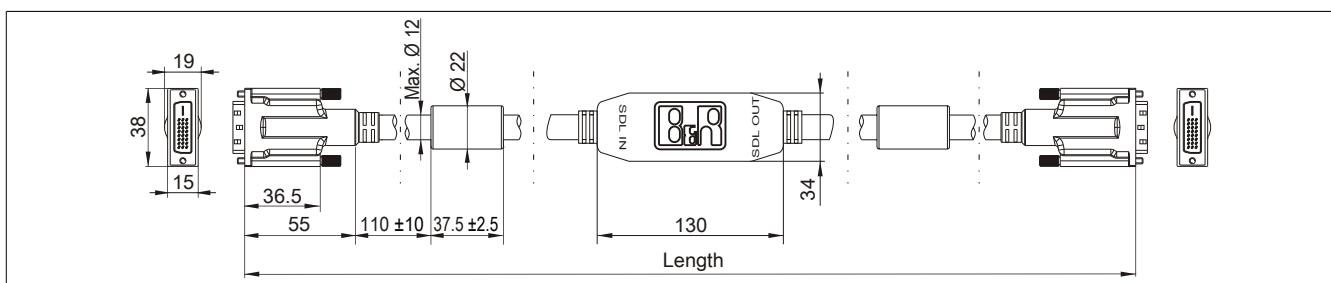


Figure 84: 5CSDL.0xx0-13 - Dimensions

3.5.1.6 Cable pinout

Warning!

Field-assembled cables must be wired according to these specifications.

If a field-assembled cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly, however.

