Automation Panel 1000

User's manual

Version: **2.00 (July 2019)**
Model no.: **MAAP1000-ENG**

Translation of the original documentation

1 Introduction

Information:

B&R makes every effort to keep user's documents as current as possible. The most current versions can be downloaded from the B&R website www.br-automation.com.

1.1 Manual history

Version	Date	Change
2.00	July 2019	• Removed register marks and directories. • Updated chapter "Security concept" on page 12. • Updated date and version entries in the manual history. • Revised terminology and standardization. • Modified chapter structure. • Updated temperature/humidity diagrams. • Updated/Revised the following sections: ° International and national certifications ° "Individual components" on page 58 ° Introduction chapter of Installation and wiring and Commissioning ° Specifications for interfaces in chapter Complete system ° Technical data of individual components and accessories
1.10	January 2018	• Updated chapter 4 "Technical data". • Revised section "Installation". • Documented the following individual components: ° "5AP1181.1505-000" on page 97 ° "5DLSD4.1001-00" on page 113 • Updated the following sections: ° "DNV GL certification " on page 178 ° "UL Haz. Loc. certification" on page 179 ° "Control Center" on page 131 ° "Development kit" on page 133 ° ".NET SDK" on page 134 ° "B&R Key Editor" on page 135 ° "Touch screen calibration" on page 126 ° "5CASDL.0xxx-03" on page 155 ° "5CASDL.0xx0-13" on page 159 • Updated section "Repairs/Complaints and replacement parts" on page 139.
1.08	March 2017	• Renamed "display units" to "panels". • Updates sections "Multi-touch drivers" on page 129, "Automation Runtime Embedded (ARemb)" on page 130 and "B&R Key Editor" on page 135. • Documented the following panel: ° "5AP1130.156C-000" on page 102 ° "5AP1130.185C-000" on page 104 • Updated data in sections "Mechanical properties", "Environmental properties" and "Electrical properties".

Version	Date	Change
1.06	October 2016	• Updated "Maximum ambient temperature during operation" on page 33.
1.05	September 2016	• Updated chapter "Standards and certifications"; updated DNV GL. • Updated section "+24 VDC power supply" on page 39. • Updated section "HMI Service Center" on page 137. • Updated the following panels: ° "5AP1130.0702-000" on page 66 ° "5AP1130.101E-000" on page 70 ° "5AP1130.121E-000" on page 89 • Updated data in sections "Mechanical properties", "Environmental properties" and "Electrical properties". • Updated the following accessories: ° Clamping blocks "5AC900.BLOC-00" on page 171 ° Clamping blocks "5AC900.BLOC-01" on page 172 ° USB interface cover "5AC900.1201-00" on page 173 ° USB interface cover "5AC900.1201-01" on page 174 ° Line filter "5AC804.MFLT-00" on page 169
1.00	December 2015	First version

1.2 Information about this document

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

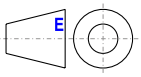
1.2.1 Organization of safety notices

Safety notices in this manual are organized as follows:

Safety notice	Description
Danger!	Failure to observe these safety guidelines and notices can result in death, severe injury or substantial damage to property.
Warning!	Failure to observe these safety guidelines and notices can result in severe injury or substantial damage to property.
Caution!	Failure to observe these safety guidelines and notices can result in injury or damage to property.
Information:	These instructions are important for avoiding malfunctions.

Table 1: Description of the safety notices used in this documentation

1.2.2 Guidelines



European dimension standards apply to all dimension diagrams.

All dimensions in mm.

Unless otherwise specified, the following general tolerances apply:

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

Table 2: Nominal dimension ranges

2 General safety guidelines

2.1 Intended use

Programmable logic controllers, operating and monitoring devices (such as industrial PCs, Power Panels, Mobile Panels, etc.) as well as uninterruptible power supplies from B&R have been designed, developed and manufactured for normal use in industry. They have not been designed, developed and manufactured for use that involves fatal risks or hazards that could result in death, injury, serious physical harm or other loss without the assurance of exceptionally stringent safety precautions. In particular, this includes the use of these systems to monitor nuclear reactions in nuclear power plants, flight control systems, air traffic control, the control of mass transport vehicles, medical life support systems and the control of weapon systems.

2.2 Protection against electrostatic discharge

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

2.2.1 Packaging

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

2.2.2 Regulations for proper ESD handling

Electrical assemblies with housing

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

Electrical assemblies without housing

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

- All persons handling electrical assemblies and devices in which electrical assemblies are installed must be grounded.
- Assemblies are only permitted to be touched on the narrow sides or front plate.
- Always place assemblies on suitable surfaces (ESD packaging, conductive foam, etc.). Metallic surfaces are not suitable surfaces!
- Assemblies must not be subjected to electrostatic discharges (e.g. due to charged plastics).
- A minimum distance of 10 cm from monitors or television sets must be maintained.
- Measuring instruments and devices must be grounded.
- Test probes of floating potential measuring instruments must be discharged briefly on suitable grounded surfaces before measurement.

Individual components

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

2.3 Regulations and measures

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

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

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

2.4 Transport and storage

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

2.5 Installation

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

2.6 Operation

2.6.1 Protection against contact with electrical parts

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

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

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

2.6.2 Ambient conditions - Dust, moisture, aggressive gases

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

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

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

2.6.3 Programs, viruses and malicious programs

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

2.7 Security concept

B&R products communicate via a network interface and were developed for integration into a secure network. The network and B&R products are affected by the following hazards (not a complete list):

- Unauthorized access
- Digital intrusion
- Data leakage
- Data theft
- A variety of other types of IT security breaches

It is the responsibility of the operator to provide and maintain a secure connection between B&R products and the internal network as well as other networks, such as the Internet, if necessary. The following measures and security solutions are suitable for this purpose:

- Segmentation of the network (e.g. separation of the IT and OT networks)
- Firewalls for the secure connection of network segments
- Implementation of a security-optimized user account and password concept
- Intrusion prevention and authentication systems
- Endpoint security solutions with modules for anti-malware, data leakage prevention, etc.
- Data encryption

It is the responsibility of the operator to take appropriate measures and to implement effective security solutions.

B&R Industrial Automation GmbH and its subsidiaries are not liable for damages and/or losses resulting from, for example, IT security breaches, unauthorized access, digital intrusion, data leakage and/or data theft.

Before B&R releases products or updates, they are subjected to appropriate functional testing. Independently of this, the development of customized test processes is recommended in order to be able to check the effects of changes in advance. Such changes include, for example:

- Installation of product updates
- Notable system modifications such as configuration changes
- Import of updates or patches for third-party software (non-B&R software)
- Hardware replacement

These tests should ensure that implemented security measures remain effective and that systems behave as expected.

3 System overview

3.1 Information about this user's manual

This user's manual contains all the necessary information for a functioning Automation Panel 1000 panel mount device.

This user's manual applies to the modular Automation Panel 1000 product generation. For information about Automation Panel 920, 980, 981 and 982 systems, see the Automation Panel 900 user's manual. For information about Automation Panel 9x3 systems, see the Automation Panel 9x3 user's manual.

Information:

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

3.2 Description of individual modules

3.2.1 AP1000 panels

AP1000 panels form the basis for the Automation Panel 1000, Panel PC 900, Panel PC 2100, Panel PC 2200 and Panel PC 3100 system families. Different display diagonals and touch screen technologies as well as panels with touch screen and keys are available. The panels are installed using retaining clips or clamping blocks.
Panels can only be operated as a complete system in combination with a link module (Automation Panel 1000) or CPU board and system unit (Panel PC).

3.2.2 Link modules

Link modules have various graphics interfaces and connections. An Automation Panel is put together by installing a link module onto a panel.

A link module cannot be operated without a panel.

3.3 Design/Configuration

Automation Panel 1000, Panel PC 900, Panel PC 2100, Panel PC 2200 and Panel PC 3100 systems can be assembled to meet individual requirements and operating conditions. Automation Panel 1000, Panel PC 900, Panel PC 2100, Panel PC 2200 and Panel PC 3100 systems are flexible so that an Automation Panel can be converted to a Panel PC or vice versa.

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

- Panel
- Link module

Configuration						
Panels						Select 1
		**Diagonal**	**Resolution**	**Touch screen**	**Keys**	**Format**
		1120 panels				
	5AP1120.0573-000	5.7"	VGA	Single-touch	No	Landscape
	5AP1120.0702-000	7.0"	WVGA	Single-touch	No	Landscape
	5AP1120.1043-000	10.4"	VGA	Single-touch	No	Landscape
	5AP1120.101E-000	10.1"	WXGA	Single-touch	No	Landscape
	5AP1120.1214-000	12.1"	SVGA	Single-touch	No	Landscape
	5AP1120.121E-000	12.1"	WXGA	Single-touch	No	Landscape
	5AP1120.1505-000	15.0"	XGA	Single-touch	No	Landscape
	5AP1120.156B-000	15.6"	HD	Single-touch	No	Landscape
	5AP1120.1906-000	19.0"	SXGA	Single-touch	No	Landscape
		1130 panels				
	5AP1130.0702-000	7.0"	WVGA	Multi-touch	No	Landscape
	5AP1130.101E-000	10.1"	WXGA	Multi-touch	No	Landscape
	5AP1130.121E-000	12.1"	WXGA	Multi-touch	No	Landscape
	5AP1130.156C-000	15.6"	FHD	Multi-touch	No	Landscape
	5AP1130.185C-000	18.5"	FHD	Multi-touch	No	Landscape
		1151 panels				
	5AP1151.0573-000	5.7"	VGA	No	Yes	Portrait
		1180 panels				
	5AP1180.1043-000	10.4"	VGA	Single-touch	Yes	Landscape
	5AP1180.1505-000	15.0"	XGA	Single-touch	Yes	Landscape
		1181 panels				
	5AP1181.1043-000	10.4"	FHD	Single-touch	Yes	Portrait
	5AP1181.1505-000	15.0"	FHD	Single-touch	Yes	Landscape
		1181 panels				
	5AP1182.1043-000	10.4	VGA	Single-touch	Yes	Landscape
Link modules						Select 1
	5DLSDL.1001-00 SDL/DVI receiver 5DLSD3.1001-00 SDL3 receiver 5DLSD4.1004-00 SDL4 receiver					
Terminal blocks						Select 1
	Power supply connectors 0TB103.9 0TB103.91					

3.4 Overview

Model number	Short description	Page
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin female - Screw clamp terminal block 3.31 mm²	140
0TB103.91	Connector 24 VDC - 3-pin female - Cage clamp terminal block 3.31 mm²	140
5AC804.MFLT-00	Line filter	169
5AC900.1201-00	USB interface cover M20 IP65, flat	173
5AC900.1201-01	USB interface cover M20 IP65 curved	174
5AC900.BLOC-00	Clamping block with swing arms, 10 pcs., replacement part	171
5AC900.BLOC-01	Terminal block without swing arms, 10 pcs; replacement part	172
5SWUTI.0001-000	HMI Service Center USB flash drive - Hardware diagnostic software - For APC810/PPC800 - For APC910/PPC900 - For APC2100/PPC2100 - For APC2200/PPC2200 - For APC3100/PPC3100 - For APC51x/PP500 - For Automation Panel 800/900 - For Automation Panel 1000/5000	137
	DVI cable	
5CADVI.0018-00	DVI-D cable - 1.8 m	146
5CADVI.0050-00	DVI-D cable - 5 m	146
5CADVI.0100-00	DVI-D cable - 10 m	146
	Link modules	
5DLSD3.1001-00	Automation Panel link module - SDL3 receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	111
5DLSD4.1001-00	Automation Panel link module - SDL4 receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	113
5DLSDL.1001-00	Automation Panel link module - SDL/DVI receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	109
	Panels	
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 / PPC2200 / link modules - Compatible with 5PP520.0573-00	58
5AP1120.0702-000	Automation Panel 7" WVGA TFT - 800 x 480 pixels (16:10) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - For PPC2100 / PPC2200 / link modules - Compatible with 5PP520.0702-00	64
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 / PPC3100 / PPC2200 / link modules	68
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 - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP520.1043-00	72
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 - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP520.1214-00	84
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 / PPC3100 / PPC2200 / link modules	87
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 - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP520.1505-00, 5AP920.1505-01, 5PC720.1505-xx, 5PC820.1505-00	91
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/PPC3100/PPC2200 - For link modules	100
5AP1120.1906-000	Automation Panel 19.0" SXGA TFT - 1280 x 1024 pixels (5:4) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5AP920.1906-01, 5PC720.1906-00, 5PC820.1906-00	106
5AP1130.0702-000	Automation Panel 7.0" WVGA TFT - 800 x 480 pixels (16:10) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC2100 / PPC2200 / link modules - Compatible with 5PP520.0702-00	66
5AP1130.101E-000	Automation Panel 10.1" WXGA TFT - 1280 x 800 pixels (16:10) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC2100 / PPC3100 / PPC2200 / link modules	70
5AP1130.121E-000	Automation Panel 12.1" WXGA TFT - 1280 x 800 pixels (16:10) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC2100 / PPC3100 / PPC2200 / link modules	89
5AP1130.156C-000	Automation Panel 15.6" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules	102
5AP1130.185C-000	Automation Panel 18.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules	104
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 / PPC2200 / link modules - Compatible with 5PP551.0573-00	61
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 - 22 function keys - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP580.1043-00, 5AP980.1043-01	75
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 - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP580.1505-00, 5AP980.1505-01	94
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 - 38 function keys and 20 system keys - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP581.1043-00, 5AP981.1043-01, 5PC781.1043-00	78
5AP1181.1505-000	Automation Panel 15" XGA TFT - 1024 x 768 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB - 32 function keys and 92 system keys - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP581.1505-000	97
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 - 44 function keys and 20 system keys - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP582.1043-00, 5AP982.1043-01, 5PC782.1043-00	81
	RS232 cable	
9A0014.02	RS232 extension cable for operating a remote panel with touch screen, 1.8 m.	167
9A0014.05	RS232 extension cable for operating a remote panel with touch screen, 5 m.	167
9A0014.10	RS232 extension cable for operating a remote panel with touch screen, 10 m.	167

Model number	Short description	Page
	SDL cables	
5CASDL.0008-00	SDL cable - 0.8 m	149
5CASDL.0018-00	SDL cable - 1.8 m	149
5CASDL.0050-00	SDL cable - 5 m	149
5CASDL.0060-00	SDL cable - 6 m	149
5CASDL.0100-00	SDL cable - 10 m	149
5CASDL.0150-00	SDL cable - 15 m	149
5CASDL.0200-00	SDL cable - 20 m	149
5CASDL.0250-00	SDL cable - 25 m	149
5CASDL.0300-00	SDL cable - 30 m	149
	SDL cables with 45° connector	
5CASDL.0018-01	SDL cable - 45-degree connector - 1.8 m	152
5CASDL.0050-01	SDL cable - 45-degree connector - 5 m	152
5CASDL.0100-01	SDL cable - 45-degree connector - 10 m	152
5CASDL.0150-01	SDL cable - 45-degree connector - 15 m	152
	SDL flex cable	
5CASDL.0018-03	SDL flex cable - 1.8 m	155
5CASDL.0050-03	SDL flex cable - 5 m	155
5CASDL.0100-03	SDL flex cable - 10 m	155
5CASDL.0150-03	SDL flex cable - 15 m	155
5CASDL.0200-03	SDL flex cable - 20 m	155
5CASDL.0250-03	SDL flex cable - 25 m	155
5CASDL.0300-03	SDL flex cable - 30 m	155
	SDL flex cables	
5CASDL.0300-13	SDL flex cable with extender - 30 m	159
5CASDL.0400-13	SDL flex cable with extender - 40 m	159
5CASDL.0430-13	SDL flex cable with extender - 43 m	159
	SDL3/SDL4/PoE cables	
5CASD3.0030-00	SDL3/SDL4 cable - 3 m	163
5CASD3.0050-00	SDL3/SDL4 cable - 5 m	163
5CASD3.0100-00	SDL3/SDL4 cable - 10 m	163
5CASD3.0150-00	SDL3/SDL4 cable - 15 m	163
5CASD3.0200-00	SDL3/SDL4 cable - 20 m	163
5CASD3.0300-00	SDL3/SDL4 cable - 30 m	163
5CASD3.0500-00	SDL3/SDL4 cable - 50 m	163
5CASD3.1000-00	SDL3/SDL4 cable - 100 m	163
	USB accessories	
5MMUSB.032G-02	USB 3.0 flash drive 32 GB MLC	144
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R	142
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R	142
	USB cable	
5CAUSB.0018-00	USB 2.0 connection cable - Type A - type B connector - 1.8 m	166
5CAUSB.0050-00	USB 2.0 connection cable - Type A - type B connector - 5 m	166

4 Technical data

4.1 Complete system

4.1.1 Connection options

The Automation Panel can be connected to a B&R industrial PC via SDL, DVI SDL3 or SDL4 operations. The connection options described below provide an overview of the operating modes and possible limitations.

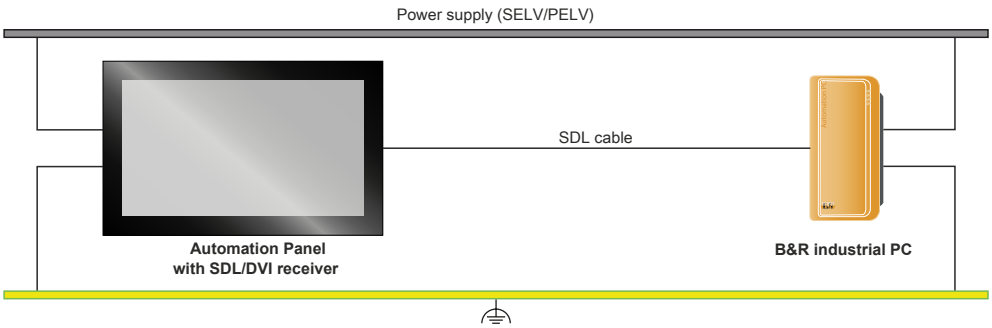
4.1.1.1 SDL operation

4.1.1.1.1 SDL operation without USB cable (mode 1)

With this connection option, all communication between the Automation Panel and B&R industrial PC takes place via a single SDL cable.

In addition to the display data, information from the touch screen, matrix keys, LEDs and service/diagnostic data is transferred. The Automation Panel can be installed up to 40 m away from the B&R industrial PC. USB 1.1 is also transferred over this distance and fully integrated into SDL. External adapter modules are not required.

The brightness of the display can be set via the B&R Control Center, for example.



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

Panel In	✓	USB In	x	Power supply	✓	Brightness controls	x
USB1, USB2	✓ USB 1.1	COM interface for touch screen	x	Grounding	✓		

Maximum cable length: 40 m

Requirements

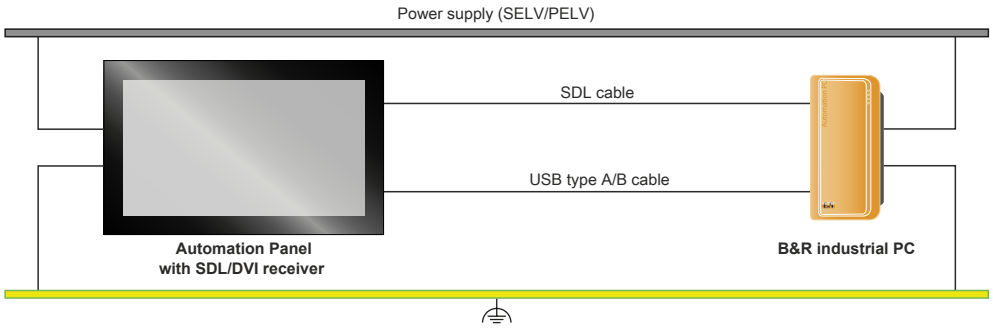
- Automation Panel with SDL/DVI receiver
- B&R industrial PC with SDL interface
- SDL cable

4.1.1.1.2 SDL operation with USB cable (mode 2)

With this connection option, communication between the Automation Panel and B&R industrial PC takes place via an SDL cable that is connected to interface "Panel In" and a USB type A/B cable that is connected to interface "USB In".

Display data as well as information from the resistive touch screen keys, matrix keys, LEDs and service/diagnostic data is transferred via the SDL cable. The touch screen data from the multi-touch screen is transferred via the USB type A/B cable. The Automation Panel can be installed up to 5 m (USB specification) away from the B&R industrial PC. USB 2.0 can be transferred over this distance via the USB type A/B cable. External adapter modules are not required.

The brightness of the display can be set via the B&R Control Center, for example.