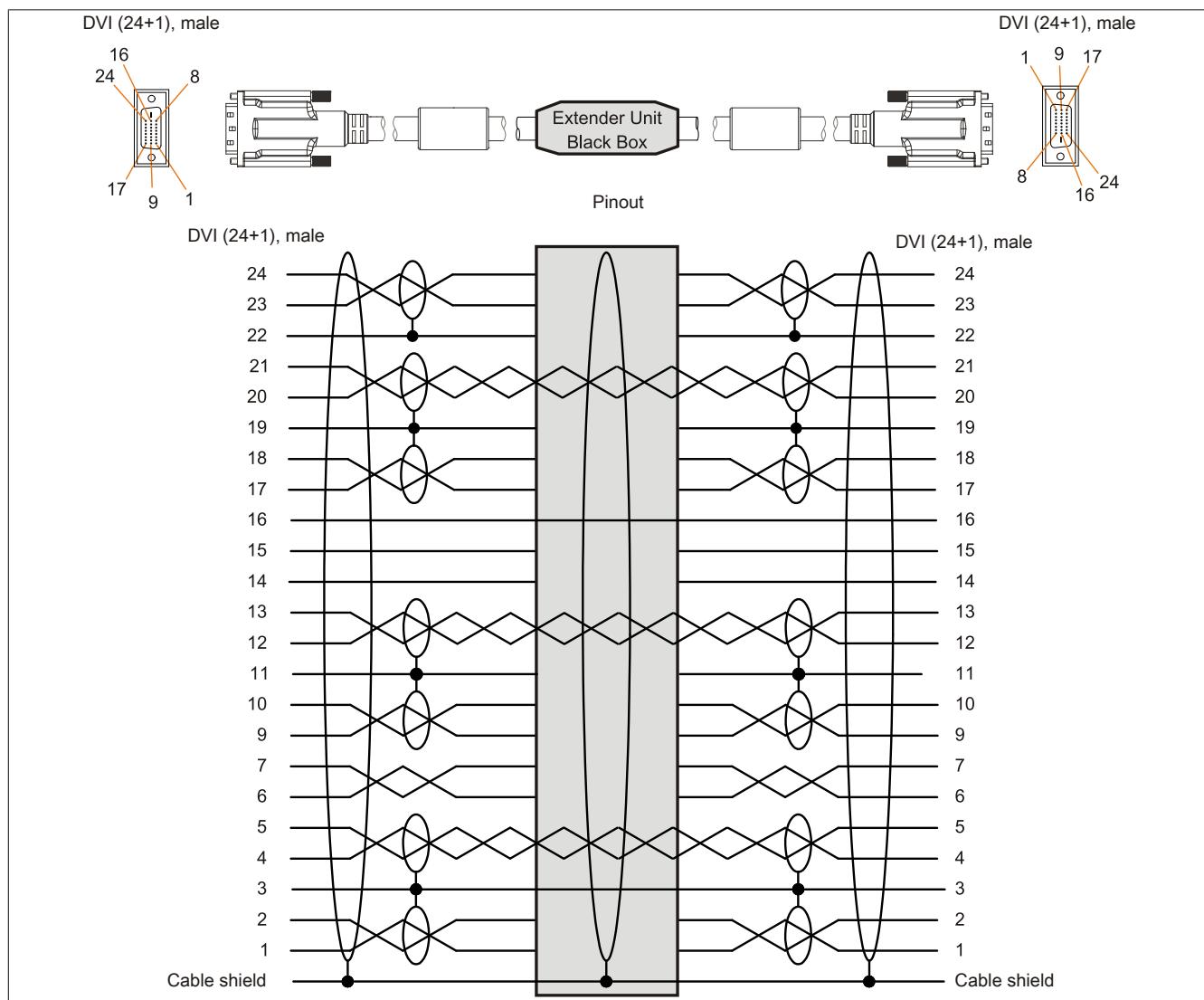


Figure 85: 5CASDL.0xx0-13 - Pinout

3.5.1.7 Cable connection

SDL flex cables with an extender must be connected between the B&R Industrial PC and the Automation Panel display unit in the correct direction. The proper signal direction is indicated on the extender.

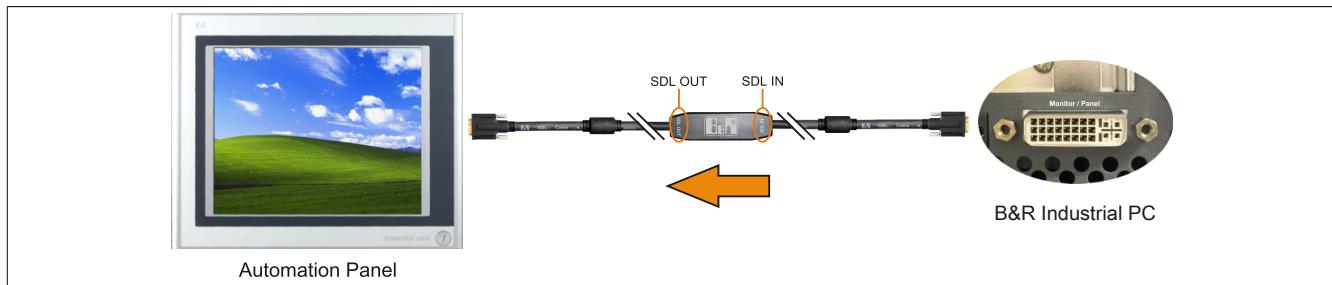


Figure 86: Example of the signal direction for an SDL flex cable with extender

3.6 SDL3 cables

3.6.1 5CASD3.xxxx-00

3.6.1.1 General information

5CASD3.xxxx-00 SDL3 cables are designed to transfer SDL3 data and very easy to install. An RJ45 connector allows these cables to be connected in very narrow spaces, for example in swing arm shafts.

Caution!

Power must be disconnected before connecting or disconnecting cables.

3.6.1.2 Order data

| Model number | Short description | Figure |
|----------------|--------------------|--------|
| | SDL3 cables | |
| 5CASD3.0050-00 | SDL3 cable - 5 m | |
| 5CASD3.0100-00 | SDL3 cable - 10 m | |
| 5CASD3.0150-00 | SDL3 cable - 15 m | |
| 5CASD3.0200-00 | SDL3 cable - 20 m | |
| 5CASD3.0300-00 | SDL3 cable - 30 m | |
| 5CASD3.0500-00 | SDL3 cable - 50 m | |
| 5CASD3.1000-00 | SDL3 cable - 100 m | |

Table 88: 5CASD3.0050-00, 5CASD3.0100-00, 5CASD3.0150-00, 5CASD3.0200-00, 5CASD3.0300-00, 5CASD3.0500-00, 5CASD3.1000-00 - Order data