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

Panel In	✓	USB In	✓ USB 2.0	Power supply	✓	Brightness controls	x
USB1, USB2	✓ USB 2.0	COM interface for touch screen	x	Grounding	✓		

Maximum cable length: 5 m

Requirements

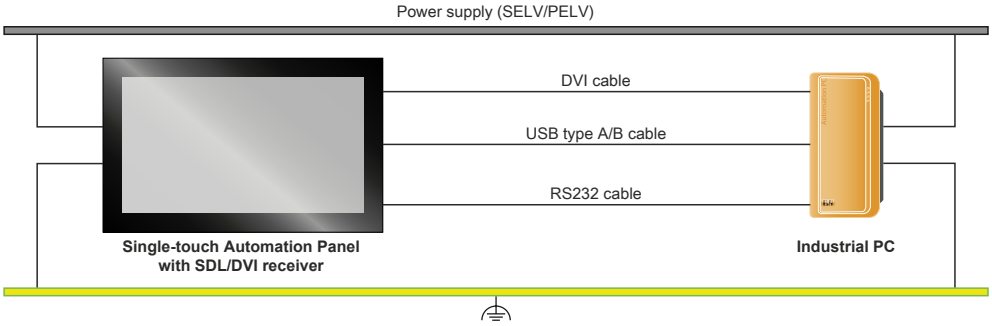
- Automation Panel with SDL/DVI receiver
- B&R industrial PC with SDL interface
- SDL cable, USB type A/B cable

4.1.1.2 DVI operation

In DVI operation, all signals needed to operate the Automation Panel are transferred via a separate cable. The brightness of the display can be set using the brightness buttons.

4.1.1.2.1 DVI operation with single-touch Automation Panel

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



Availability of the 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 interface for touch screen	✓	Grounding	✓		

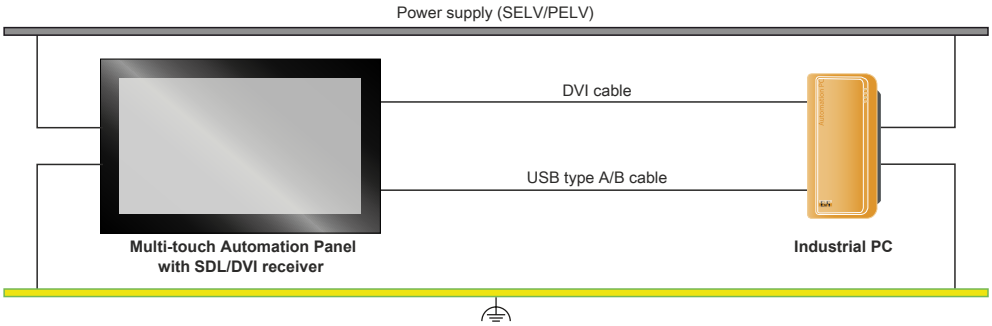
Maximum cable length: 5 m

Requirements

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

4.1.1.2.2 DVI operation with multi-touch Automation Panel

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



Availability of the 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 interface for touch screen	x	Grounding	✓		

Maximum cable length: 5 m

Requirements

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

4.1.1.2.3 General limitations/characteristics

- Key and LED data is not transferred.
- Data from operating elements is not transferred.
- Service and diagnostic data is not transferred.
- The maximum cable length is limited to 5 m.
- Upgrading the firmware of Automation Panels is not possible.

4.1.1.3 SDL3 operation

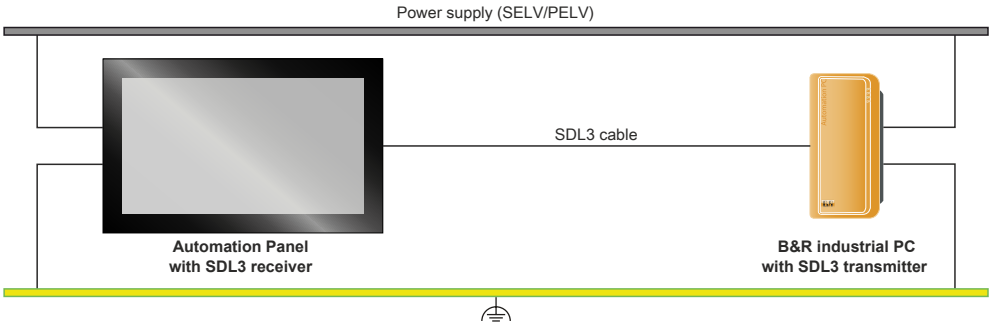
Smart Display Link 3 (SDL3) technology transfers all communication channels between a B&R industrial PC and panel up to 100 m over a standard Ethernet cable (min. Cat 6a). An RJ45 connector is used for the device connection, which is ideal for confined spaces in feed-throughs and swing arm systems.

4.1.1.3.1 SDL3 operation with SDL3 transmitter

In SDL3 operation with an SDL3 transmitter in the B&R industrial PC, all communication between the Automation Panel and B&R industrial PC takes place via a single SDL3 cable.

In addition to the display data, information from the touch screen, matrix keys, LEDs and service/diagnostic data is transferred. The Automation Panel can be installed up to 100 m away from the B&R industrial PC. USB 2.0 is also transferred over this distance and fully integrated into SDL3. External adapter modules are not required.

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



Availability of interfaces on Automation Panels with an SDL3 receiver:

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

Maximum cable length for SDL3: 100 m

Requirements

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

4.1.1.3.2 General limitations/characteristics

- USB 2.0 transfer is limited to 30 Mbit/s with SDL3.
- A display is always emulated by the SDL3 transmitter using EDID data and hot plug detection, so DVI-compatible operation is possible. For this reason, the following behavior may occur during operation with multiple displays. In the operating system, a connected panel is reported by the video driver even in the following situations:
  - No SDL3/SDL4 cable is connected.
  - There is no connection established yet between the SDL3 link module and SDL3 transmitter.

  This behavior can be avoided by appropriate configuration in BIOS or via the graphics driver.

4.1.1.4 SDL4 operation

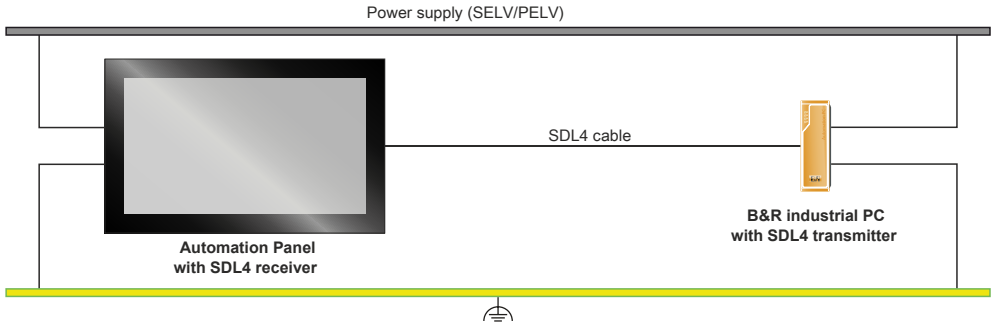
Smart Display Link 4 (SDL4) technology transfers all communication channels between a B&R industrial PC and panel up to 100 m over a standard Ethernet cable (min. Cat 6a). An RJ45 connector is used for the device connection, which is ideal for confined spaces in feed-throughs and swing arm systems.

4.1.1.4.1 SDL4 operation with SDL4 transmitter

In SDL4 operation with an SDL4 transmitter in the B&R industrial PC, all communication between the Automation Panel and B&R industrial PC takes place via a single SDL4 cable.

In addition to the display data, information from the touch screen, matrix keys, LEDs and service/diagnostic data is transferred. The Automation Panel can be installed up to 100 m away from the B&R industrial PC. USB 2.0 is also transferred over this distance and fully integrated into SDL4. External adapter modules are not required.

The brightness of the display can be set via the B&R Control Center, for example.



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

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

Maximum cable length for SDL4: 100 m

Requirements

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

4.1.1.4.2 General limitations

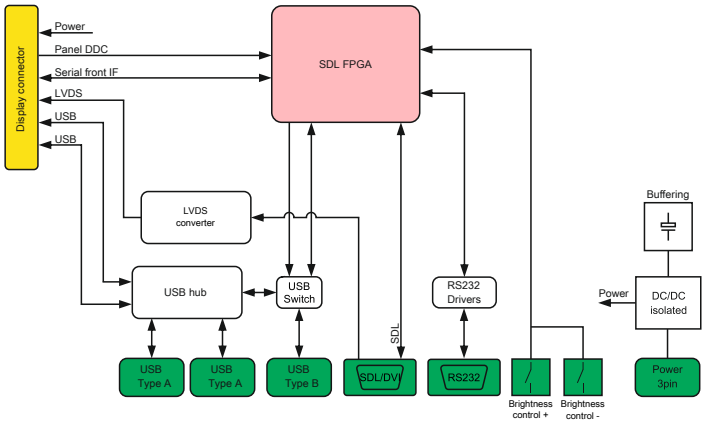
- USB 2.0 transfer is limited to 150 Mbit/s with SDL4.
- A display is always emulated by the SDL4 transmitter using EDID data and hot plug detection, so DVI-compatible operation is possible. For this reason, the following behavior may occur during operation with multiple displays.
  In the operating system, a connected panel is reported by the video driver even in the following situations:
  - No SDL3/SDL4 cable is connected.
  - There is no connection established yet between the SDL4 link module and SDL4 transmitter.

  This behavior can be avoided by appropriate configuration in BIOS or via the graphics driver.

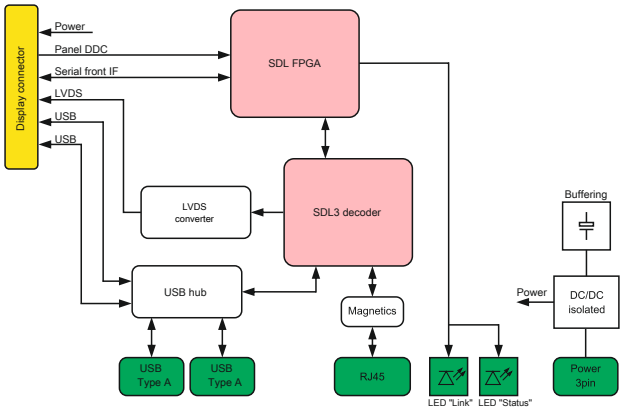
4.1.2 Electrical properties

4.1.2.1 Block diagrams

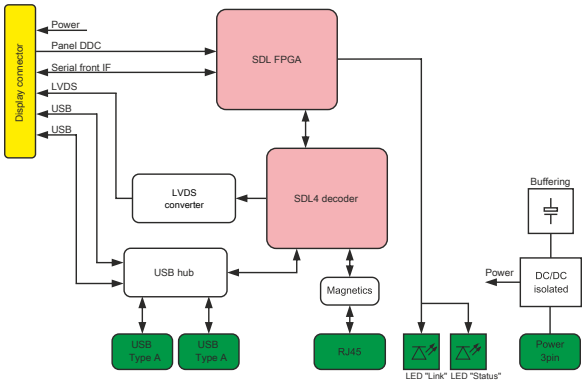
The following block diagram shows the simplified structure of the 5DLSDL.1001-00 SDL/DVI receiver link module.



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



The following block diagram shows the simplified structure of the 55DLSD4.1001-00 SDL4 receiver link module.



4.1.2.2 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 modules

Type	Model number	Total power consumption of link module
SDL/DVI receiver	5DLSDL.1001-00	Max. 3.6 W Max. 8.6 W (with USB consumer)
SDL3 receiver	5DLSD3.1001-00	Max. 8.1 W Max. 13.1 W (with USB consumer)
SDL4 receiver	5DLSD4.1001-00	Max. 8.1 W Max. 13.1 W (with USB consumer)

Panels

Type	Model number	+5 V	+3.3 V	+12 V	Total power consumption
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	-	1.0 W	3.5 W	4.5 W
7.0" multi-touch	5AP1130.0702-000	1.0 W	1.0 W	3.5 W	5.5 W
10.1" single-touch	5AP1120.101E-000	-	1.0 W	5.8 W	6.8 W
10.1" multi-touch	5AP1130.101E-000	1.0 W	1.0 W	5.8 W	7.8 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	6.0 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	1.0 W	1.9 W	3.6 W	6.5 W
12.1" single-touch	5AP1120.1214-000	-	1.9 W	7.0 W	8.9 W
12.1" single-touch	5AP1120.121E-000	-	2.5 W	7.8 W	10.3 W
12.1" multi-touch	5AP1130.121E-000	1.0 W	2.5 W	7.8 W	11.3 W
15.0" single-touch	5AP1120.1505-000	-	2.1 W	8.9 W	11.0 W
15.0" single-touch with keys	5AP1180.1505-000	0.5 W	2.7 W	8.9 W	12.1 W
15.0" single-touch with keys	5AP1181.1505-000	0.8 W	2.7 W	8.9 W	12.4 W
15.6" single-touch	5AP1120.156B-000	1.8 W	-	15.6 W	17.4 W
15.6" multi-touch	5AP1130.156C-000	6 W	-	18 W	24 W
18.5" multi-touch	5AP1130.185C-000	7 W	-	18.6 W	25.6 W
19.0" single-touch	5AP1120.1906-000	5.0 W	-	22.0 W	27.0 W

Example

15" panel 5AP1120.1505-000	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**

4.1.3 Mechanical properties

4.1.3.1 Dimensions

Information:

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

The following diagrams are symbolic and only meant to illustrate how the dimension tables should be read.

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

AP1000 panels with retaining clips - Dimensions

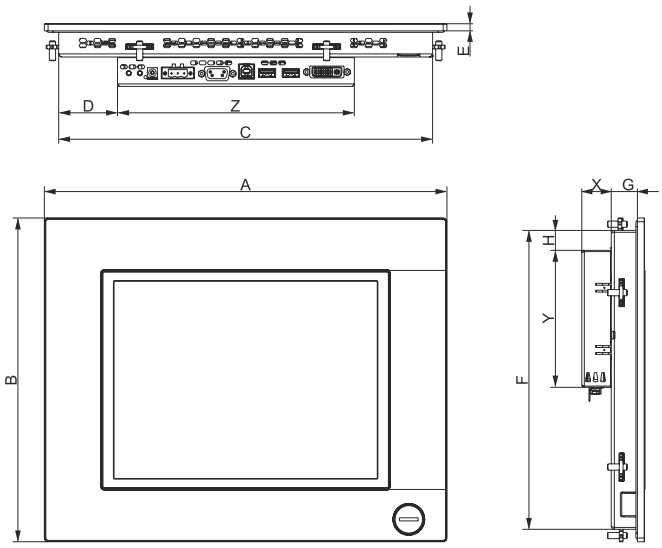


Figure 1: Automation Panel 1000 with retaining clips - Dimensions

Panels									
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
7.0" multi-touch	5AP1130.0702-000	209	153	196	3	9	140	20	7.25
10.1" single-touch	5AP1120.101E-000	279	191	266	38	9	178	18	13.5
10.1" multi-touch	5AP1130.101E-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
12.1" multi-touch	5AP1130.121E-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
15.6" multi-touch	5AP1130.156C-000	414	258.5	401	105.5	9	245.5	20	13.5
18.5" multi-touch	5AP1130.185C-000	475	295	462	166.5	9	282	18	13.5

Link modules				
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
SDL4 receiver	5DLSD4.1001-00	23.6	110	190

AP1000 panels with clamping blocks - Dimensions

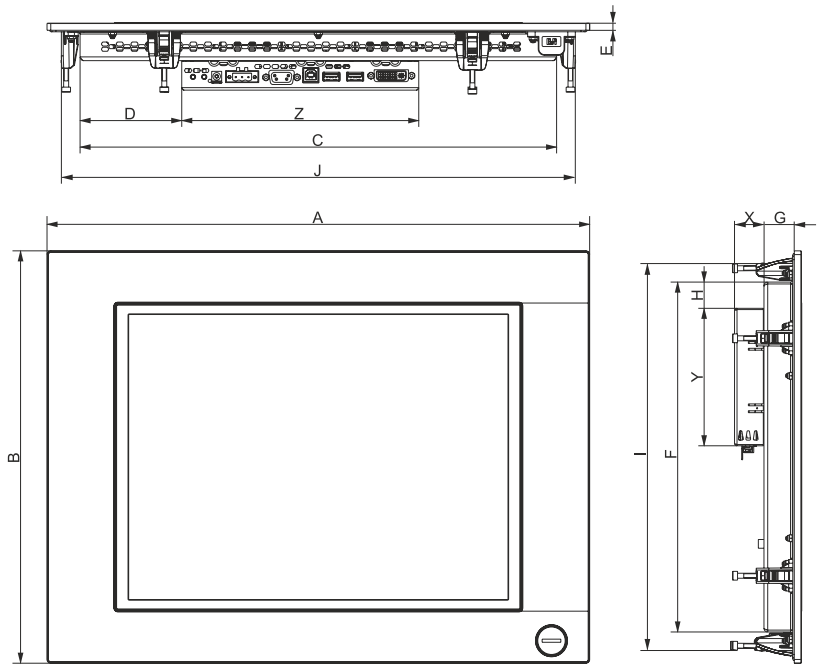


Figure 2: Automation Panel 1000 with clamping blocks - Dimensions

Panels											
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
15.0" single-touch with keys	5AP1181.1505-000	435	430	382	81.5	5.7	380	24.3	24	410	412
19.0" single-touch	5AP1120.1906-000	527	421	445	186.5	5.7	351	23.3	19.3	401	507

Link modules				
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
SDL4 receiver	5DLSD4.1001-00	23.6	110	190

4.1.3.2 Installation diagrams

Information:

When installing the Automation Panel 1000, spacing for air circulation and additional free space for operating and servicing the device must be taken into account.

AP1000 panels with retaining clips - Installation diagrams

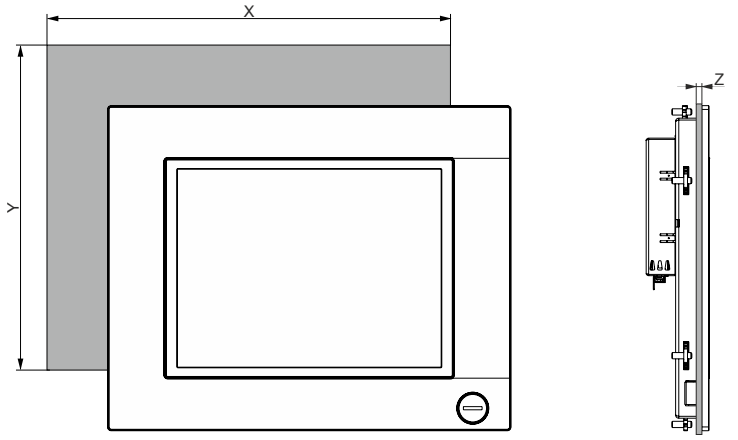


Figure 3: Automation Panel 1000 with retaining clips - Installation diagram

The cutout tolerances are +0 mm / -0.5 mm.

Panels						
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
7.0" multi-touch	5AP1130.0702-000	199	143	1	8	4
10.1" single-touch	5AP1120.101E-000	268	180	1	6	8
10.1" multi-touch	5AP1130.101E-000	268	180	1	6	8
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
12.1" multi-touch	5AP1130.121E-000	313	210.5	1	6	10
15.6" single-touch	5AP1120.156B-000	403	247.5	1	6	10
15.6" multi-touch	5AP1130.156C-000	403	247.5	1	6	10
18.5" multi-touch	5AP1130.185C-000	464	284	1	6	10

Dimension "Z" describes the thickness of the wall or control cabinet plate.

A 2.5 mm hex screwdriver is needed to tighten and remove the screw on the retaining clips. The maximum tightening torque of the retaining clips is 1 Nm.

Information:

A minimum circumferential distance of 30 mm must be maintained in order to enable installation with retaining clips.

AP1000 panels with clamping blocks - Installation diagrams

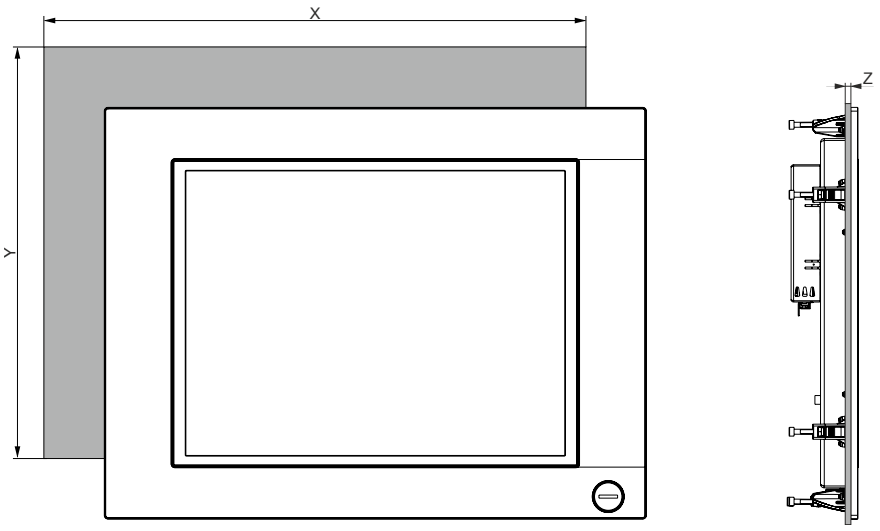


Figure 4: Automation Panel 1000 with clamping blocks - Installation diagram

The cutout tolerances are +0 mm / -0.5 mm.

Panels						
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
15.0" single-touch with keys	5AP1181.1505-000	415	413	2	10	10
19.0" single-touch	5AP1120.1906-000	510	404	2	10	12

Dimension "Z" describes the thickness of the wall or control cabinet plate.

A 3 mm hex screwdriver is needed to tighten or remove the screw on the clamping blocks. The maximum tightening torque of the clamping block is 0.5 Nm.

4.1.3.3 Spacing for air circulation

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

Information:

The following figure and table exclusively show the thermal view of the complete system. If additional space is required for operating or servicing the device, this must be taken into account during installation.

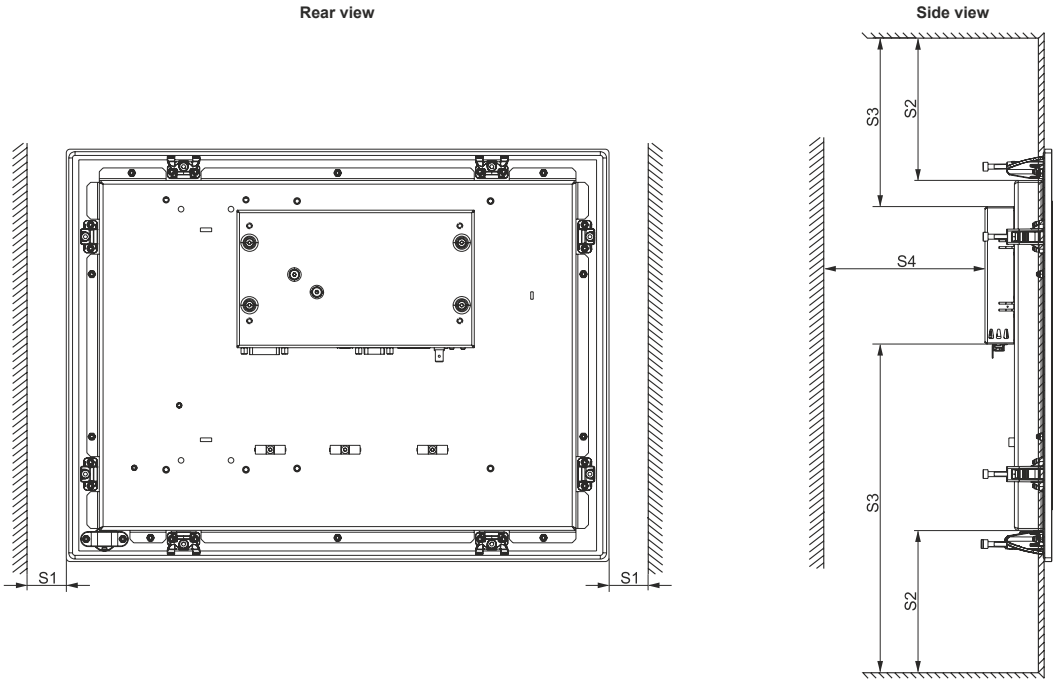


Figure 5: Automation Panel 1000 - Spacing for air circulation

S1: ≥10 mm

S2: ≥ 50 mm

S3: ≥80 mm

S4: ≥ 50 mm

Information:

A minimum distance of 30 mm at all points is required to perform the installation with retaining clips.

Caution!

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

If the specified spacing for air circulation cannot be maintained, the maximum specified temperatures of the temperature sensors (see "Temperature sensor positions" on page 36) must be monitored by the user and appropriate measures taken if these values are exceeded.

4.1.3.4 Mounting orientations

The following diagram shows the approved mounting orientations for Automation Panel 1000 devices. An AP1000 is only permitted to be installed as shown or described below.

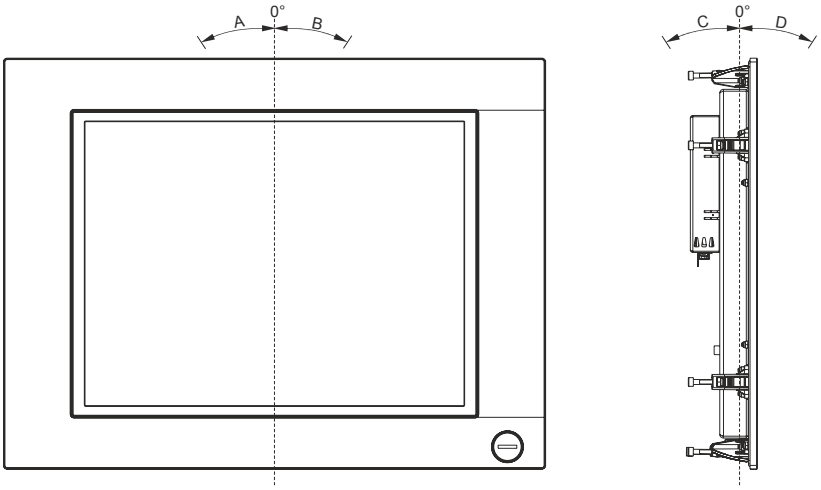


Figure 6: Automation Panel 1000 - Mounting orientation

This applies to the following tables:

- If "✓" is marked for the panel, it can be used at the maximum ambient temperature (see "Maximum ambient temperature during operation" on page 33) of the complete system without problems.
- If the panel has a temperature specification for a certain mounting orientation, e.g. "55", the ambient temperature is not permitted to exceed this value.

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

All temperature specifications in degrees Celsius (°C) at 500 meters above sea level.	Mounting orientation						
	0°	A[1]	B[2]	C[3]	D[3]	C	D[4]
	0°	-1° to -90°	+1° to +90°	±180°		-1° to -45°	+1° to +90°
5AP1120.0573-000	✓	✓	✓	✓	✓	✓	✓
5AP1151.0573-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.0702-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.0702-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.101E-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.101E-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.1043-000	✓	✓	✓	✓	✓	✓	✓
5AP1180.1043-000	✓	✓	✓	✓	✓	✓	✓
5AP1181.1043-000	✓	✓	✓	✓	✓	✓	✓
5AP1182.1043-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.1214-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.121E-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.121E-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.1505-000	✓	✓	✓	✓	✓	✓	✓
5AP1180.1505-000	✓	✓	✓	✓	✓	✓	✓
5AP1181.1505-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.156B-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.156C-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.185C-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.1906-000	✓	✓	✓	✓	✓	✓	✓

1) Counterclockwise
2) Clockwise
3) Interfaces on top
4) Display facing down

Mounting orientations for the Automation Panel 1000 with SDL3 receiver

All temperature specifications in degrees Celsius (°C) at 500 meters above sea level.	Mounting orientation						
	0°	A[1]	B[2]	C[3]	D[3]	C	D[4]
	0°	-1° to -90°	+1° to +90°	±180°		-1° to -45°	+1° to +90°
5AP1120.0573-000	✓	55	55	55	55	55	55
5AP1151.0573-000	✓	55	55	55	55	55	55
5AP1120.0702-000	✓	✓	✓	✓	✓	✓	55
5AP1130.0702-000	✓	✓	✓	✓	✓	✓	55
5AP1120.101E-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.101E-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.1043-000	✓	✓	✓	✓	✓	✓	55
5AP1180.1043-000	✓	✓	✓	✓	✓	✓	55
5AP1181.1043-000	✓	✓	✓	✓	✓	✓	55
5AP1182.1043-000	✓	✓	✓	✓	✓	✓	55
5AP1120.1214-000	✓	✓	✓	✓	✓	✓	55
5AP1120.121E-000	✓	55	✓	✓	✓	✓	55
5AP1130.121E-000	✓	55	✓	✓	✓	✓	55
5AP1120.1505-000	✓	✓	✓	✓	✓	✓	55
5AP1180.1505-000	✓	✓	✓	✓	✓	✓	55
5AP1181.1505-000	✓	✓	✓	✓	✓	✓	55
5AP1120.156B-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.156C-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.185C-000	✓	50	✓	✓	✓	✓	50
5AP1120.1906-000	✓	55	✓	✓	✓	55	55

1) Counterclockwise
2) Clockwise
3) Interfaces on top
4) Display facing down

Mounting orientations for the Automation Panel 1000 with SDL4 receiver

All temperature specifications in degrees Celsius (°C) at 500 meters above sea level.	Mounting orientation						
	0°	A[1]	B[2]	C[3]	D[3]	C	D[4]
	0°	-1° to -90°	+1° to +90°	±180°		-1° to -45°	+1° to +90°
5AP1120.0573-000	✓	55	55	55	55	55	55
5AP1151.0573-000	✓	55	55	55	55	55	55
5AP1120.0702-000	✓	✓	✓	✓	✓	✓	55
5AP1130.0702-000	✓	✓	✓	✓	✓	✓	55
5AP1120.101E-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.101E-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.1043-000	✓	✓	✓	✓	✓	✓	55
5AP1180.1043-000	✓	✓	✓	✓	✓	✓	55
5AP1181.1043-000	✓	✓	✓	✓	✓	✓	55
5AP1182.1043-000	✓	✓	✓	✓	✓	✓	55
5AP1120.1214-000	✓	✓	✓	✓	✓	✓	55
5AP1120.121E-000	✓	55	✓	✓	✓	✓	55
5AP1130.121E-000	✓	55	✓	✓	✓	✓	55
5AP1120.1505-000	✓	✓	✓	✓	✓	✓	55
5AP1180.1505-000	✓	✓	✓	✓	✓	✓	55
5AP1181.1505-000	✓	✓	✓	✓	✓	✓	55
5AP1120.156B-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.156C-000	✓	50	50	✓	✓	50	50
5AP1130.185C-000	✓	50	✓	✓	✓	✓	50
5AP1120.1906-000	✓	55	✓	✓	✓	55	55

1) Counterclockwise
2) Clockwise
3) Interfaces on top
4) Display facing down

4.1.3.5 Weight

Panels

Type	Model number	Weight [g]
5.7" single-touch	5AP1120.0573-000	1100
5.7" keys	5AP1151.0573-000	1400
7.0" single-touch	5AP1120.0702-000	900
7.0" multi-touch	5AP1130.0702-000	1200
10.1" single-touch	5AP1120.101E-000	1900
10.1" multi-touch	5AP1130.101E-000	2000
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
12.1" multi-touch	5AP1130.121E-000	2400
15.0" single-touch	5AP1120.1505-000	5000
15.0" single-touch with keys	5AP1180.1505-000	4900
15.0" single-touch with keys	5AP1181.1505-000	6000
15.6" single-touch	5AP1120.156B-000	4200
15.6" multi-touch	5AP1130.156C-000	3700
18.5" multi-touch	5AP1130.185C-000	4600
19.0" single-touch	5AP1120.1906-000	7300

Link modules

Type	Model number	Weight [g]
SDL/DVI receiver	5DLSDL.1001-00	538
SDL3 receiver	5DLSD3.1001-00	527
SDL4 receiver	5DLSD4.1001-00	525

4.1.4 Environmental properties

4.1.4.1 Temperature specifications

Because it is possible to combine different panels and link modules, the following table provides a component-dependent overview of the maximum ambient temperatures resulting from these combinations.

Information:

The maximum specified ambient temperatures for operation were determined under worst-case conditions. Experience has shown that higher ambient temperatures can be achieved with typical applications in Microsoft Windows, for example. The relevant test and assessment must be carried out individually by the user on site (reading out the temperatures in BIOS or using the B&R Control Center, for example).

Information about worst-case conditions

- BurnInTest tool (BurnIn V4.0 Pro from PassMark Software) for simulating 100% interface utilization using loopback adapters (serial interface, USB interfaces)
- Maximum expansion and power consumption of the system

4.1.4.1.1 Maximum ambient temperature during operation

All temperature specifications in degrees Celsius (°C) at 500 m above sea level, **non-condensing**	**Link module**		
The maximum ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.	**5DLSDL.1001-00** SDL/DVI	**5DLSD3.1001-00** SDL3[1)]	**5DLSD4.1001-00** SDL4
Maximum ambient temperature	60	60	60
5AP1120.0573-000	✓	✓	✓
5AP1151.0573-000	✓	✓	✓
5AP1120.0702-000	✓	✓	✓
5AP1130.0702-000	✓	✓	✓
5AP1120.101E-000	55	55	55
5AP1130.101E-000	55	55	55
5AP1120.1043-000	✓	✓	✓
5AP1180.1043-000	✓	✓	✓
5AP1181.1043-000	✓	✓	✓
5AP1182.1043-000	✓	✓	✓
5AP1120.1214-000	✓	✓	✓
5AP1120.121E-000	✓	✓	✓
5AP1130.121E-000	✓	✓	✓
5AP1120.1505-000	✓	✓	✓
5AP1180.1505-000	✓	✓	✓
5AP1181.1505-000	✓	✓	✓
5AP1120.156B-000	✓	55	55
5AP1130.156C-000	55	50	55
5AP1130.185C-000	55	55	55
5AP1120.1906-000	✓	✓	✓

1) The maximum ambient temperature for SDL3 link module 5DLSD3.1001-00 < Rev. A5 with the corresponding panel is reduced by 5°C.

4.1.4.1.2 Maximum ambient temperature operation

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

All temperature specifications in degrees Celsius (°C) at 500 m above sea level, **non-condensing**	**Link module**		
The maximum ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.	**5DLSDL.1001-00** SDL/DVI	**5DLSD3.1001-00** SDL3	**5DLSD4.1001-00** SDL4
Minimum ambient temperature	0	0	0
5AP1120.0573-000	✓	✓	✓
5AP1151.0573-000	✓	✓	✓
5AP1120.0702-000	✓	✓	✓
5AP1130.0702-000	✓	✓	✓
5AP1120.101E-000	✓	✓	✓
5AP1130.101E-000	✓	✓	✓
5AP1120.1043-000	✓	✓	✓
5AP1180.1043-000	✓	✓	✓
5AP1181.1043-000	✓	✓	✓
5AP1182.1043-000	✓	✓	✓
5AP1120.1214-000	✓	✓	✓
5AP1120.121E-000	✓	✓	✓
5AP1130.121E-000	✓	✓	✓
5AP1120.1505-000	✓	✓	✓
5AP1180.1505-000	✓	✓	✓
5AP1181.1505-000	✓	✓	✓
5AP1120.156B-000	✓	✓	✓
5AP1130.156C-000	✓	✓	✓
5AP1130.185C-000	✓	✓	✓
5AP1120.1906-000	✓	✓	✓

4.1.4.1.3 Determining the ambient temperature

1. Select the link module.
2. The rows specify the maximum ambient temperature of the complete system in conjunction with the respective link module.
3. The panel determines if there are temperature limits.
    - If the installed component has a "✓" (check mark), it can be operated without any problems at the maximum ambient temperature of the complete system.
    - If the installed component has a temperature specification (e.g. "45[°C]"), the ambient temperature of the complete system is not permitted to exceed this value.
4. Possible limitations may arise due to the mounting orientation of the device. For more information, see section "Mounting orientations" on page 30.

4.1.4.1.4 Ambient temperature for storage and transport

The individual components can be transported and stored within the following temperature ranges.

Panels

Type	Model number	Storage [°C]	Transport [°C]
5.7" single-touch	5AP1120.0573-000	-25 to 80	-25 to 80
5.7" keys	5AP1151.0573-000	-25 to 70	-25 to 70
7.0" single-touch	5AP1120.0702-000	-25 to 80	-25 to 80
7.0" multi-touch	5AP1130.0702-000	-25 to 70	-25 to 70
10.1" single-touch	5AP1120.101E-000	-25 to 70	-25 to 70
10.1" multi-touch	5AP1130.101E-000	-25 to 70	-25 to 70
10.4" single-touch	5AP1120.1043-000	-25 to 80	-25 to 80
10.4" single-touch with keys	5AP1180.1043-000	-25 to 70	-25 to 70
10.4" single-touch with keys	5AP1181.1043-000	-25 to 70	-25 to 70
10.4" single-touch with keys	5AP1182.1043-000	-25 to 70	-25 to 70
12.1" single-touch	5AP1120.1214-000	-25 to 80	-25 to 80
12.1" single-touch	5AP1120.121E-000	-25 to 80	-25 to 80
12.1" multi-touch	5AP1130.121E-000	-25 to 70	-25 to 70
15.0" single-touch	5AP1120.1505-000	-25 to 80	-25 to 80
15.0" single-touch with keys	5AP1180.1505-000	-25 to 70	-25 to 70
15.0" single-touch with keys	5AP1181.1505-000	-25 to 70	-25 to 70
15.6" single-touch	5AP1120.156B-000	-25 to 70	-25 to 70
15.6" multi-touch	5AP1130.156C-000	-20 to 70	-20 to 70
18.5" multi-touch	5AP1130.185C-000	-25 to 70	-25 to 70
19.0" single-touch	5AP1120.1906-000	-25 to 70	-25 to 70

Link modules

Type	Model number	Storage [°C]	Transport [°C]
SDL/DVI receiver	5DLSDL.1001-00	-20 to 60	-20 to 60
SDL3 receiver	5DLSD3.1001-00	-20 to 60	-20 to 60
SDL4 receiver	5DLSD4.1001-00	-20 to 60	-20 to 60

4.1.4.1.5 Temperature monitoring

A sensor in the display monitors the temperature of the AP1000 panel. For the position of the temperature sensor, see Tab. 0 "Title" on page 36. The specified values in Tab. 0 "Title" on page 36 represent the defined maximum temperature for this measurement point. If the temperature is exceeded, no alarm is triggered.

Temperatures[1)] can be read out in different ways in approved operating systems:

- BIOS
- B&R Control Center[2)]
- B&R ADI Development Kit[2)]
- B&R ADI .NET SDK[2)]
- B&R HMI Service Center[2)]
- B&R HMI Diagnose[2)]
- B&R PVI ADI line[2)]
- B&R ADI SNMP Agent[2)]
- Automation Runtime library[2)]

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

4.1.4.1.6 Temperature sensor positions

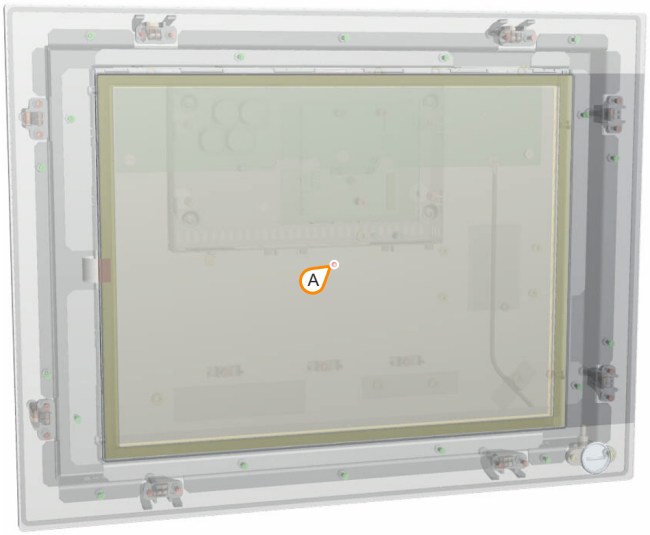


Figure 7: Automation Panel 1000 - Temperature sensor position

ADI sensors	Position	Measuring point for	Measurement	Max. specified	
Panel	A	Display	Temperature of the display (sensor integrated in the panel).	5AP1120.0573-000: 80°C 5AP1151.0573-000: 80°C 5AP1120.0702-000: 85°C 5AP1130.0702-000: 85°C 5AP1120.101E-000: 80°C 5AP1130.101E-000: 80°C 5AP1120.1043-000: 90°C 5AP1180.1043-000: 90°C 5AP1181.1043-000: 90°C 5AP1182.1043-000: 90°C	5AP1120.1214-000: 80°C 5AP1120.121E-000: 80°C 5AP1130.121E-000: 80°C 5AP1120.1505-000: 90°C 5AP1180.1505-000: 90°C 5AP1181.1505-000: 90°C 5AP1120.156B-000: 80°C 5AP1130.156C-000: 80°C 5AP1130.185C-000: 80°C 5AP1120.1906-000: 80°C

1) The measured temperature is a guide value for the immediate ambient temperature, but it may have been influenced by neighboring components.
2) Drivers for approved operating systems can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

4.1.4.2 Relative humidity

The following tables show the minimum and maximum relative humidity (at 30°C, non-condensing) of the individual components that are relevant for limiting the humidity of the complete system. The smallest or largest value must always be used for this determination. For more detailed information, see technical data or temperature/humidity diagrams of the individual components.