3.6.1.3 Technical data

| Product ID | 5CASD3.0050-00 | 5CASD3.0100-00 | 5CASD3.0150-00 | 5CASD3.0200-00 | 5CASD3.0300-00 | 5CASD3.0500-00 | 5CASD3.1000-00 |
|---|----------------|----------------|--|--|--|--|----------------|
| General information | | | | | | | |
| Certification | | | | | | | |
| CE | | | | | Yes | | |
| cULus | | | | | Yes | | |
| Cable construction | | | | | | | |
| Wire cross section | | 4x 2x 26/7 AWG | | | 4x 2x 23/1 AWG | | |
| Features | | | | | Flame-resistant, halogen-free, lead-free | | |
| Outer sheathing | | | | | Polyurethane (PUR) | | |
| Material | | | | | Yellow, RAL 1021 | | |
| Color | | | | | | | |
| Labeling | | | | HARTING INDUSTRIAL CABLE S/FTP CAT 6A PUR 4x 2x 26/7 AWG | | HARTING INDUSTRIAL INSTALLATION CABLE S/FTP CAT 7 PUR 4x 2x 23/1 AWG | |
| Lines | | | | | | | |
| Wire insulation | | | | | Polyethylene (PE) | | |
| Wire colors | | | | | Green/white-green, orange/white-orange, blue/white-blue, brown/white-brown | | |
| Shield | | | | | Aluminum foil and braided wire shield made of tinned copper wires | | |
| Type | | | | Unprotected copper wire, 4x 2x 26/7 AWG | | Unprotected copper wire, 4x 2x 23/1 AWG | |
| Connector | | | | | | | |
| Type | | | | | 2x RJ45, male | | |
| Connection cycles | | | | | Min. 750 | | |
| Contacts | | | | | 8 | | |
| Electrical characteristics ¹⁾ | | | | | | | |
| Operating voltage | | | ≤100 V | | | ≤125 V | |
| Conductor resistance | | | ≤290 Ω/km | | | ≤75 Ω/km | |
| Wave impedance | | | | 100 ±5 Ω (at 100 MHz) | | | |
| Transfer properties | | | Category 6A / Class EA up to 500 MHz in accordance with ISO/IEC 11801 (EN 50173-1), ISO/IEC 24702 (EN 50173-3) | | | Category 7 / Class F up to 600 MHz in accordance with ISO/IEC 11801 (EN 50173-1), ISO/IEC 24702 (EN 50173-3) | |
| Insulation resistance | | | ≥ 500 MΩ/km | | | ≥ 5 GΩ/km | |
| Operating conditions | | | | | | | |
| Flame-retardant | | | | | IEC 60332-1-2 | | |
| Oil and hydrolysis resistance | | | | | EN 60811-2-1 (90°C / 7x24 h) | | |
| EN 60529 protection | | | | | IP20 | | |
| Cables | | | | | | | |
| RJ45 connector | | | | | IP20, only when connected properly | | |
| Environmental conditions | | | | | | | |
| Temperature | | | | | –40 to 70°C | | |
| Storage | | | | | –40 to 70°C | | |
| Fixed installation | | | | | | | |
| Flexible installation | | | –40 to 70°C | | | –10 to 50°C | |

Table 89: 5CASD3.0050-00, 5CASD3.0100-00, 5CASD3.0150-00, 5CASD3.0200-00, 5CASD3.0300-00, 5CASD3.0500-00, 5CASD3.1000-00 - Technical data

| Product ID | 5CASD3. 0050-00 | 5CASD3. 0100-00 | 5CASD3. 0150-00 | 5CASD3. 0200-00 | 5CASD3. 0300-00 | 5CASD3. 0500-00 | 5CASD3. 1000-00 |
|-----------------------------------|--------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Mechanical characteristics | | | | | | | |
| Dimensions | | | | | | | |
| Length | 5 m | 10 m | 15 m | 20 m | 30 m | 50 m | 100 m |
| Diameter | | 6.7 mm | | | | 8.3 mm | |
| Flex radius | | | | | | | |
| Fixed installation | | $\geq 5x$ diameter | | | | $\geq 4x$ diameter | |
| Flexible installation | | $\geq 10x$ diameter | | | | $\geq 8x$ diameter | |
| Weight | 250 g | 500 g | 700 g | 950 g | 2150 g | 3500 g | 6950 g |
| Tension | | | | | | | |
| During operation | | ≤ 70 N | | | | ≤ 110 N | |
| During installation | | ≤ 70 N | | | | ≤ 110 N | |

Table 89: 5CASD3.0050-00, 5CASD3.0100-00, 5CASD3.0150-00, 5CASD3.0200-00,
5CASD3.0300-00, 5CASD3.0500-00, 5CASD3.1000-00 - Technical data

1) At an ambient temperature of 20°C.

3.6.1.4 Flex radius specifications

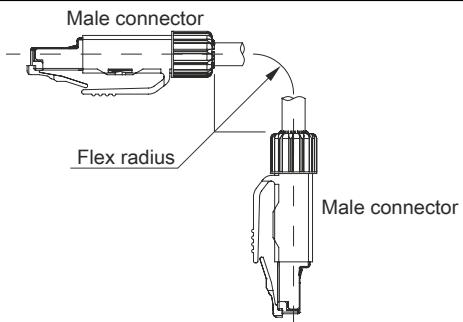


Figure 87: SDL3 - Flex radius specifications

3.6.1.5 Dimensions

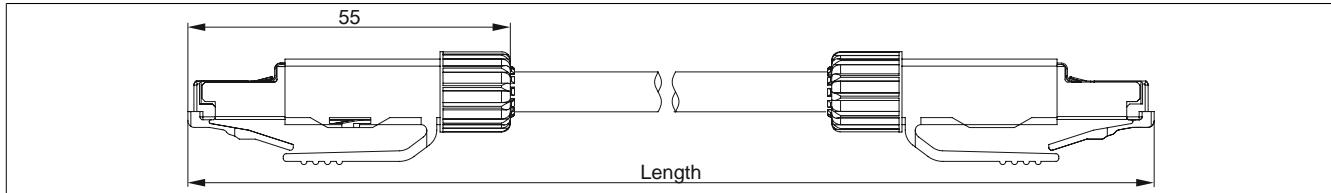


Figure 88: 5CASD3.xxxx-00 - Dimensions

3.6.1.6 Cable pinout

Warning!