Panels

Type	Model number	Operation [%]	Storage [%]	Transport [%]
5.7" single-touch	5AP1120.0573-000 ≤ Rev. D0	5 to 90	5 to 90	5 to 90
5.7" single-touch	5AP1120.0573-000 ≥ Rev. E0	20 to 90	10 to 90	10 to 90
5.7" keys	5AP1151.0573-000 ≤ Rev. D0	5 to 90	5 to 90	5 to 90
5.7" keys	5AP1151.0573-000 ≥ Rev. E0	20 to 90	10 to 90	10 to 90
7.0" single-touch	5AP1120.0702-000	20 to 90	10 to 90	10 to 90
7.0" multi-touch	5AP1130.0702-000	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
10.1" multi-touch	5AP1130.101E-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
12.1" multi-touch	5AP1130.121E-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
15.0" single-touch with keys	5AP1181.1505-000	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
15.6" multi-touch	5AP1130.156C-000	5 to 90	5 to 90	5 to 90
18.5" multi-touch	5AP1130.185C-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

Link modules

Type	Model number	Operation [%]	Storage [%]	Transport [%]
SDL/DVI receiver	5DLSDL.1001-00	5 to 90	5 to 95	5 to 95
SDL3 receiver	5DLSD3.1001-00	5 to 90	5 to 95	5 to 95
SDL4 receiver	5DLSD4.1001-00	5 to 90	5 to 95	5 to 95

4.1.4.3 Vibration and shock

The following table provides an overview of the maximum vibration values of the complete system. Limitations are possible due to individual components.

Vibration				
	Operation[1)]		Storage[1)3)]	Transport[1)3)]
	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
Shock				
	Operation[2)]		Storage[2)3)]	Transport[2)3)]
Automation Panel 1000	15 g, 11 ms		30 g, 6 ms	30 g, 6 ms

1) Testing is performed per EN 60068-2-6.
2) Testing is performed per EN 60068-2-27.
3) The specification refers to a device in its original packaging.

4.1.4.4 Degree of protection

Under the following conditions, the Automation Panel 1000 offers IP65 protection on the front and IP20 protection on the back per EN 60529:

- Correct installation of the Automation Panel 1000 (see "Installation and wiring" on page 115)
- Installation of all covers or components on interfaces and slots
- All ambient conditions are observed.

The Automation Panel 1000 also has "Type 4X indoor use only" under the same conditions per UL 50.

4.1.5 Device interfaces

4.1.5.1 SDL/DVI receiver (5DLSDL.1001-00)

4.1.5.1.1 Overview

Information:

For information about SDL/DVI operation, see section "SDL operation" on page 17 or "DVI operation" on page 19.

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

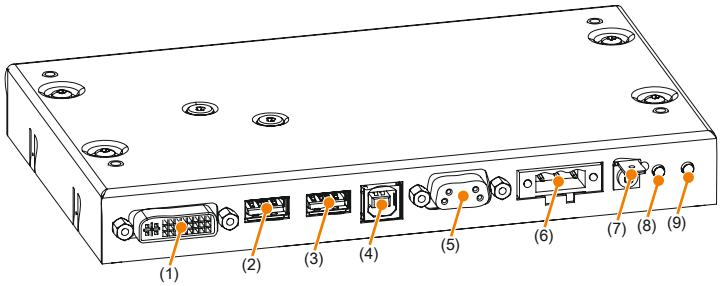


Figure 8: Overview of interfaces - SDL/DVI receiver link module

No.	Interface name	Chapter	No.	Interface name	Chapter
1	Panel In SDL/DVI	"Panel In interface"	6	Power 24 VDC	"+24 VDC power supply"
2	USB1	"USB interfaces"	7	Grounding	"Grounding"
3	USB2	"USB interfaces"	8	Brightness (DVI) +	"Brightness controls"
4	USB In	"USB In interface"	9	Brightness (DVI) -	"Brightness controls"
5	COM	"Serial interface"			

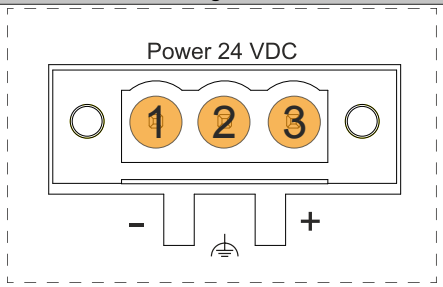
4.1.5.1.2 +24 VDC power supply

Danger!

The device is only permitted to be supplied with a SELV/PELV power supply or with safety extra-low voltage (SELV) per EN 60950.

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

The device is protected against overload and reverse polarity by a soldered fuse (15 A, fast-acting). If the fuse is defective (e.g. due to overload), the device must be sent to B&R for repairs. If the polarity is reversed, it is not necessary to replace the fuse.

Pin	Description	Figure
1	-	
2	Functional ground	
3	+	

- Reverse polarity protection
- 3-pin
- Male

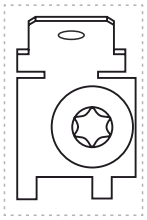
Electrical properties	
Nominal voltage	24 VDC ±25%, SELV[1)]
Nominal current	Max. 3 A
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes
Uninterruptible power supply	No

1) EN 60950 requirements must be observed.

4.1.5.1.3 Grounding

Caution!

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

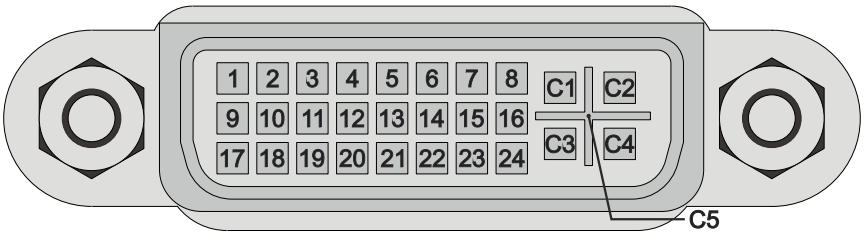


For example, a copper strip must be attached to the ground connection at a central grounding point of the control cabinet or system in which the device is installed. The wire cross section should be as large as possible (at least 2.5 mm²).

4.1.5.1.4 Panel In interface

The interface is designed as a DVI-I connector (female) and can be operated with DVI-D or SDL transmission technology. For more information, see sections "SDL operation" on page 17 and "DVI operation" on page 19.

Video signals SDL and DVI are available for the following link modules: 5DLSDL.1001-00. For details, see the technical data for the link module or panel used.



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

1) Protected internally by a multifuse.

Information:

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

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

Information:

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

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

4.1.5.1.4.1 USB transfer in SDL and DVI operation

Information:

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

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

4.1.5.1.4.2 Cable lengths and resolutions for SDL transfer

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

SDL cable	Resolution						
Segment length [m]	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	HD 1366 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200	FHD 1920 x 1080
0.8	5CASDL.0008-00	5CASDL.0008-00	5CASDL.0008-00	5CASDL.0008-00	5CASDL.0008-00	5CASDL.0008-00	5CASDL.0008-00
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
6	5CASDL.0060-00	5CASDL.0060-00	5CASDL.0060-00	5CASDL.0060-00	5CASDL.0060-00	5CASDL.0060-00	5CASDL.0060-00
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	- - -	- - 5CASDL.0150-03
20	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	- -	- 5CASDL.0200-03
25	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	- -	- -	- -
30	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-00 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

4.1.5.1.4.3 Cable lengths and resolutions for DVI transfer

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

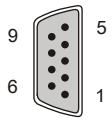
DVI cable	Resolution						
Segment length [m]	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	HD 1366 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200	FHD 1920 x 1080
1.8	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00
5	5CADVI.0050-00	5CADVI.0050-00	5CADVI.0050-00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

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

4.1.5.1.5 Serial interface

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

COM interface	
	RS232
Type	Modem supported, not galvanically isolated, DSUB, 9-pin, female
UART	16550-compatible, 16-byte FIFO buffer
Transfer rate	Max. 115 kbit/s
Bus length	Max. 15 m
Pin	**Pinout**
1	n.c.
2	RXD
3	TXD
4	n.c.
5	GND
6	n.c.
7	RTS
8	CTS
9	n.c.



4.1.5.1.6 USB interfaces

The link module is equipped with a USB 2.0 (Universal Serial Bus) host controller with several USB ports, of which 2 USB interfaces are routed externally and freely available to the user.

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is guaranteed.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

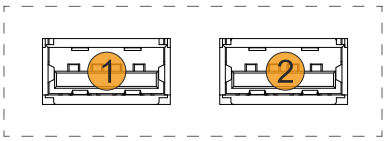
USB1, USB2

Depending on the type of transfer (SDL or DVI operation), there are limitations regarding the transfer rate for interfaces USB1 and USB2. For possible transfer methods, see section "Connection options" on page 17.

Transfer method	USB type	Max. cable length
SDL operation without USB cable	USB 1.1	40 m[1)]
SDL operation with USB cable	USB 2.0	5 m
Single-touch DVI operation	USB 2.0	5 m
Multi-touch DVI operation	USB 2.0	5 m

1) The max. cable length of 40 m depends on the resolution. For more detailed information, see table Cable lengths and resolutions for SDL transfer.

USB1 - 2	
Standard	USB 2.0
Variant	Type A, female
Transfer rate	Low speed (1.5 Mbit/s) Full speed (12 Mbit/s) High speed (480 Mbit/s)
Current-carrying capacity[1)] USB1 (1) USB2 (2)	Total max. 1 A
Cable length USB 2.0	Max. 5 m (without hub)



1) The USB interfaces are protected by a shared maintenance-free "USB current-limiting switch" (total max. 1 A).

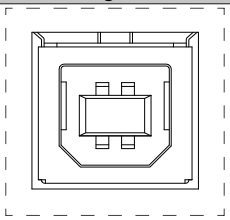
Front USB

Automation Panel 1000 devices with 10.4", 12.1" (4:3 format only), 15" (4:3 format only) and 19" diagonals are equipped with a front USB 2.0 interface. For more information, see section "USB interface" on page 57.

4.1.5.1.7 USB In interface

The USB In interface is a USB 2.0 type B interface that is used to transfer USB data. It must be connected to a USB interface on the output device (e.g. B&R industrial PC) if DVI operation or SDL operation with a USB type A/B cable was chosen as the transfer method. For possible transfer methods, see section "Connection options" on page 17.

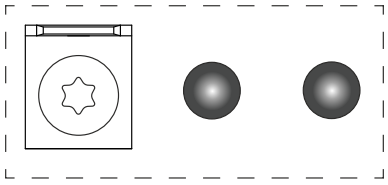
If the interface is connected to an output device (e.g. B&R industrial PC), then USB 2.0 transfer rates are possible on the USB1 and USB2 interfaces.

Description		Figure
Standard	USB 2.0	
Variant	Type B, female	
Transfer rate	Low speed (1.5 Mbit/s) Full speed (12 Mbit/s) High speed (480 Mbit/s)	
Current-carrying capacity[1)]	Max. 500 mA	
Cable length	Max. 5 m (without hub)	
-		

1) The USB interfaces are protected by a maintenance-free "USB current-limiting switch" (max. 500 mA).

4.1.5.1.8 Brightness controls

The brightness controls can be used to set the brightness of the backlight on the Automation Panel in DVI operation. Buttons have no function during SDL operation; the brightness can be set via the B&R Control Center, for example.



4.1.5.2 SDL3 receiver (5DLSD3.1001-00)

4.1.5.2.1 Overview

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

The receiver interfaces are located on the back of the device.

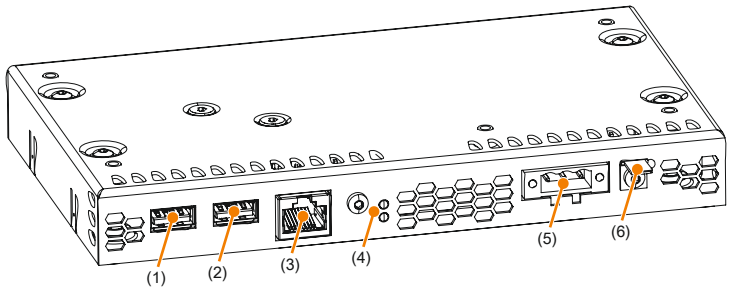


Figure 9: Overview of interfaces - SDL3 receiver link module

No.	Interface name	Chapter	No.	Interface name	Chapter
1	USB1	USB interfaces	4	SDL3 In LEDs	SDL3 In interfaces
2	USB2	USB interfaces	5	Power 24 VDC	+24 VDC power supply
3	SDL3 In	SDL3 In interfaces	6	Grounding	Grounding

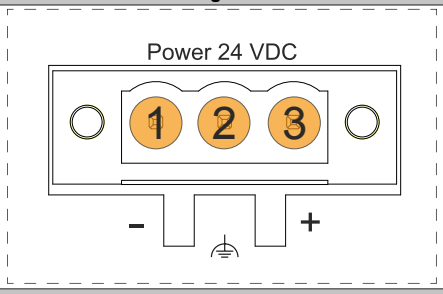
4.1.5.2.2 +24 VDC power supply

Danger!

The device is only permitted to be supplied with a SELV/PELV power supply or with safety extra-low voltage (SELV) per EN 60950.

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

The device is protected against overload and reverse polarity by a soldered fuse (15 A, fast-acting). If the fuse is defective (e.g. due to overload), the device must be sent to B&R for repairs. If the polarity is reversed, it is not necessary to replace the fuse.

Pin	Description	Figure
1	-	
2	Functional ground	
3	+	

- Reverse polarity protection
- 3-pin
- Male

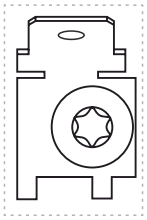
Electrical properties	
Nominal voltage	24 VDC ±25%, SELV[1)]
Nominal current	Max. 3 A
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes
Uninterruptible power supply	No

1) EN 60950 requirements must be observed.

4.1.5.2.3 Grounding

Caution!

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



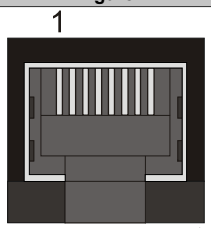
For example, a copper strip must be attached to the ground connection at a central grounding point of the control cabinet or system in which the device is installed. The wire cross section should be as large as possible (at least 2.5 mm²).

4.1.5.2.4 SDL3 In interfaces

Information:

For more information, see section "SDL3 operation" on page 21.

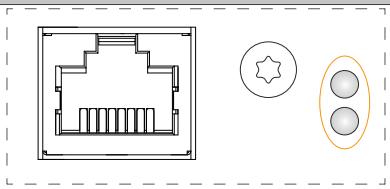
The SDL3 In interface is a female RJ45 connector and operated with SDL3 transmission technology.

Description		Figure
The following shows an overview of the video signals possible on the panel input. For details, see the technical data for the link module or panel used.		
Variant	RJ45 connector, female	
Link module	**Video signals**	
5DLSD3.1001-00	SDL3	
-		

Information:

Cable lengths and resolutions for SDL3 transfer:

The maximum cable length for SDL3 transfers is 100 m with a B&R SDL3/SDL4 cable (regardless of the panel resolution).

SDL3 In LEDs				
LED	**Color**	**Status**	**Explanation**	
Link	Yellow	On	Indicates an active SDL3 connection.	
		Off	No active SDL3 connection.	
Status	Yellow	On	The SDL3 connection is established and OK.	
		Off	No active SDL3 connection.	
		Blinking	Indicates the SDL3 connection is OK, but a firmware image is corrupt	

Information:

Hot plugging display devices on the SDL3 In interface for service purposes is supported by the hardware and graphics drivers of approved operating systems. The female RJ45 connector is specified for 500 mating 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.

4.1.5.2.5 USB interfaces

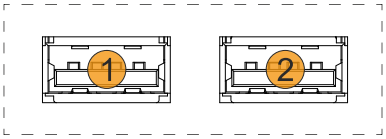
The link module is equipped with a USB 2.0 (Universal Serial Bus) host controller with several USB ports, of which 2 USB interfaces are routed externally and freely available to the user.

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is guaranteed.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

USB1 - 2		
Standard	USB 2.0	
Variant	Type A, female	
Transfer rate	Low speed (1.5 Mbit/s) Full speed (12 Mbit/s) High speed (30 Mbit/s)	
Current-carrying capacity[1)] USB1 (1) USB2 (2)	Total max. 1 A	
Cable length USB 2.0	Max. 5 m (without hub)	

1) The USB interfaces are protected by a shared maintenance-free "USB current-limiting switch" (total max. 1 A).

Front USB

Automation Panel 1000 devices with 10.4", 12.1" (4:3 format only), 15" (4:3 format only) and 19" diagonals are equipped with a front USB 2.0 interface. For information about this, see section "USB interfaces" on the respective link module in chapter "Device interfaces" on page 39.

4.1.5.3 SDL4 receiver (5DLSD4.1001-00)

4.1.5.3.1 Overview

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

The receiver interfaces are located on the back of the device.

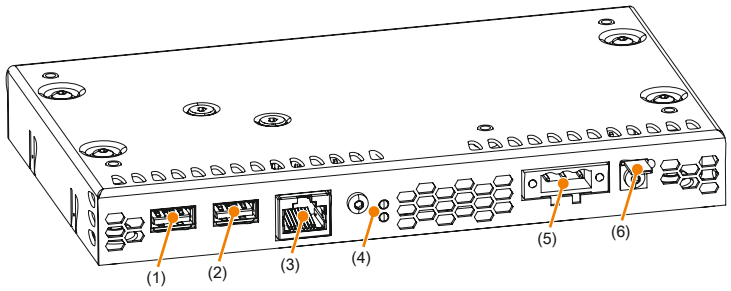


Figure 10: Overview of interfaces - SDL3 receiver link module

No.	Interface name	Chapter	No.	Interface name	Chapter
1	USB1	USB interfaces	4	SDL4 In LEDs	SDL4 In interface
2	USB2	USB interfaces	5	Power 24 VDC	+24 VDC power supply
3	SDL4 In	SDL4 In interface	6	Grounding	Grounding

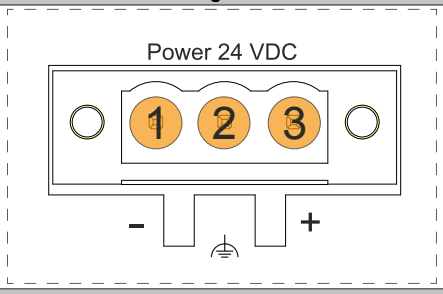
4.1.5.3.2 +24 VDC power supply

Danger!

The device is only permitted to be supplied with a SELV/PELV power supply or with safety extra-low voltage (SELV) per EN 60950.

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

The device is protected against overload and reverse polarity by a soldered fuse (15 A, fast-acting). If the fuse is defective (e.g. due to overload), the device must be sent to B&R for repairs. If the polarity is reversed, it is not necessary to replace the fuse.

Pin	Description	Figure
1	-	
2	Functional ground	
3	+	

- Reverse polarity protection
- 3-pin
- Male

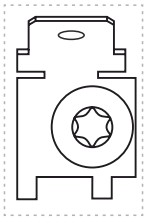
Electrical properties	
Nominal voltage	24 VDC ±25%, SELV[1)]
Nominal current	Max. 3 A
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes
Uninterruptible power supply	No

1) EN 60950 requirements must be observed.

4.1.5.3.3 Grounding

Caution!

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



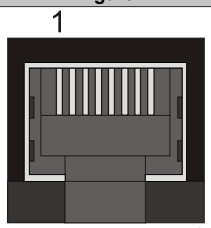
For example, a copper strip must be attached to the ground connection at a central grounding point of the control cabinet or system in which the device is installed. The wire cross section should be as large as possible (at least 2.5 mm²).

4.1.5.3.4 SDL4 In interface

Information:

For more information, see section "SDL4 operation" on page 22.

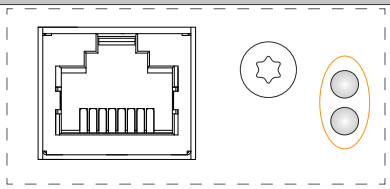
The SDL4 In interface is a female RJ45 connector and operated with SDL4 transmission technology.