Field-assembled cables must be wired according to these specifications.

If a field-assembled cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly, however.

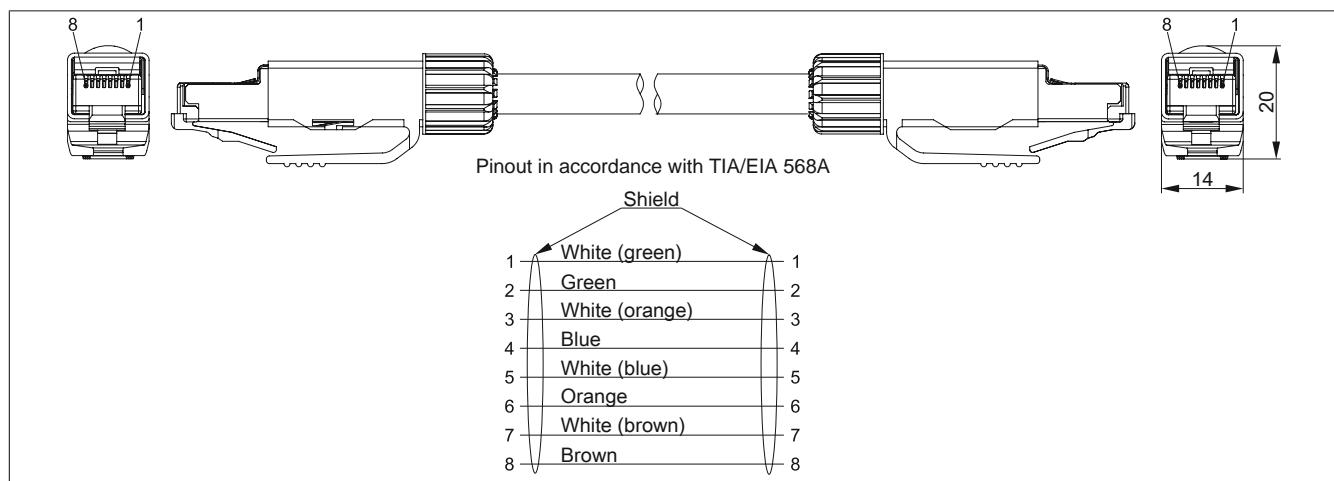


Figure 89: 5CASD3.xxxx-00 - Pinout

3.6.1.7 Cabling

The following information and figure apply when using a field-assembled cable that is not directly connected to a B&R device, but to an RJ45 network interface (e.g. patch panel).

Cables must meet category 6a (Cat6a) or category 7 (Cat7) requirements. Exceeding the maximum total length of 100 m is not permitted.

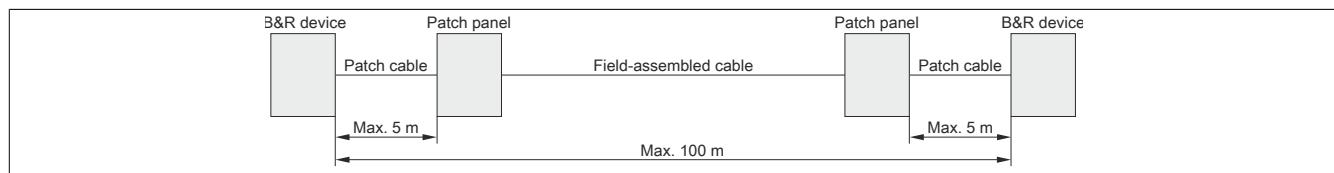


Figure 90: Cabling with a field-assembled cable

3.7 USB cables

3.7.1 5CAUSB.00xx-00

3.7.1.1 General information

USB cables are designed to achieve USB 2.0 transfer speeds.

3.7.1.2 Order data

| Model number | Short description | Figure |
|----------------|--|--|
| | 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 |  |

Table 90: 5CAUSB.0018-00, 5CAUSB.0050-00 - Order data

3.7.1.3 Technical data

| Product ID | 5CAUSB.0018-00 | 5CAUSB.0050-00 |
|-----------------------------------|-------------------------------------|----------------|
| General information | | |
| Certification | | |
| CE | Yes | |
| cULus | Yes | |
| GOST-R | Yes | |
| Cable construction | | |
| Wire cross section | AWG 24, 28 | |
| Shield | Entire cable | |
| Outer sheathing | | |
| Color | Beige | |
| Connector | | |
| Type | USB type A male and USB type B male | |
| Mechanical characteristics | | |
| Dimensions | | |
| Length | 1.8 m ±30 mm | 5 m ±50 mm |
| Diameter | Max. 5 mm | |
| Flex radius | Min. 100 mm | |

Table 91: 5CAUSB.0018-00, 5CAUSB.0050-00 - Technical data

3.7.1.4 Cable pinout

Warning!

Field-assembled cables must be wired according to these specifications.