Description		Figure
The following shows an overview of the video signals possible on the panel input. For details, see the technical data for the link module or panel used.		
Variant	RJ45 connector, female	
Link module	**Video signals**	
5DLSD4.1001-00	SDL4	
-		

Information:

Cable lengths and resolutions for SDL4 transfer:

The maximum cable length for SDL4 transfer with a B&R SDL3/SDL4 cable is 100 meters (regardless of the resolution of the panel).

SDL4 In LEDs				
LED	**Color**	**Status**	**Explanation**	
Link	Yellow	On	Indicates an active SDL4 connection.	
		Off	No active SDL4 connection.	
Status	Yellow	On	The SDL4 connection is established and OK.	
		Off	No active SDL4 connection.	
		Blinking	Indicates the SDL4 connection is OK, but a firmware image is corrupt	

Information:

Hot plugging display devices on the SDL4 In interface for service purposes is supported by the hardware and graphic drivers of approved operating systems. The female RJ45 connector is specified for 500 mating cycles.

Information:

If a display device with touch screen is connected to the SDL4 In interface and then disconnected again during operation (hot plugging), it may be necessary to recalibrate the touch screen.

4.1.5.3.5 USB interfaces

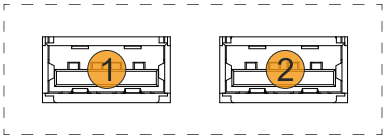
The link module is equipped with a USB 2.0 (Universal Serial Bus) host controller with several USB ports, of which 2 USB interfaces are routed externally and freely available to the user.

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is guaranteed.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

USB1 - 2		
Standard	USB 2.0	
Variant	Type A, female	
Transfer rate	Low speed (1.5 Mbit/s) Full speed (12 Mbit/s) High speed (150 Mbit/s)	
Current-carrying capacity[1)] USB1 (1) USB2 (2)	Total max. 1 A	
Cable length USB 2.0	Max. 5 m (without hub)	

1) The USB interfaces are protected by a shared maintenance-free "USB current-limiting switch" (total max. 1 A).

Front USB

Automation Panel 1000 devices with 10.4", 12.1" (4:3 format only), 15" (4:3 format only) and 19" diagonals are equipped with a front USB 2.0 interface. For information about this, see section "USB interfaces" on the respective link module in chapter "Device interfaces" on page 39.

4.1.6 Features of AP1000 panels

Different display diagonals as well as panels with touch screen and keys are available. The following table provides an overview of the panels and their features. For examples of different equipment variants, see the figure below.

Display type	Model number	Resolution	Touch screen	Function keys	System keys	Front USB 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
7.0" multi-touch	5AP1130.0702-000	WVGA	Multi-touch	No	No	No
10.1" single-touch	5AP1120.101E-000	WXGA	Single-touch	No	No	No
10.1" multi-touch	5AP1130.101E-000	WXGA	Multi-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
12.1" multi-touch	5AP1130.121E-000	WXGA	Multi-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
15.0" single-touch with keys	5AP1181.1505-000	XGA	Single-touch	Yes	Yes	Yes
15.6" single-touch	5AP1120.156B-000	HD	Single-touch	No	No	No
15.6" multi-touch	5AP1130.156C-000	FHD	Multi-touch	No	No	No
18.5" multi-touch	5AP1130.185C-000	FHD	Multi-touch	No	No	No
19.0" single-touch	5AP1120.1906-000	SXGA	Single-touch	No	No	Yes

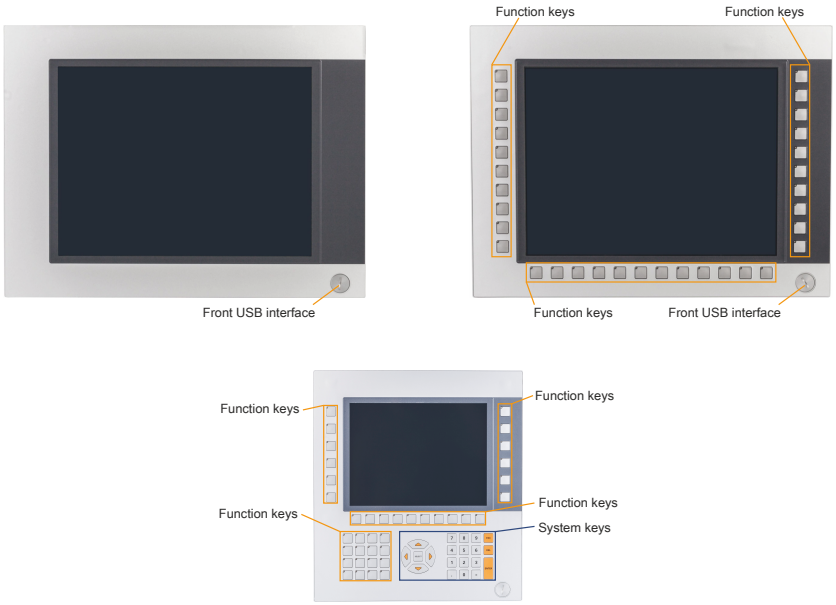


Figure 11: Features of AP1000 panels

4.1.6.1 Slide-in labels

Panels with keys are delivered with inserted, transparent slide-in labels in the function keys. These can be labeled by hand.

It is also possible to download a print template for slide-in labels with individual inscriptions from the B&R website (www.br-automation.com).

The slots provided for slide-in labels are accessible on the rear of the Automation Panel devices.

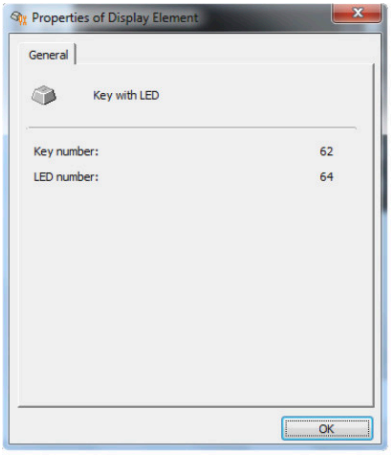
4.1.6.2 Key and LED configuration

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

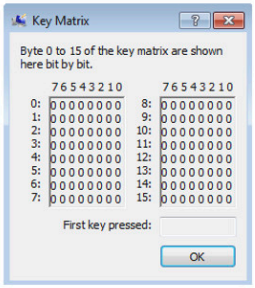
- B&R Key Editor for Windows operating systems
- B&R KCF Editor for Windows operating systems
- Visual Components for Automation Runtime

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

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



B&R Key Editor



B&R Control Center

Keys and LEDs in the matrix

- Hardware numbers of keys are specified in the following with black numbers.
- Hardware numbers of LEDs are specified in the following with blue numbers.
- Presentation examples:

Key	Key with LED	LED
12	115 103	3

5AP1151.0573-000

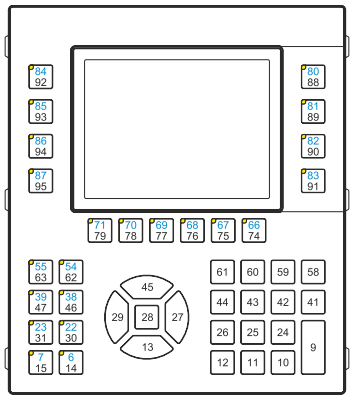


Figure 12: 5AP1151.0573-000 - Key and LED configuration

5AP1180.1043-000

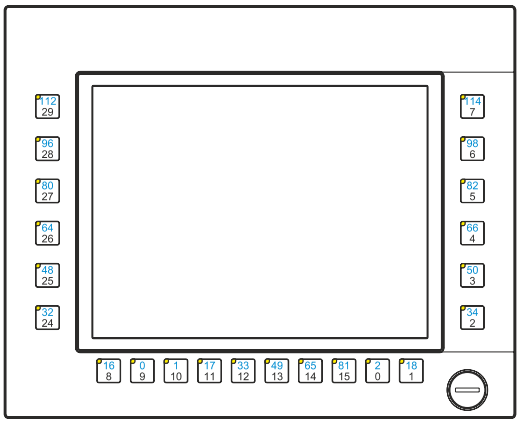


Figure 13: 5AP1180.1043-000 - Key and LED configuration

5AP1181.1043-000

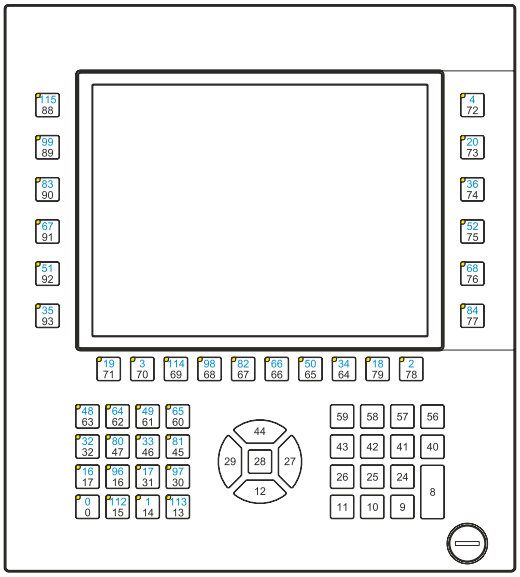


Figure 14: 5AP1181.1043-000 - Key and LED configuration

5AP1182.1043-000

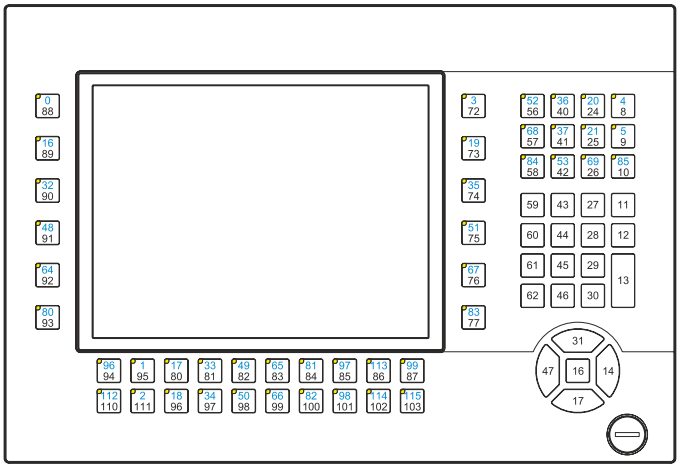


Figure 15: 5AP1182.1043-000 - Key and LED configuration

5AP1180.1505-000

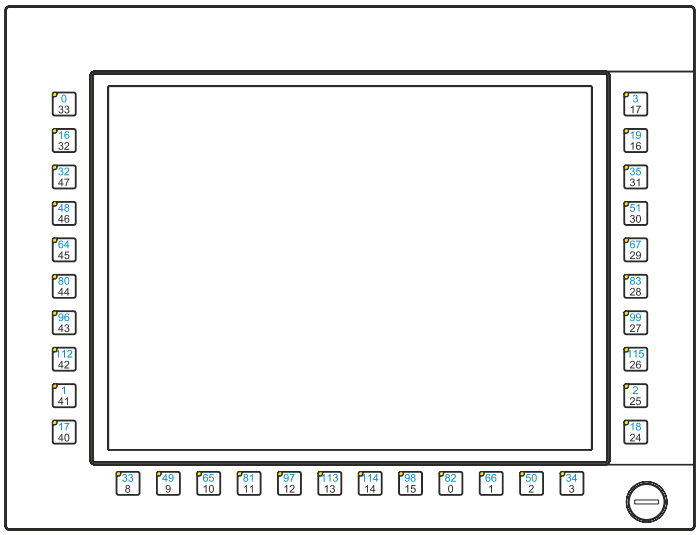


Figure 16: 5AP1180.1505-000 - Key and LED configuration

5AP1181.1505-000

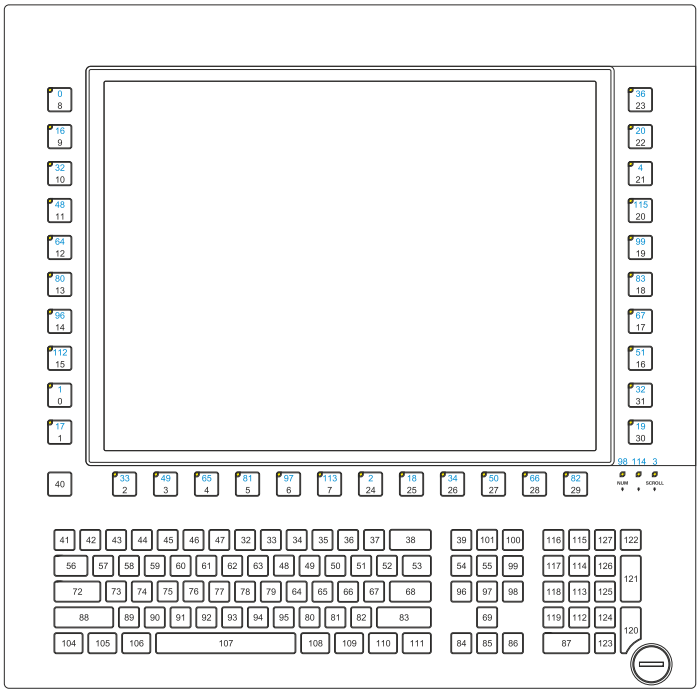


Figure 17: 5AP1181.1505-000 - Key and LED configuration

4.1.6.3 USB interface

AP1000 panels with 10.4", 12.1" (4:3 format only), 15" (4:3 format only) and 19" display diagonals are equipped with a front USB 2.0 interface. This is equipped with a USB interface cover. IP65 protection (front) is only provided if the USB interface cover is correctly installed.

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

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is guaranteed.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

Front USB

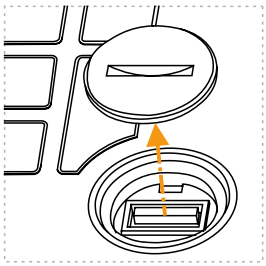
The front USB interface is available to the user for service purposes.

Depending on the type of transfer (SDL or DVI operation), there are limitations regarding the transfer rate for interfaces USB1 and USB2. For possible transfer methods, see section "Connection options" on page 17.

Transfer method	USB type	Max. cable length
SDL operation without USB cable	USB 1.1	40 m[1)]
SDL operation with USB cable	USB 2.0	5 m
Single-touch DVI operation	USB 2.0	5 m
Multi-touch DVI operation	USB 2.0	5 m
SDL3 operation	USB 2.0	100 m
SDL4 operation	USB 2.0	100 m

1) The max. cable length of 40 m depends on the resolution. For more detailed information, see the table in section Cable lengths and resolutions for SDL transfer.

	Front USB[1)]
Standard	USB 2.0
Variant	Type A, female
Transfer rate[2)]	Low speed (1.5 Mbit/s) Full speed (12 Mbit/s) High speed (480 Mbit/s)
Current-carrying capacity[3)]	Max. 500 mA
Cable length	Max. 5 m (without hub)
-	



1) The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.
2) In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1.
In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)
3) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 500 mA).

4.2 Individual components

4.2.1 Panels

4.2.1.1 5AP1120.0573-000

4.2.1.1.1 General information

- Panel for AP1000, PPC2100 or PPC2200
- 5.7" TFT VGA color display
- Single-touch (analog resistive)
- Control cabinet installation

4.2.1.1.2 Order data

Model number	Short description	Figure
	Panels	
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 / PPC2200 / link modules - Compatible with 5PP520.0573-00	

Table 3: 5AP1120.0573-000 - Order data

4.2.1.1.3 Technical data

Information:

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

Model number	5AP1120.0573-000	
Revision	**D0**	**E0**
General information		
B&R ID code	0xE7AA	
Certifications		
CE	Yes	
EAC	Yes	
UL	cULus E115267 Industrial control equipment	
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]	
Display		
Type	TFT color	
Diagonal	5.7"	
Colors	262,144	
Resolution	VGA, 640 x 480 pixels	
Contrast	850:1	800:1
Viewing angles		
Horizontal	Direction R = 80° / Direction L = 80°	
Vertical	Direction U = 80° / Direction D = 80°	Direction U = 70° / Direction D = 70°
Backlight		
Type	LED	
Brightness (dimmable)	Typ. 20 to 400 cd/m²	Typ. 22.5 to 450 cd/m²
Half-brightness time [2)]	50,000 h	
Touch screen [3)]		
Type	AMT	
Technology	Analog, resistive	
Controller	B&R, serial, 12-bit	
Transmittance	81% ±3%	

Table 4: 5AP1120.0573-000, 5AP1120.0573-000 - Technical data

Model number	5AP1120.0573-000	
Revision	D0	E0
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)	
Degree of protection per UL 50	Front: Type 4X indoor use only	
Mechanical properties		
Front [4]		
Frame	Aluminum, naturally anodized	
Panel overlay		
Material	Polyester	
Light background color	RAL 9006	
Dark border color around display	RAL 7024	
Gasket	3 mm fixed gasket	
Dimensions		
Width	212 mm	
Height	156 mm	
Weight	1100 g	

Table 4: 5AP1120.0573-000, 5AP1120.0573-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.1.4 Dimensions

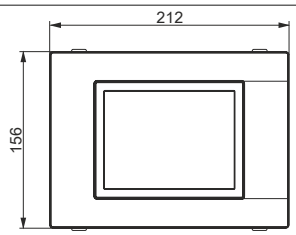


Figure 18: 5AP1120.0573-000 - Dimensions

4.2.1.1.5 Requirements

5.7" AP1000 panels are supported starting with the following firmware versions:

- Firmware V03.11 or later with SDL/DVI receiver 5DLSDL.1001-00
- Firmware V04.08 or later with SDL3 receiver 5DLSD3.1001-00

4.2.1.1.6 Temperature/Humidity diagram

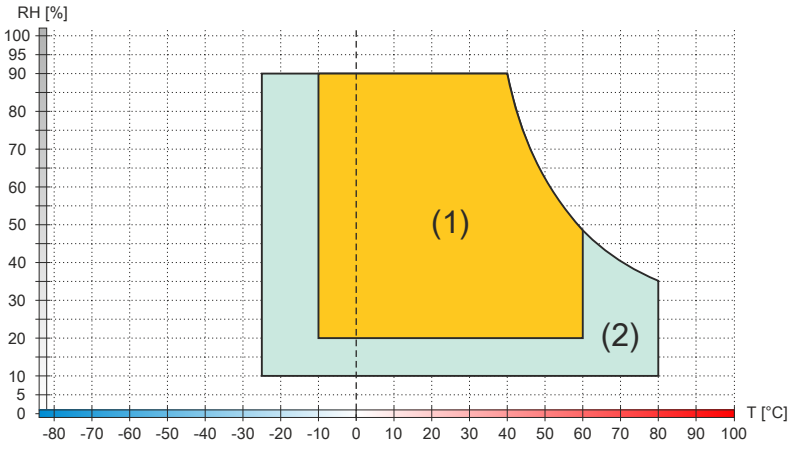


Figure 19: 5AP1120.0573-000 ≥ Rev. E0 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

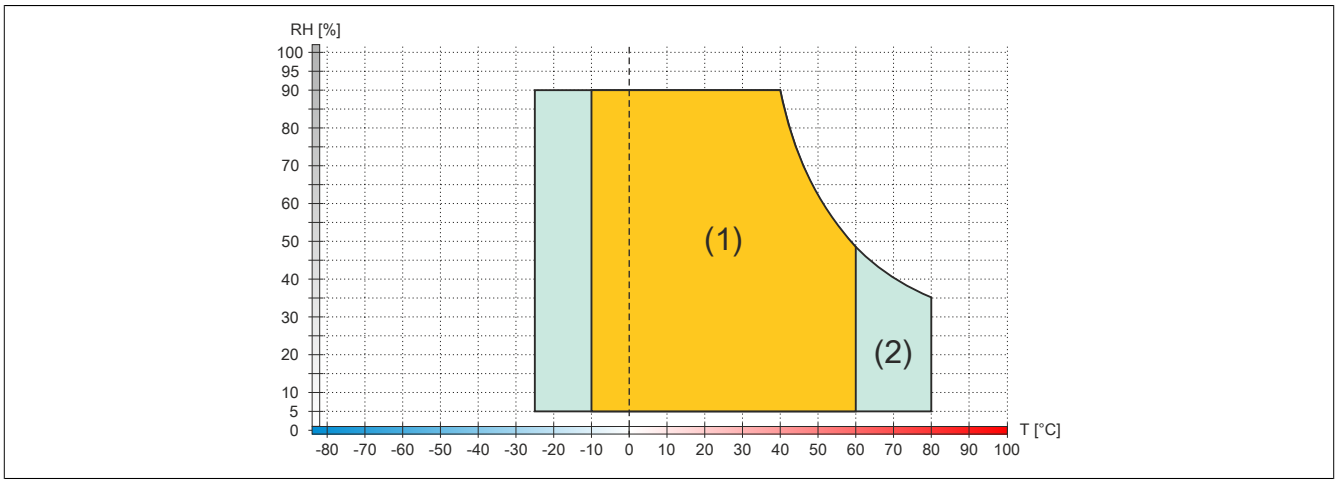


Figure 20: 5AP1120.0573-000 ≤ Rev. D0 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.2 5AP1151.0573-000