If a field-assembled cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly, however.

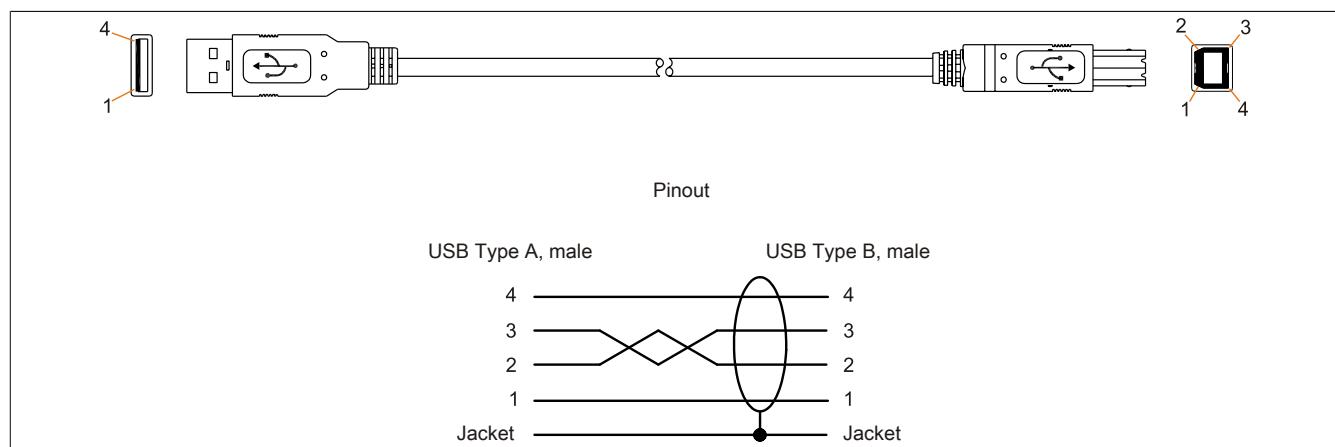


Figure 91: 5CAUSB.00xx-00 USB cables - Pinout

3.8 RS232 cables

3.8.1 9A0014.xx

3.8.1.1 General information

RS232 cables are used as extension cables between two RS232 interfaces.

3.8.1.2 Order data

| Model number | Short description | Figure |
|--------------|---|---|
| | RS232 cables | |
| 9A0014.02 | RS232 extension cable for remote operation of a display unit with touch screen, 1.8 m | |
| 9A0014.05 | RS232 extension cable for remote operation of a display unit with touch screen, 5 m | |
| 9A0014.10 | RS232 extension cable for remote operation of a display unit with touch screen, 10 m |  |

Table 92: 9A0014.02, 9A0014.05, 9A0014.10 - Order data

3.8.1.3 Technical data

| Product ID | 9A0014.02 | 9A0014.05 | 9A0014.10 |
|-----------------------------------|--------------|----------------------------------|--------------|
| General information | | | |
| Certification | | | |
| CE | | Yes | |
| GOST-R | - | | Yes |
| Cable construction | | | |
| Wire cross section | | AWG 26 | |
| Shield | | Entire cable | |
| Outer sheathing | | | |
| Color | | Beige | |
| Connector | | | |
| Type | | 9-pin male/female DSUB connector | |
| Locating screw tightening torque | | Max. 0.5 Nm | |
| Mechanical characteristics | | | |
| Dimensions | | | |
| Length | 1.8 m ±50 mm | 5 m ±80 mm | 10 m ±100 mm |
| Diameter | | Max. 5 mm | |
| Flex radius | | Min. 70 mm | |

Table 93: 9A0014.02, 9A0014.05, 9A0014.10 - Technical data

3.8.1.4 Cable pinout

Warning!

Field-assembled cables must be wired according to these specifications.

If a field-assembled cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly, however.