4.2.1.2.1 General information

- Panel for AP1000, PPC2100 or PPC2200
- 5.7" TFT VGA color display
- 22 function keys and 20 system keys
- Control cabinet installation

4.2.1.2.2 Order data

Model number	Short description	Figure
	Panels	
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 / PPC2200 / link modules - Compatible with 5PP551.0573-00	

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

4.2.1.2.3 Technical data

Information:

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

Model number	5AP1151.0573-000	
Revision	**D0**	**E0**
General information		
B&R ID code	0xE7AB	
Certifications		
CE	Yes	
UL	cULus E115267 Industrial control equipment	
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]	
Display		
Type	TFT color	
Diagonal	5.7"	
Colors	262,144	
Resolution	VGA, 640 x 480 pixels	
Contrast	850:1	800:1
Viewing angles		
Horizontal	Direction R = 80° / Direction L = 80°	
Vertical	Direction U = 80° / Direction D = 80°	Direction U = 70° / Direction D = 70°
Backlight		
Type	LED	
Brightness (dimmable)	Typ. 20 to 400 cd/m²	Typ. 22.5 to 450 cd/m²
Half-brightness time [2)]	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 intensity		
Yellow	Typ. 38 mcd	

Table 6: 5AP1151.0573-000, 5AP1151.0573-000 - Technical data

Model number	5AP1151.0573-000	
Revision	**D0**	**E0**
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)	
Degree of protection per UL 50	Front: Type 4X indoor use only	
Mechanical properties		
Front [3]		
Frame	Aluminum, naturally anodized	
Panel overlay		
Material	Polyester	
Light background color	RAL 9006	
Dark border color around display	RAL 7024	
Gasket	3 mm fixed gasket	
Dimensions		
Width	212 mm	
Height	245 mm	
Weight	1400 g	

Table 6: 5AP1151.0573-000, 5AP1151.0573-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.2.4 Dimensions

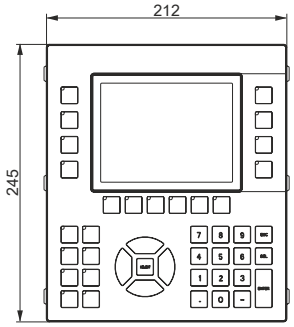


Figure 21: 5AP1151.0573-000 - Dimensions

4.2.1.2.5 Requirements

5.7" AP1000 panels are supported starting with the following firmware versions:

- Firmware V03.11 or later with SDL/DVI receiver 5DLSDL.1001-00
- Firmware V04.08 or later with SDL3 receiver 5DLSD3.1001-00

4.2.1.2.6 Temperature/Humidity diagram

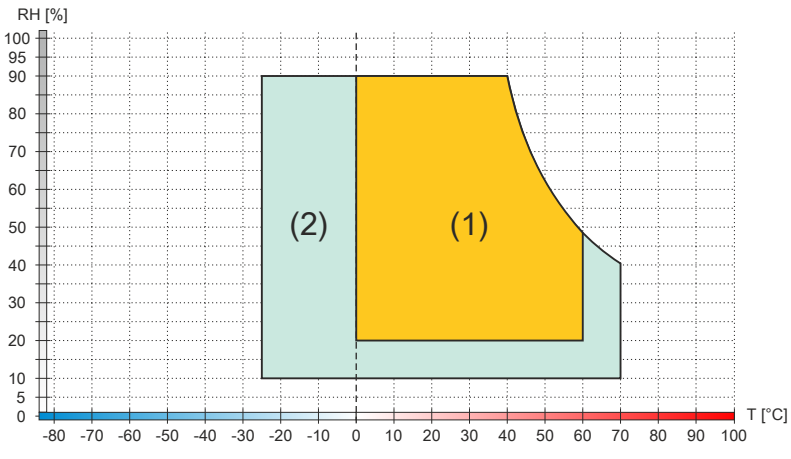


Figure 22: 5AP1151.0573-000 ≥ Rev. E0 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

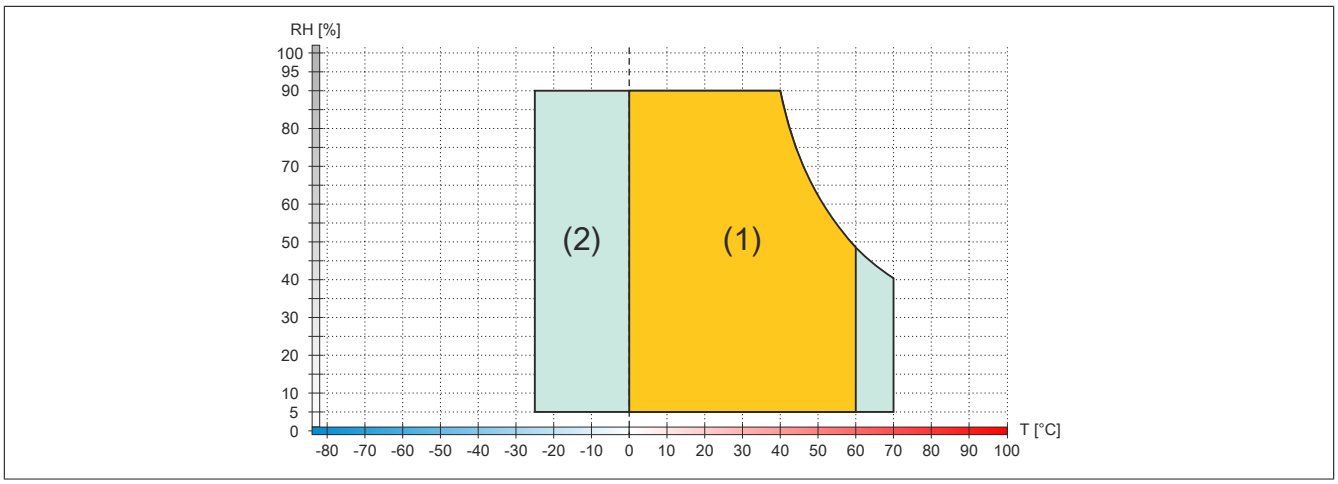


Figure 23: 5AP1151.0573-000 ≤ Rev. D0 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.3 5AP1120.0702-000

4.2.1.3.1 General information

- Panel for AP1000, PPC2100 or PPC2200
- 7.0" TFT WVGA color display
- Single-touch (analog resistive)
- Control cabinet installation

4.2.1.3.2 Order data

Model number	Short description	Figure
	Panels	
5AP1120.0702-000	Automation Panel 7" WVGA TFT - 800 x 480 pixels (16:10) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - For PPC2100 / PPC2200 / link modules - Compatible with 5PP520.0702-00	

Table 7: 5AP1120.0702-000 - Order data

4.2.1.3.3 Technical data

Information:

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

Model number	5AP1120.0702-000
General information	
B&R ID code	0xE7AC
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]
Display	
Type	TFT color
Diagonal	7.0"
Colors	16.7 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/m²
Half-brightness time [2)]	50,000 h
Touch screen [3)]	
Type	AMT
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only

Table 8: 5AP1120.0702-000 - Technical data

Model number	5AP1120.0702-000
Mechanical properties	
Front [4]	
Frame	Aluminum, naturally anodized
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket
Dimensions	
Width	212 mm
Height	156 mm
Weight	Approx. 900 g

Table 8: 5AP1120.0702-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.3.4 Dimensions

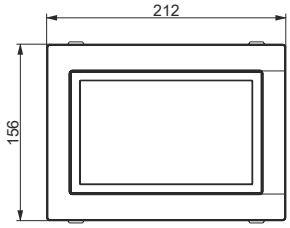


Figure 24: 5AP1120.0702-000 - Dimensions

4.2.1.3.5 Temperature/Humidity diagram

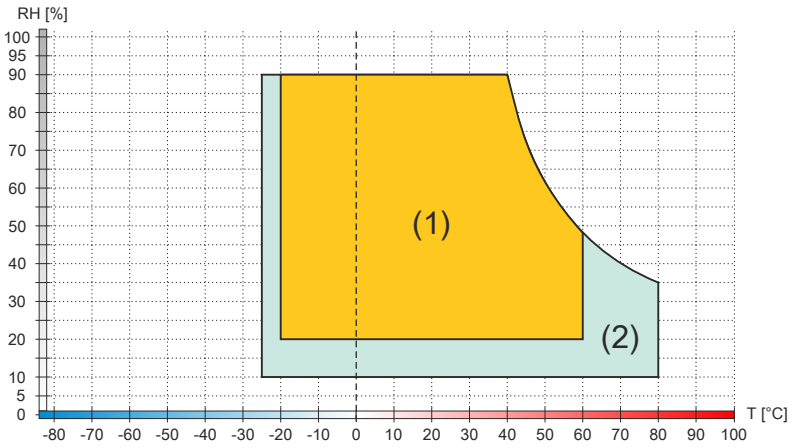


Figure 25: 5AP1120.0702-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.4 5AP1130.0702-000

4.2.1.4.1 General information

- Panel for AP1000, PPC2100 or PPC2200
- 7.0" TFT WVGA color display
- Multi-touch (projected capacitive)
- Control cabinet installation

4.2.1.4.2 Order data

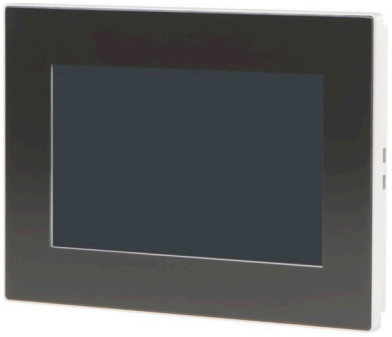
Model number	Short description	Figure
	Panels	
5AP1130.0702-000	Automation Panel 7.0" WVGA TFT - 800 x 480 pixels (16:10) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC2100 / PPC2200 / link modules - Compatible with 5PP520.0702-00	

Table 9: 5AP1130.0702-000 - Order data

4.2.1.4.3 Technical data

Information:

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

Model number	5AP1130.0702-000
General information	
B&R ID code	0xEB61
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]
Display	
Type	TFT color
Diagonal	7.0"
Colors	16.7 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/m²
Half-brightness time [2)]	50,000 h
Touch screen [3)]	
Type	3M
Technology	Projected capacitive touch (PCT)
Controller	3M
Transmittance	See appendix A, section "Touch screen".
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)

Table 10: 5AP1130.0702-000 - Technical data

Model number	5AP1130.0702-000
Degree of protection per UL 50	Front: Type 4X indoor use only
Mechanical properties	
Front [4]	
Frame	Aluminum, coated
Design	Black
Gasket	3 mm fixed gasket
Dimensions	
Width	209 mm
Height	153 mm
Weight	1200 g

Table 10: 5AP1130.0702-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) The specifications for the touch screen driver must be taken into account. See chapter 4 "Software", section 2 "Multi-touch drivers".
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.4.4 Dimensions

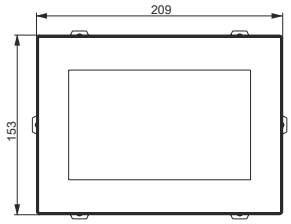


Figure 26: 5AP1130.0702-000 - Dimensions

4.2.1.4.5 Temperature/Humidity diagram

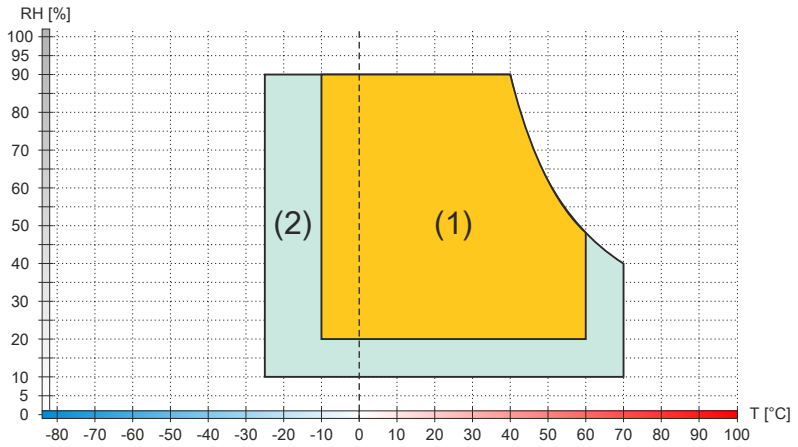


Figure 27: 5AP1130.0702-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.5 5AP1120.101E-000

4.2.1.5.1 General information

- Panel for AP1000, PPC2100, PPC2200 or PPC3100
- 10.1" TFT WXGA color display
- Single-touch (analog resistive)
- Control cabinet installation

4.2.1.5.2 Order data

Model number	Short description	Figure
	Panels	
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 / PPC3100 / PPC2200 / link modules	

Table 11: 5AP1120.101E-000 - Order data

4.2.1.5.3 Technical data

Information:

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

Model number	5AP1120.101E-000
General information	
B&R ID code	0xE93D
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]
Display	
Type	TFT color
Diagonal	10.1"
Colors	16.7 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 [2)]	50,000 h
Touch screen [3)]	
Type	AMT
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only

Table 12: 5AP1120.101E-000 - Technical data

Model number	5AP1120.101E-000
Mechanical properties	
Front [4]	
Frame	Aluminum, coated
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket
Dimensions	
Width	279 mm
Height	191 mm
Weight	1900 g

Table 12: 5AP1120.101E-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.5.4 Dimensions

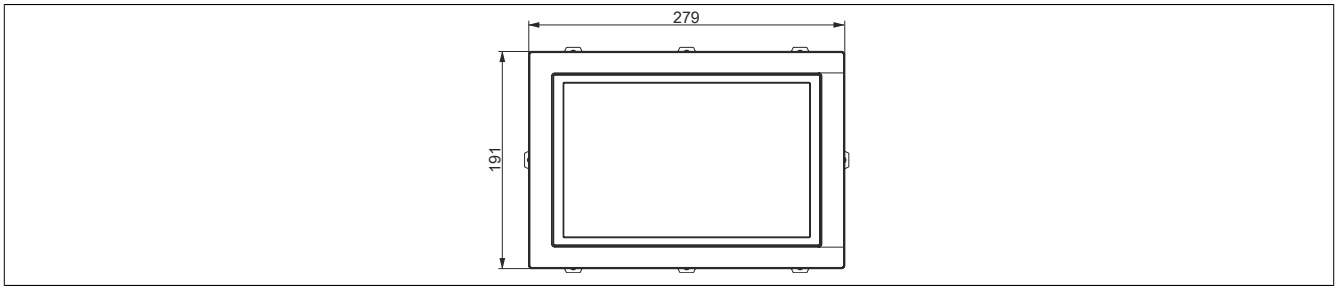


Figure 28: 5AP1120.101E-000 - Dimensions

4.2.1.5.5 Temperature/Humidity diagram

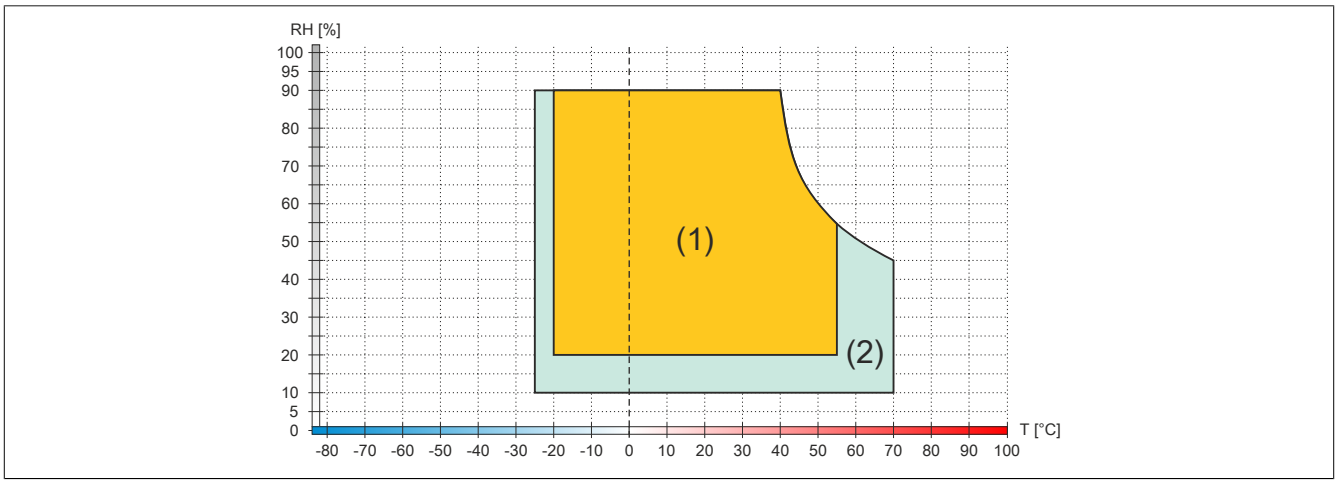


Figure 29: 5AP1120.101E-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.6 5AP1130.101E-000

4.2.1.6.1 General information

- Panel for AP1000, PPC2100, PPC2200 or PPC3100
- 10.1" TFT WXGA color display
- Multi-touch (projected capacitive)
- Control cabinet installation

4.2.1.6.2 Order data

Model number	Short description	Figure
	Panels	
5AP1130.101E-000	Automation Panel 10.1" WXGA TFT - 1280 x 800 pixels (16:10) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC2100 / PPC3100 / PPC2200 / link modules	

Table 13: 5AP1130.101E-000 - Order data

4.2.1.6.3 Technical data

Information:

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

Model number	5AP1130.101E-000
General information	
B&R ID code	0xEB62
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]
Display	
Type	TFT color
Diagonal	10.1"
Colors	16.7 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 [2)]	50,000 h
Touch screen [3)]	
Type	3M
Technology	Projected capacitive touch (PCT)
Controller	3M
Transmittance	See appendix A, section "Touch screen".
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only

Table 14: 5AP1130.101E-000 - Technical data

Model number	5AP1130.101E-000
Mechanical properties	
Front [4]	
Frame	Aluminum, coated
Design	Black
Gasket	3 mm fixed gasket
Dimensions	
Width	279 mm
Height	191 mm
Weight	2000 g

Table 14: 5AP1130.101E-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) The specifications for the touch screen driver must be taken into account. See chapter 4 "Software", section "Multi-touch drivers".
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.6.4 Dimensions

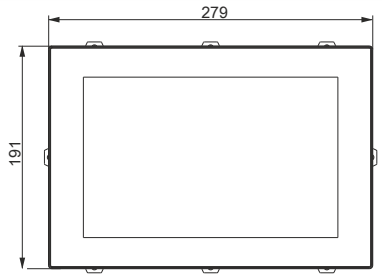


Figure 30: 5AP1130.101E-000 - Dimensions

4.2.1.6.5 Temperature/Humidity diagram

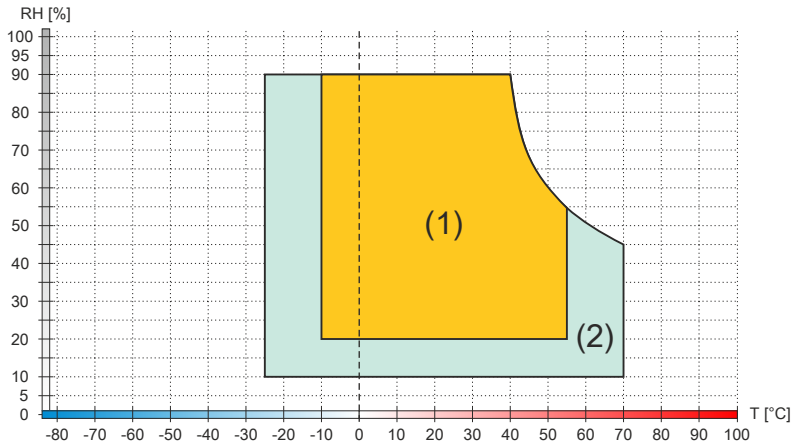


Figure 31: 5AP1130.101E-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.7 5AP1120.1043-000