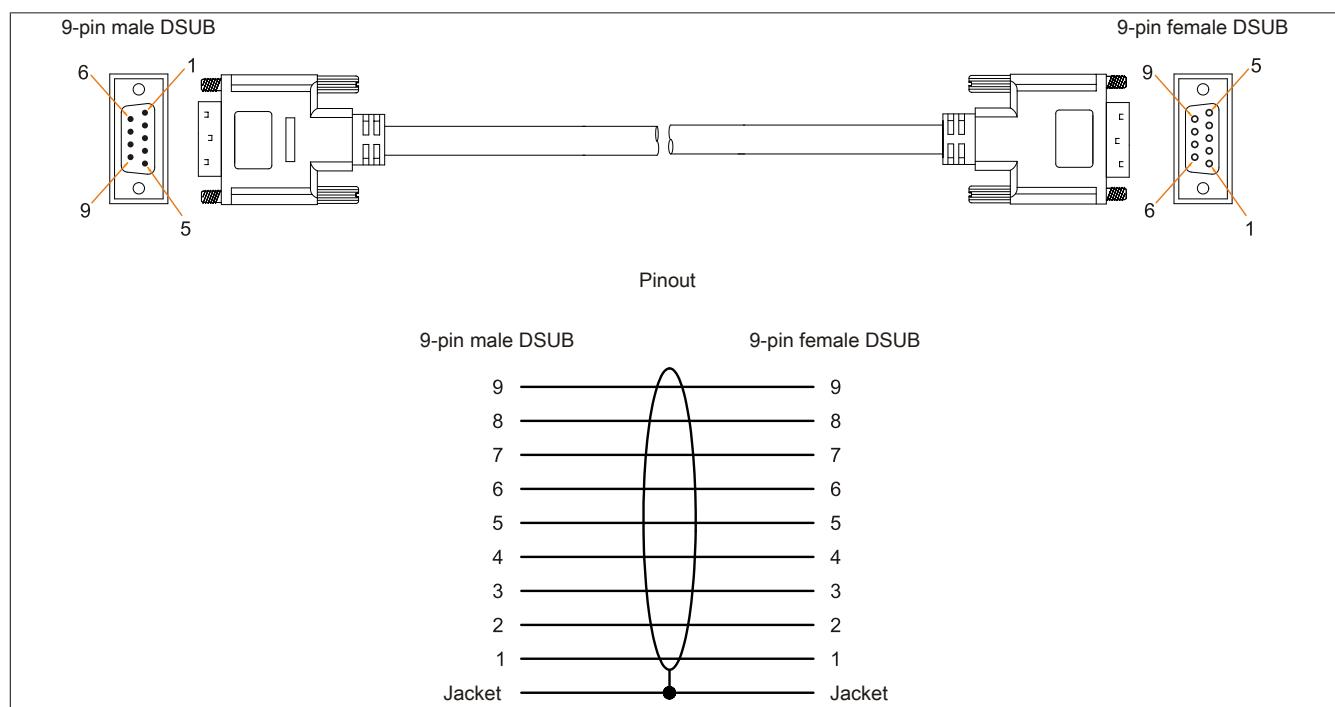


Figure 92: 9A0014.xx RS232 cables - Pinout

Chapter 7 • Maintenance and service

This chapter describes service/maintenance work that can be carried out by a qualified end user.

1 Cleaning

Danger!

This device must be switched off before cleaning in order to prevent unintended functions from being triggered when handling the touch screen or pressing keys.

This device should be cleaned with a moist cloth. The cloth should be moistened with water and detergent, a screen cleaning agent or alcohol (ethanol). The cleaning agent should be applied to the cloth beforehand, not sprayed directly on the device! Aggressive solvents, chemicals, scouring agents, pressurized air or steam jets should never be used.

Information:

Displays with a touch screen should be cleaned regularly.

2 Tips for extending the service life of the display

2.1 Backlight

The service life of the backlight is specified by its "half-brightness time". For example, a specified operating time of 50,000 hours means that the display would still retain 50% of its brightness after this time.

2.1.1 How can the service life of the backlight be extended?

- By setting the display brightness to the lowest value that is still comfortable for the eyes
- By using dark images
- By reducing the brightness by 50%, which can result in an approximately 50% increase in the half-brightness time

2.2 Screen burn-in

Screen burn-in refers to the "burning in" of a static image on a display after being displayed for a prolonged period of time. Nevertheless, static images are not the only cause of screen burn-in. Screen burn-in is also referred to as burn-in effect, image retention, memory effect, memory sticking or ghost image.

There are basically two types:

- Area type: This type of screen burn-in is indicated by a dark gray image. The effect will disappear if the display is switched off for a long period of time.
- Line type: This type of screen burn-in can cause lasting damage.

2.2.1 What causes screen burn-in?

- Static images
- No screensaver
- Sharp transitions in contrast (e.g. black/white)
- High ambient temperatures
- Operation outside of specifications

2.2.2 How can screen burn-in be avoided?

- By constantly changing between static and dynamic images
- By avoiding excessive brightness differences between foreground and background elements
- By using colors with similar brightness
- By using complementary colors in follow-up images
- By using a screensaver

3 Pixel errors

Information:

Displays may contain defective pixels (dead/stuck pixels) that result from the manufacturing process. These flaws are not grounds for reclamation or initiating a warranty claim.

Appendix A

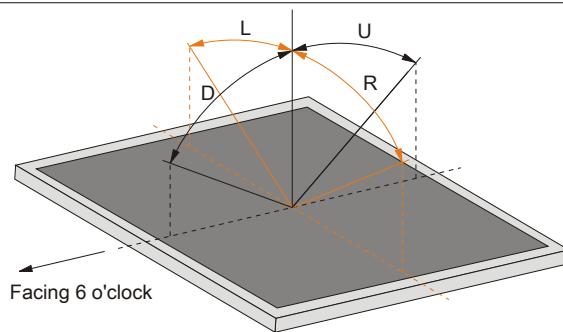
1 Abbreviations

| Abbreviation | Stands for | Description |
|--------------|-----------------|---|
| NC | Normally closed | A normally closed relay contact |
| | Not connected | Used in pinout descriptions if a terminal or pin is not connected to a module |
| ND | Not defined | In data tables, this stands for a value that has not been defined. This may be because a cable manufacturer does not provide certain technical data, for example. |
| NO | Normally open | A normally open relay contact |
| TBD | To be defined | Used in technical data tables when certain information is not yet available. The value will be provided later. |

Table 94: Abbreviations in this user's manual

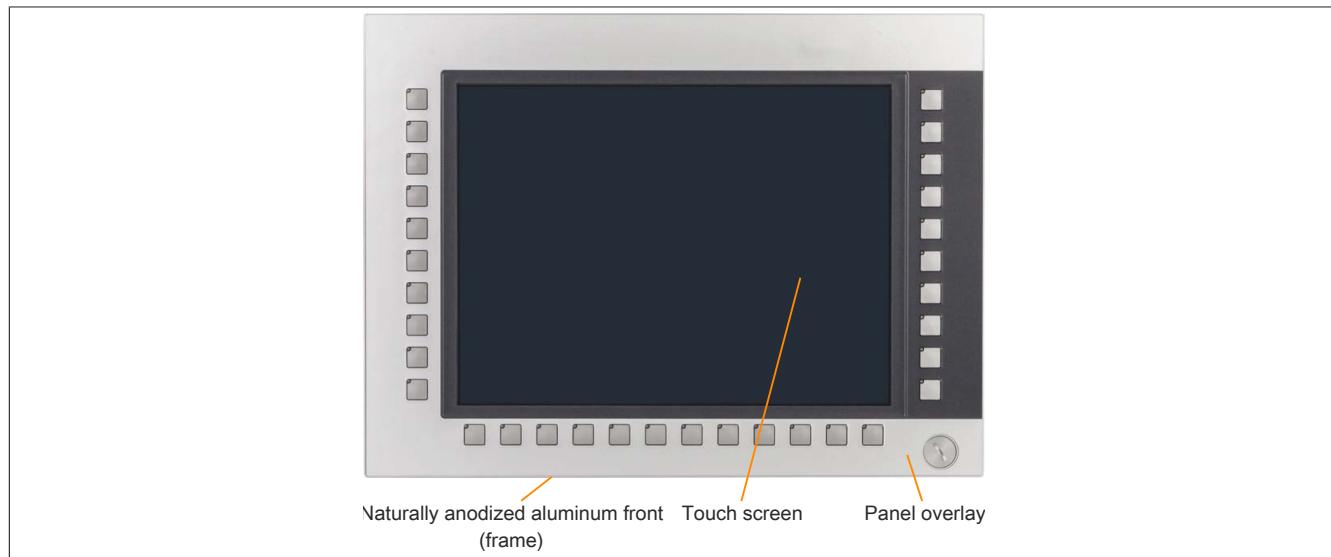
2 Viewing angles

Viewing angle specifications (R, L, U, D) for the display types are listed in the technical data for each device.



3 Chemical resistance

Display units feature the Autotex panel overlay:



3.1 Panel overlay Autotex (polyester)

Unless otherwise specified, the panel overlay conforms to DIN 42115 (Part 2). This means it is resistant to exposure to the following chemicals for a 24-hour period with no visible signs of damage:

- Acetaldehyde
- Acetone
- Acetonitrile
- Aliphatic hydrocarbons
- Alkali carbonate
- Formic acid <50%
- Ammonia <40%
- Amyl acetate
- Ethanol
- Ether
- Gasoline
- Bichromate
- Potassium
- Cutting oil
- Brake fluid
- Butylcellosolve
- Sodium hypochlorite <20%
- Cyclohexanol
- Cyclohexanone
- Decon
- Diacetone alcohol
- Dibutyl phthalate
- Diesel
- Diethyl ether
- Diethyl phthalate
- Dioxan
- Dowanol
- DRM/PM
- Iron chloride (FeCl₂)
- Iron chloride (FeCl₃)
- Acetic acid <50%
- Ethyl acetate
- Linseed oil
- Aviation fuel
- Formaldehyde 37 to 42%
- Glycerine
- Glycol
- Isophorone
- Isopropanol
- Potassium hydroxide
- Potassium carbonate
- Methanol
- Methylisobutylketone
- MIBK
- Sodium bisulphate
- Sodium carbonate
- Caustic soda <40%
- N-Butyl acetate
- Paraffin oil
- Phosphoric acid <30%
- Blown castor oil
- Nitric acid <10%
- Hydrochloric acid <36%
- Sea water
- Sulphuric acid <10%
- Silicon oil
- Tenside
- Turpentine oil replacement
- Toluene
- Triacetin
- Trichloracetic acid <50%
- Trichloroethane
- White spirits
- Washing agents
- Water
- Hydrogen peroxide <25%
- Fabric conditioner
- Xylene

The panel overlay conforms to DIN 42115 Part 2 for exposure to glacial acetic acid for less than one hour without visible damage.