4.2.1.7.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3100
- 10.4" TFT VGA color display
- Single-touch (analog resistive)
- Front USB interface
- Control cabinet installation

4.2.1.7.2 Order data

Model number	Short description	Figure
	Panels	
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 - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP520.1043-00	

Table 15: 5AP1120.1043-000 - Order data

4.2.1.7.3 Technical data

Information:

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

Model number	5AP1120.1043-000
General information	
B&R ID code	0xE7AD
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4 [1)]
Display	
Type	TFT color
Diagonal	10.4"
Colors	16.7 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 [2)]	70,000 h
Touch screen [3)]	
Type	AMT
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%

Table 16: 5AP1120.1043-000 - Technical data

Model number	5AP1120.1043-000
Interfaces	
USB	
Quantity	1
Type	USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)
Current-carrying capacity	Max. 500 mA
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only
Mechanical properties	
Front [4]	
Frame	Aluminum, naturally anodized
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket
Dimensions	
Width	323 mm
Height	260 mm
Weight	2800 g

Table 16: 5AP1120.1043-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.7.4 Dimensions

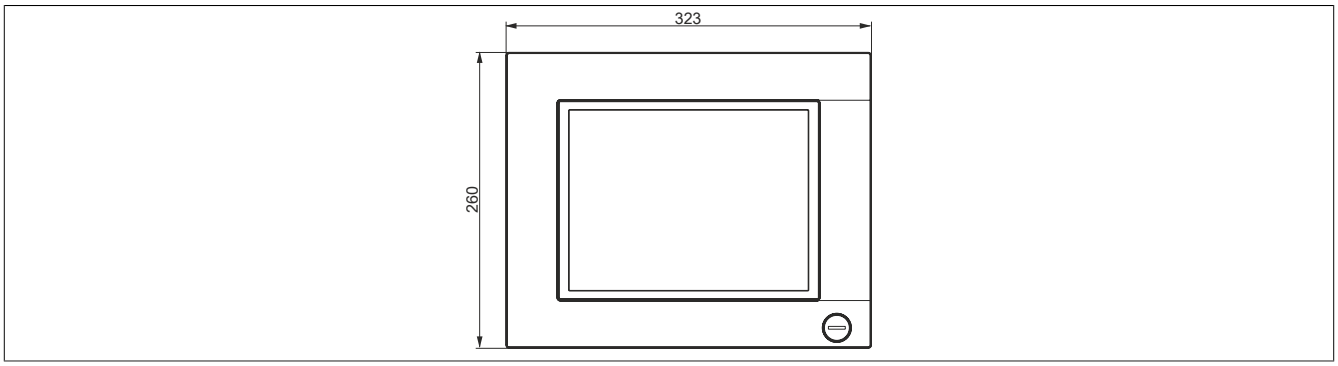


Figure 32: 5AP1120.1043-000 - Dimensions

4.2.1.7.5 Requirements

10.4" AP1000 panels are supported starting with the following firmware versions:

- Firmware V03.11 or later with SDL/DVI receiver 5DLSDL.1001-00
- Firmware V04.08 or later with SDL3 receiver 5DLSD3.1001-00

4.2.1.7.6 Temperature/Humidity diagram

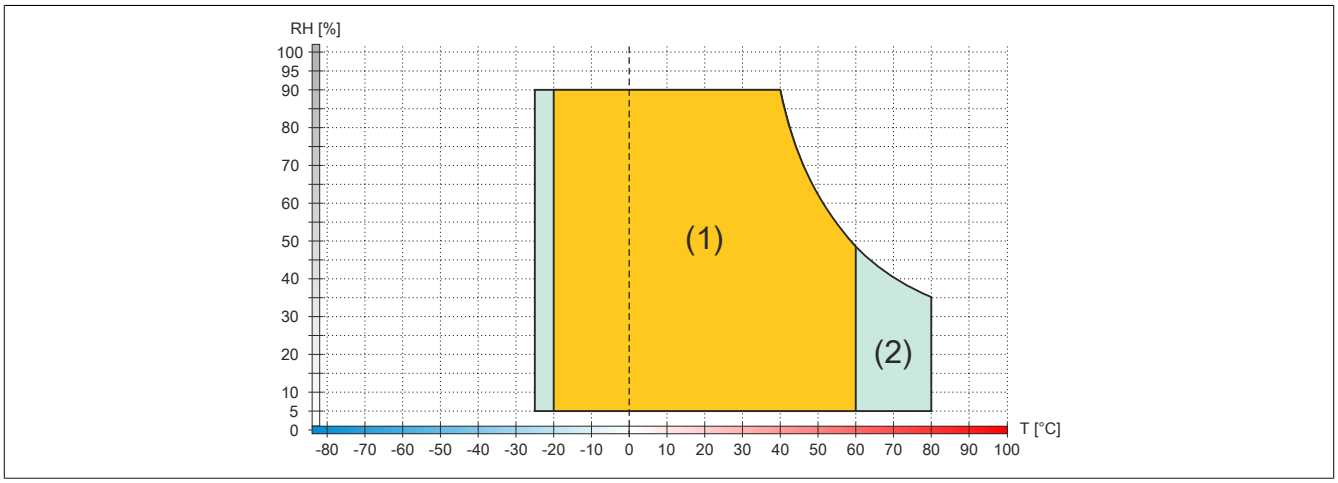


Figure 33: 5AP1120.1043-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.8 5AP1180.1043-000

4.2.1.8.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3100
- 10.4" TFT VGA color display
- Single-touch (analog resistive)
- 22 function keys
- Front USB interface
- Control cabinet installation

4.2.1.8.2 Order data

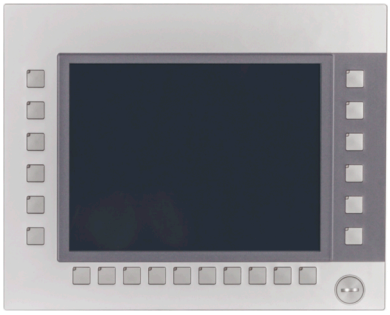
Model number	Short description	Figure
	Panels	
5AP1180.1043-000	Automation Panel 10.4" VGA TFT - 640 x 480 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB - 22 function keys - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP580.1043-00, 5AP980.1043-01	

Table 17: 5AP1180.1043-000 - Order data

4.2.1.8.3 Technical data

Information:

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

Model number	5AP1180.1043-000
General information	
B&R ID code	0xE7AE
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4 [1)]
Display	
Type	TFT color
Diagonal	10.4"
Colors	16.7 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 [2)]	70,000 h
Touch screen [3)]	
Type	AMT
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%

Table 18: 5AP1180.1043-000 - Technical data

Model number	5AP1180.1043-000
Interfaces	
USB	
Quantity	1
Type	USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)
Current-carrying capacity	Max. 500 mA
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 intensity	
Yellow	Typ. 38 mcd
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only
Mechanical properties	
Front [4)]	
Frame	Aluminum, naturally anodized
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket
Dimensions	
Width	323 mm
Height	260 mm
Weight	2800 g

Table 18: 5AP1180.1043-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.8.4 Dimensions

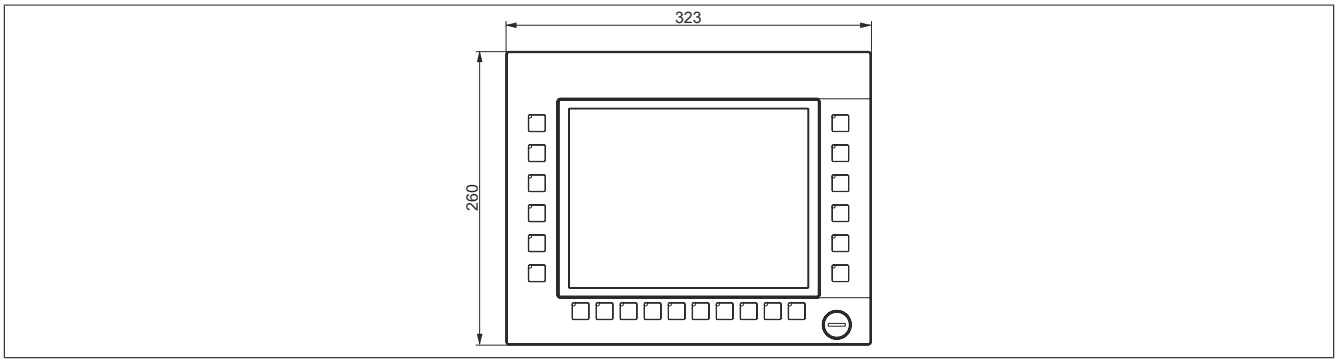


Figure 34: 5AP1180.1043-000 - Dimensions

4.2.1.8.5 Requirements

10.4" AP1000 panels are supported starting with the following firmware versions:

- Firmware V03.11 or later with SDL/DVI receiver 5DLSDL.1001-00
- Firmware V04.08 or later with SDL3 receiver 5DLSD3.1001-00

4.2.1.8.6 Temperature/Humidity diagram

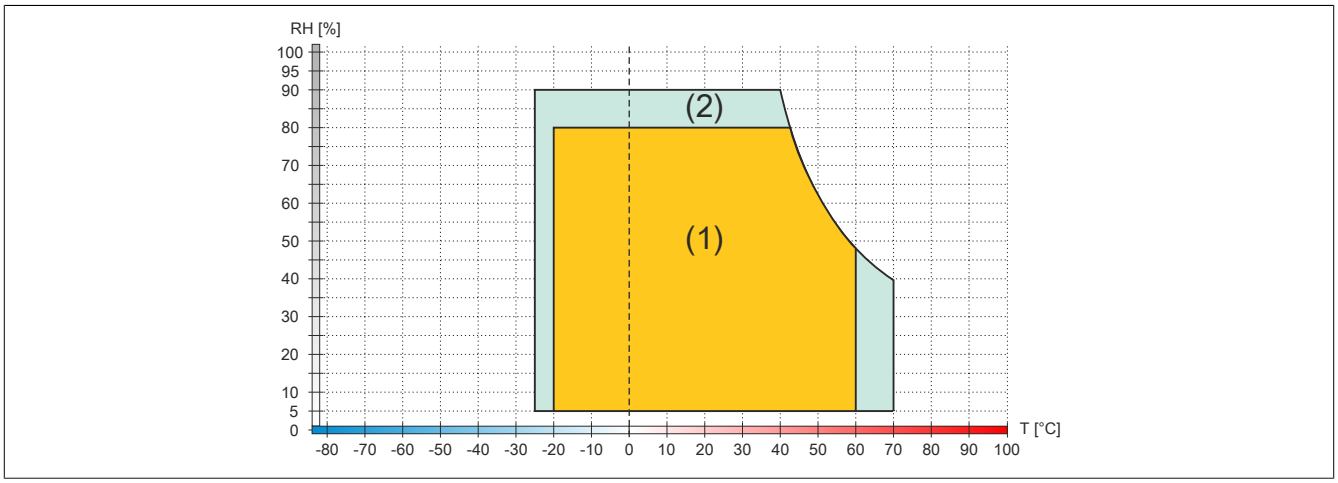


Figure 35: 5AP1180.1043-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.9 5AP1181.1043-000

4.2.1.9.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3100
- 10.4" TFT VGA color display
- Single-touch (analog resistive)
- 38 function keys and 20 system keys
- Front USB interface
- Control cabinet installation

4.2.1.9.2 Order data

Model number	Short description	Figure
	Panels	
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 - 38 function keys and 20 system keys - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP581.1043-00, 5AP981.1043-01, 5PC781.1043-00	

Table 19: 5AP1181.1043-000 - Order data

4.2.1.9.3 Technical data

Information:

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

Model number	5AP1181.1043-000
General information	
B&R ID code	0xE7AF
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]
Display	
Type	TFT color
Diagonal	10.4"
Colors	16.7 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 [2)]	70,000 h

Table 20: 5AP1181.1043-000 - Technical data

Model number	5AP1181.1043-000
Touch screen [3]	
Type	AMT
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%
Interfaces	
USB	
Quantity	1
Type	USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)
Current-carrying capacity	Max. 500 mA
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
LED intensity	
Yellow	Typ. 38 mcd
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only
Mechanical properties	
Front [4]	
Frame	Aluminum, naturally anodized
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket
Dimensions	
Width	323 mm
Height	358 mm
Weight	3400 g

Table 20: 5AP1181.1043-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.9.4 Dimensions

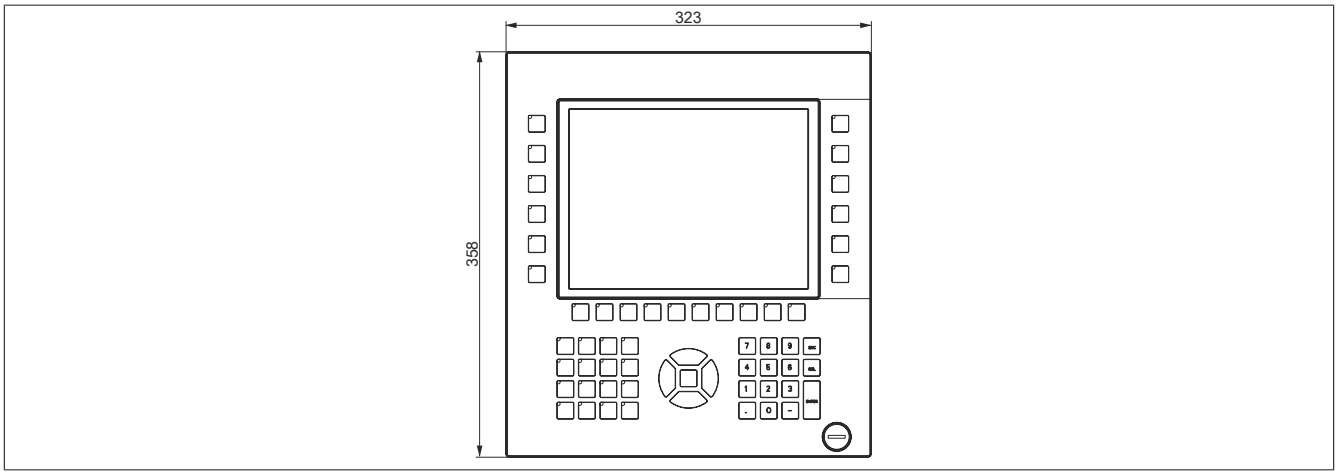


Figure 36: 5AP1181.1043-000 - Dimensions

4.2.1.9.5 Requirements

10.4" AP1000 panels are supported starting with the following firmware versions:

- Firmware V03.11 or later with SDL/DVI receiver 5DLSDL.1001-00
- Firmware V04.08 or later with SDL3 receiver 5DLSD3.1001-00

4.2.1.9.6 Temperature/Humidity diagram

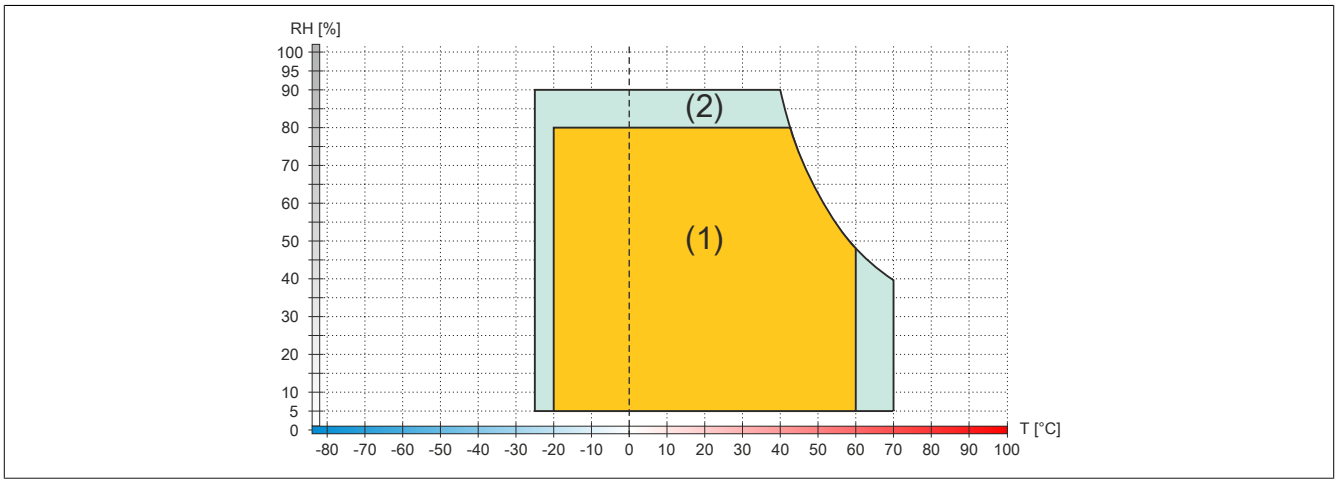


Figure 37: 5AP1181.1043-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.10 5AP1182.1043-000

4.2.1.10.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3100
- 10.4" TFT VGA color display
- Single-touch (analog resistive)
- 44 function keys and 20 system keys
- Front USB interface
- Control cabinet installation

4.2.1.10.2 Order data

Model number	Short description	Figure
	Panels	
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 - 44 function keys and 20 system keys - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP582.1043-00, 5AP982.1043-01, 5PC782.1043-00	

Table 21: 5AP1182.1043-000 - Order data

4.2.1.10.3 Technical data

Information:

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

Model number	5AP1182.1043-000
General information	
B&R ID code	0xE7B0
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]
Display	
Type	TFT color
Diagonal	10.4"
Colors	16.7 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 [2)]	70,000 h
Touch screen [3)]	
Type	AMT
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%

Table 22: 5AP1182.1043-000 - Technical data

Model number	5AP1182.1043-000
Interfaces	
USB	
Quantity	1
Type	USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)
Current-carrying capacity	Max. 500 mA
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 intensity	
Yellow	Typ. 38 mcd
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only
Mechanical properties	
Front [4)]	
Frame	Aluminum, naturally anodized
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket
Dimensions	
Width	423 mm
Height	288 mm
Weight	3500 g

Table 22: 5AP1182.1043-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.10.4 Dimensions

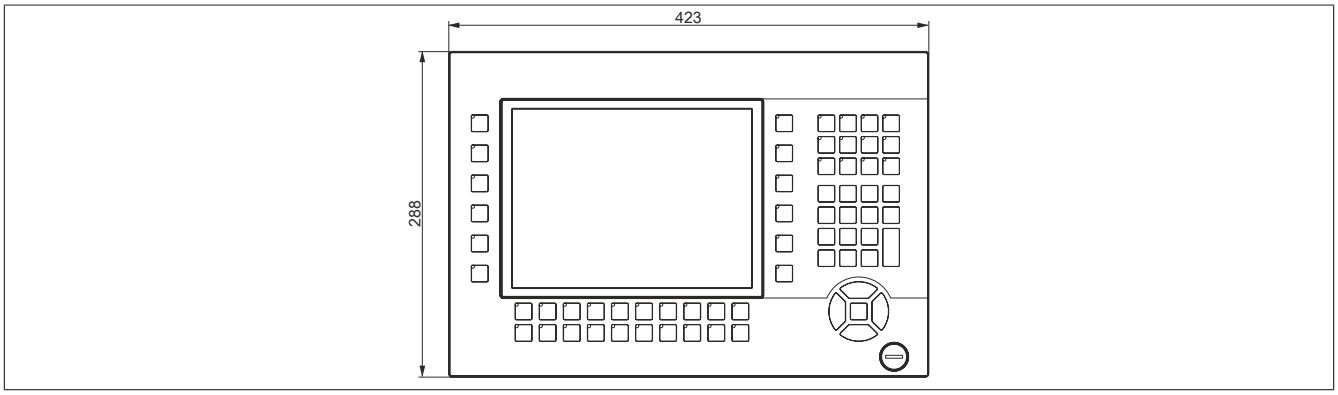


Figure 38: 5AP1182.1043-000 - Dimensions

4.2.1.10.5 Requirements

10.4" AP1000 panels are supported starting with the following firmware versions:

- Firmware V03.11 or later with SDL/DVI receiver 5DLSDL.1001-00
- Firmware V04.08 or later with SDL3 receiver 5DLSD3.1001-00