3.2 Touch screen

AMT touch screen (single-touch)

Unless otherwise specified, the AMT touch screen is resistant to exposure to the following chemicals for a 1-hour period (at 25°C) with no visible signs of damage:

- Acetone
- Ammonia-based glass cleaner
- Beer
- Unleaded gasoline
- Chemical cleaning agents
- Hydrochloric acid <6%
- Coca-Cola
- Diesel
- Dimethylbenzene
- Vinegar
- Ethanol
- Antifreeze
- Transmission fluid
- Household cleaning agents
- Hexane
- n-hexane
- Isopropanol
- Coffee
- Methylbenzene
- Methylene chloride
- Methyl ethyl ketone
- Mineral spirits
- Motor oil
- Nitric acid <70%
- Salt solution <5% tea
- Turpentine
- Grease
- Sulphuric acid <40%
- Cooking oil

4 Touch screen

4.1 5-wire AMT touch screen (single-touch)

4.1.1 Technical data

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the complete system. For the complete system in which this individual component is used, refer to the data given specifically for that device.

| Product ID | 5-wire AMT touch screen |
|---------------------------------|---|
| General information | |
| Certification | |
| CE | Yes |
| c-UL-us | Yes |
| Manufacturer | AMT |
| Technology | Analog, resistive |
| Release pressure | <1 N |
| Light permeability | 81% ±3% |
| Environmental conditions | |
| Temperature | |
| Operation | - 20 to 70°C |
| Storage | - 40 to 80°C |
| Transport | - 40 to 80°C |
| Relative humidity | |
| Operation | 90% at max. 50°C |
| Storage | 90% RH at max. 60°C for 504 hours |
| Transport | 90% RH at max. 60°C for 504 hours |
| Operating conditions | |
| Service life | 36 million touch operations at the same position (release pressure: 250 g, interval: 2x per second) |
| Activation | Finger, pointer, credit card, glove |
| Drivers | Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com). |

Table 95: 5-wire AMT touch screen - Technical data

4.1.2 Temperature/Humidity diagram

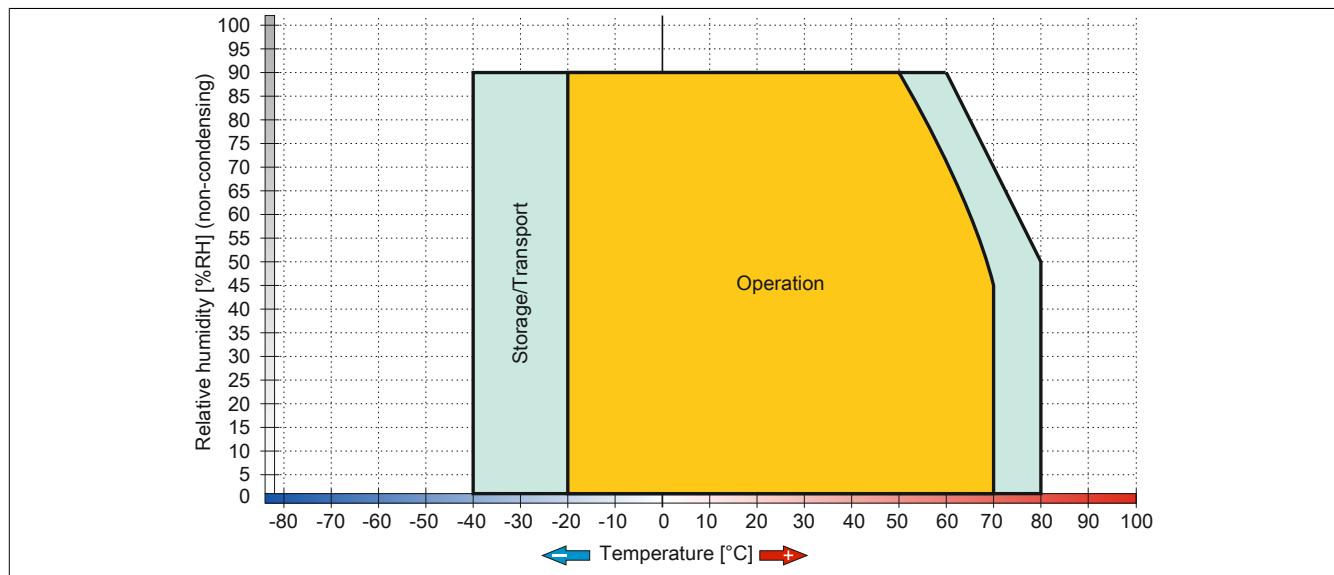


Figure 93: 5-wire AMT touch screen - Temperature/Humidity diagram

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