4.2.1.10.6 Temperature/Humidity diagram

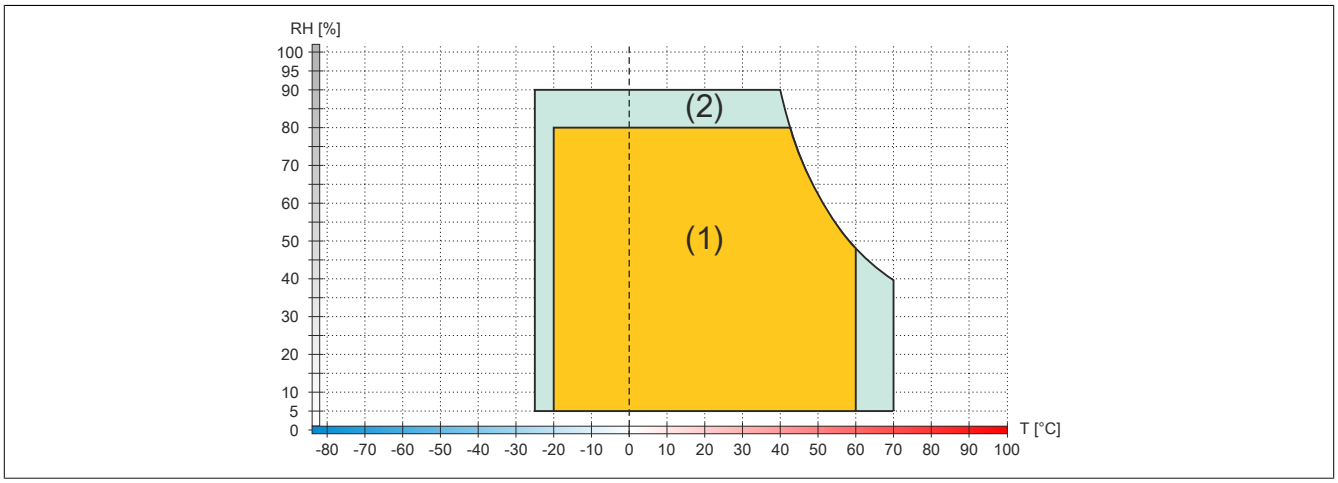


Figure 39: 5AP1182.1043-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.11 5AP1120.1214-000

4.2.1.11.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3100
- 12.1" TFT SVGA color display
- Single-touch (analog resistive)
- Front USB interface
- Control cabinet installation

4.2.1.11.2 Order data

Model number	Short description	Figure
	Panels	
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 - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP520.1214-00	

Table 23: 5AP1120.1214-000 - Order data

4.2.1.11.3 Technical data

Information:

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

Model number	5AP1120.1214-000
General information	
B&R ID code	0xE7BB
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4 [1)]
Display	
Type	TFT color
Diagonal	12.1"
Colors	16.7 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 [2)]	50,000 h
Touch screen [3)]	
Type	AMT
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%

Table 24: 5AP1120.1214-000 - Technical data

Model number	5AP1120.1214-000
Interfaces	
USB	
Quantity	1
Type	USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)
Current-carrying capacity	Max. 500 mA
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only
Mechanical properties	
Front [4]	
Frame	Aluminum, naturally anodized
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket
Dimensions	
Width	362 mm
Height	284 mm
Weight	3200 g

Table 24: 5AP1120.1214-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.11.4 Dimensions

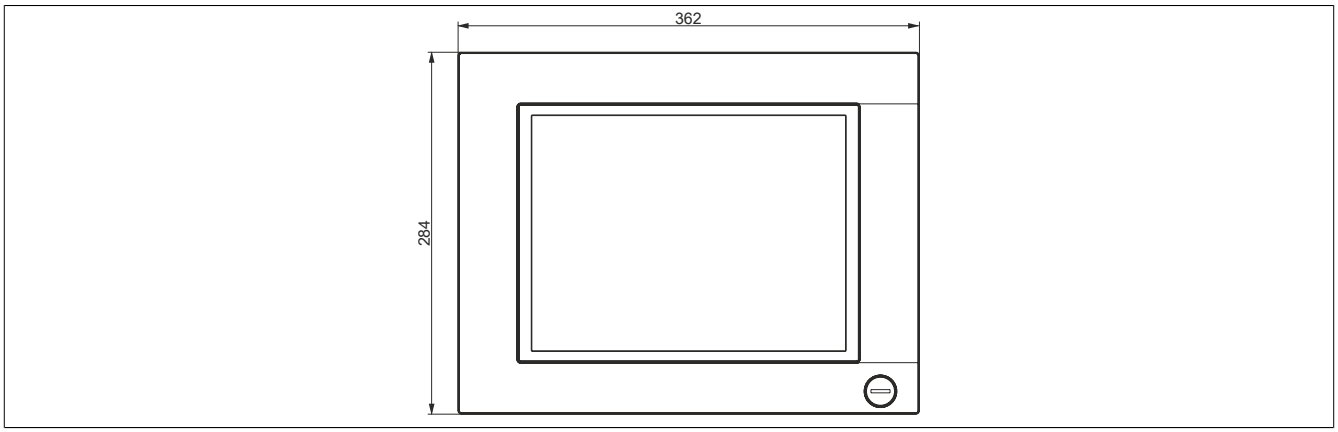


Figure 40: 5AP1120.1214-000 - Dimensions

4.2.1.11.5 Temperature/Humidity diagram

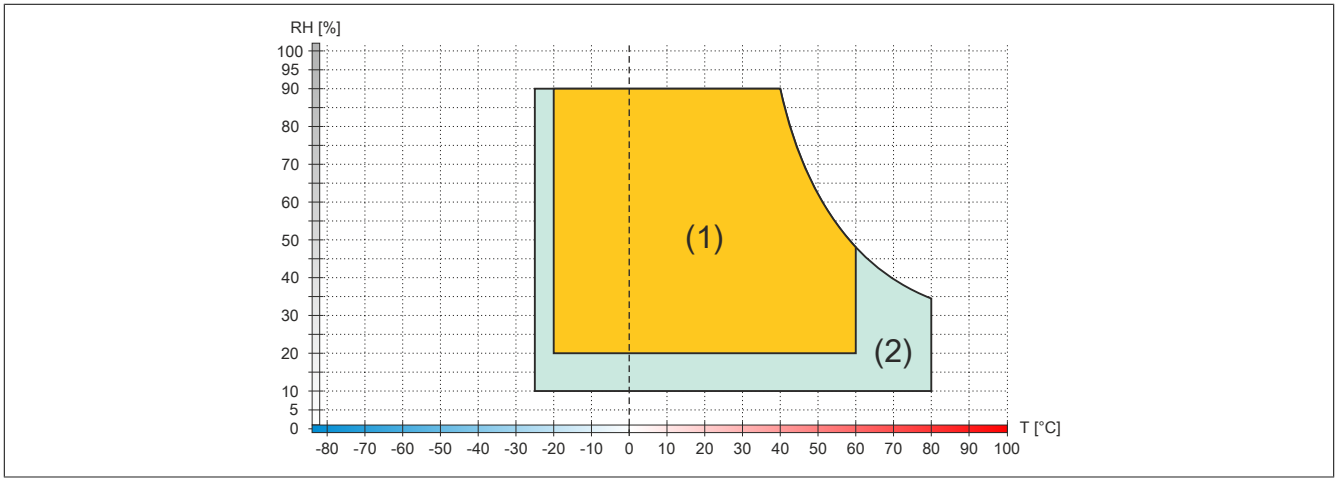


Figure 41: 5AP1120.1214-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.12 5AP1120.121E-000

4.2.1.12.1 General information

- Panel for AP1000, PPC2100, PPC2200 or PPC3100
- 12.1" TFT WXGA color display
- Single-touch (analog resistive)
- Control cabinet installation

4.2.1.12.2 Order data

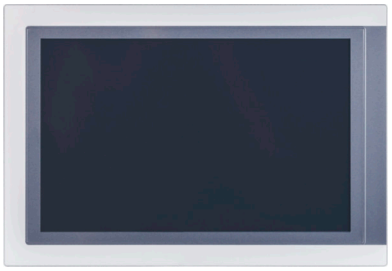
Model number	Short description	Figure
	Panels	
5AP1120.121E-000	Automation Panel 12.1" WXGA TFT - 1280 x 800 pixels (16:10) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - For PPC2100 / PPC3100 / PPC2200 / link modules	

Table 25: 5AP1120.121E-000 - Order data

4.2.1.12.3 Technical data

Information:

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

Model number	5AP1120.121E-000
General information	
B&R ID code	0xE8E4
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4 [1)]
Display	
Type	TFT color
Diagonal	12.1"
Colors	16.7 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/m²
Half-brightness time [2)]	50,000 h
Touch screen [3)]	
Type	AMT
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only

Table 26: 5AP1120.121E-000 - Technical data

Model number	5AP1120.121E-000
Mechanical properties	
Front [4]	
Frame	Aluminum, coated
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket
Dimensions	
Width	324 mm
Height	221.5 mm
Weight	2300 g

Table 26: 5AP1120.121E-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.12.4 Dimensions

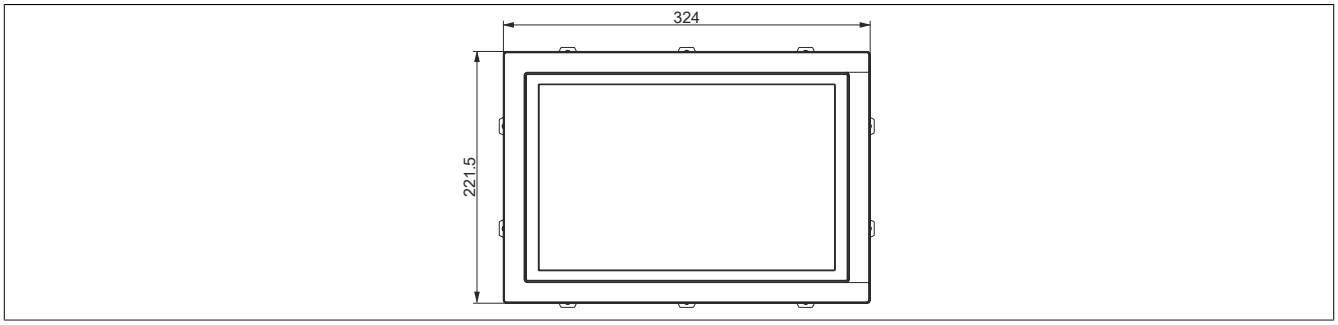


Figure 42: 5AP1120.121E-000 - Dimensions

4.2.1.12.5 Temperature/Humidity diagram

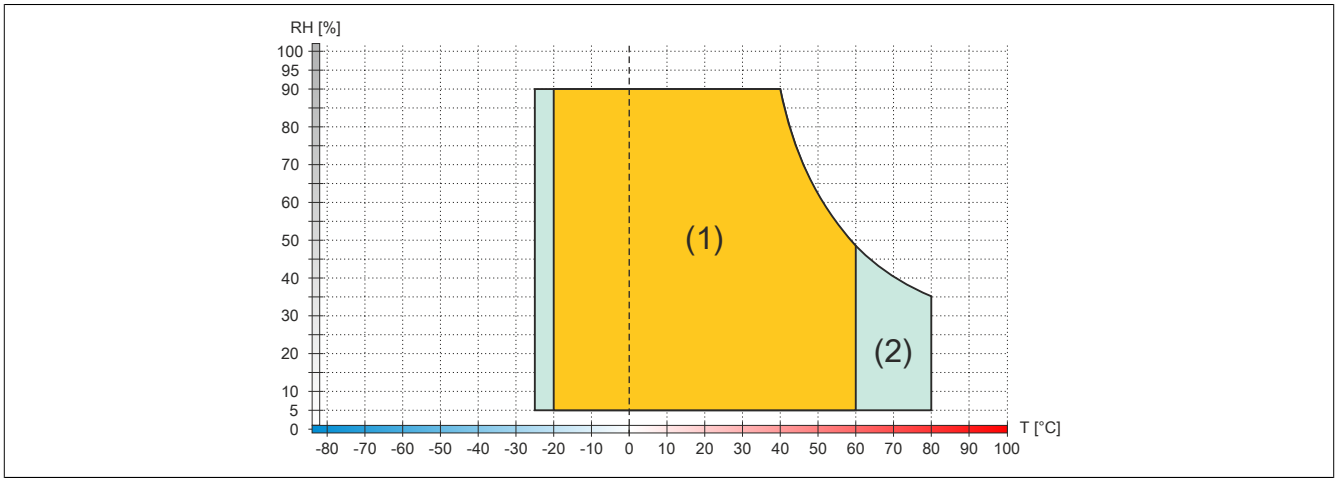


Figure 43: 5AP1120.121E-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.13 5AP1130.121E-000

4.2.1.13.1 General information

- Panel for AP1000, PPC2100, PPC2200 or PPC3100
- 12.1" TFT WXGA color display
- Multi-touch (projected capacitive)
- Control cabinet installation

4.2.1.13.2 Order data

Model number	Short description	Figure
	Panels	
5AP1130.121E-000	Automation Panel 12.1" WXGA TFT - 1280 x 800 pixels (16:10) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC2100 / PPC3100 / PPC2200 / link modules	

Table 27: 5AP1130.121E-000 - Order data

4.2.1.13.3 Technical data

Information:

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

Model number	5AP1130.121E-000
General information	
B&R ID code	0xEB63
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]
Display	
Type	TFT color
Diagonal	12.1"
Colors	16.7 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/m²
Half-brightness time [2)]	50,000 h
Touch screen [3)]	
Type	3M
Technology	Projected capacitive touch (PCT)
Controller	3M
Transmittance	See appendix A, section "Touch screen".
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only

Table 28: 5AP1130.121E-000 - Technical data

Model number	5AP1130.121E-000
Mechanical properties	
Front [4]	
Frame	Aluminum, coated
Design	Black
Gasket	3 mm fixed gasket
Dimensions	
Width	324 mm
Height	221.5 mm
Weight	2400 g

Table 28: 5AP1130.121E-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) The specifications for the touch screen driver must be taken into account. See chapter 4 "Software", section "Multi-touch drivers".
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.13.4 Dimensions

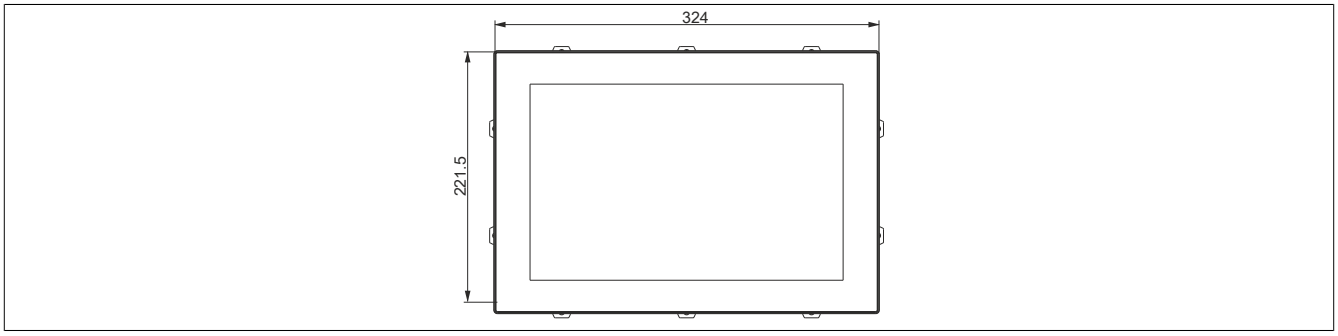


Figure 44: 5AP1130.121E-000 - Dimensions

4.2.1.13.5 Temperature/Humidity diagram

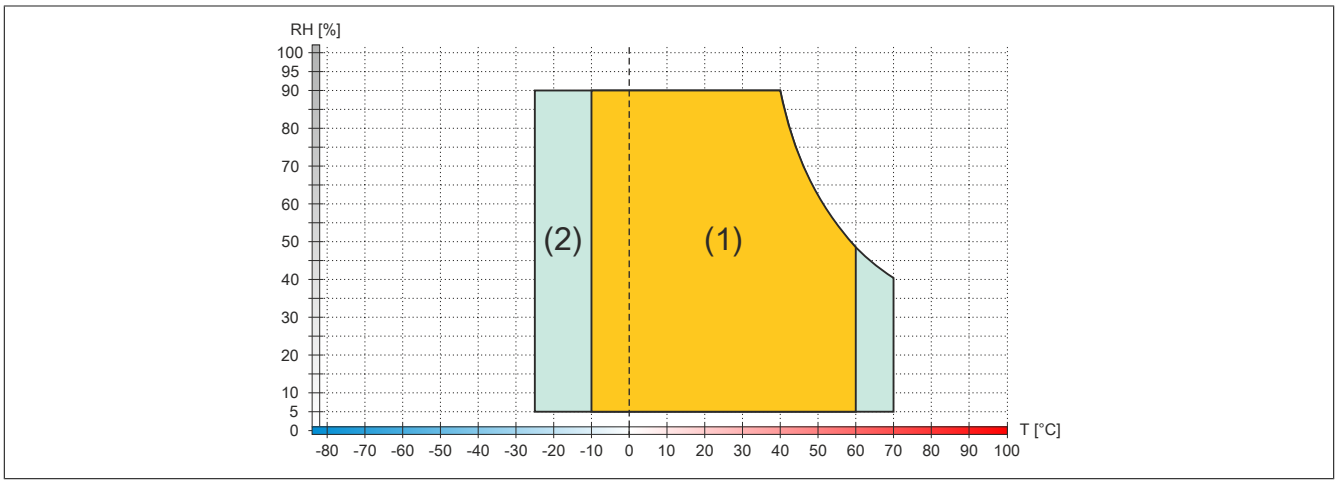


Figure 45: 5AP1130.121E-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.14 5AP1120.1505-000

4.2.1.14.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3100
- 15.0" TFT XGA color display
- Single-touch (analog resistive)
- Front USB interface
- Control cabinet installation

4.2.1.14.2 Order data

Model number	Short description	Figure
	Panels	
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 - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP520.1505-00, 5AP920.1505-01, 5PC720.1505-xx, 5PC820.1505-00	

Table 29: 5AP1120.1505-000 - Order data

4.2.1.14.3 Technical data

Information:

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

Model number	5AP1120.1505-000
General information	
B&R ID code	0xE7BC
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4 [1)]
Display	
Type	TFT color
Diagonal	15.0"
Colors	16.7 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 [2)]	50,000 h
Touch screen [3)]	
Type	AMT
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%

Table 30: 5AP1120.1505-000 - Technical data

Model number	5AP1120.1505-000
Interfaces	
USB	
Quantity	1
Type	USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)
Current-carrying capacity	Max. 500 mA
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only
Mechanical properties	
Front [4]	
Frame	Aluminum, naturally anodized
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket
Dimensions	
Width	435 mm
Height	330 mm
Weight	5000 g

Table 30: 5AP1120.1505-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.14.4 Dimensions

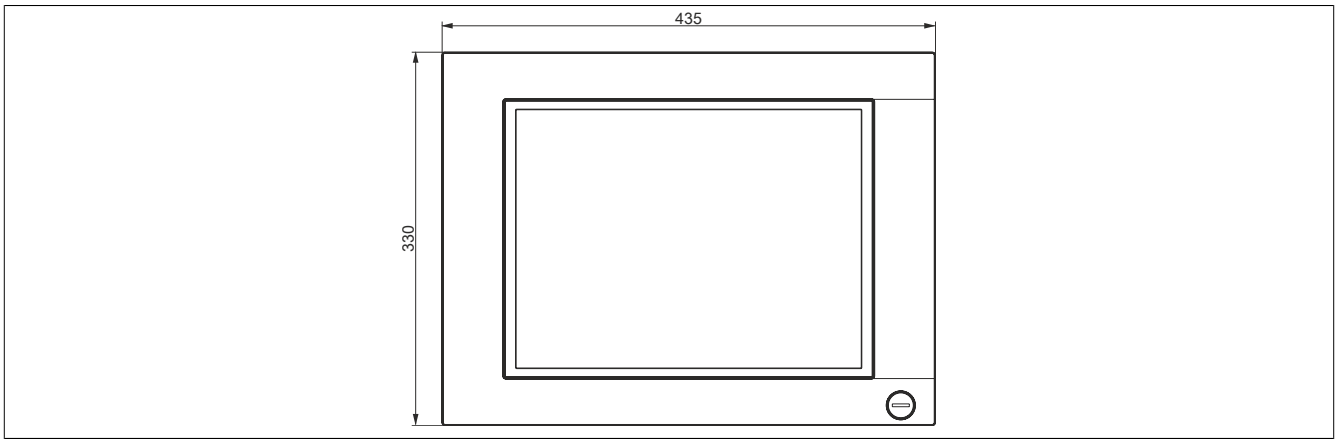


Figure 46: 5AP1120.1505-000 - Dimensions

4.2.1.14.5 Temperature/Humidity diagram

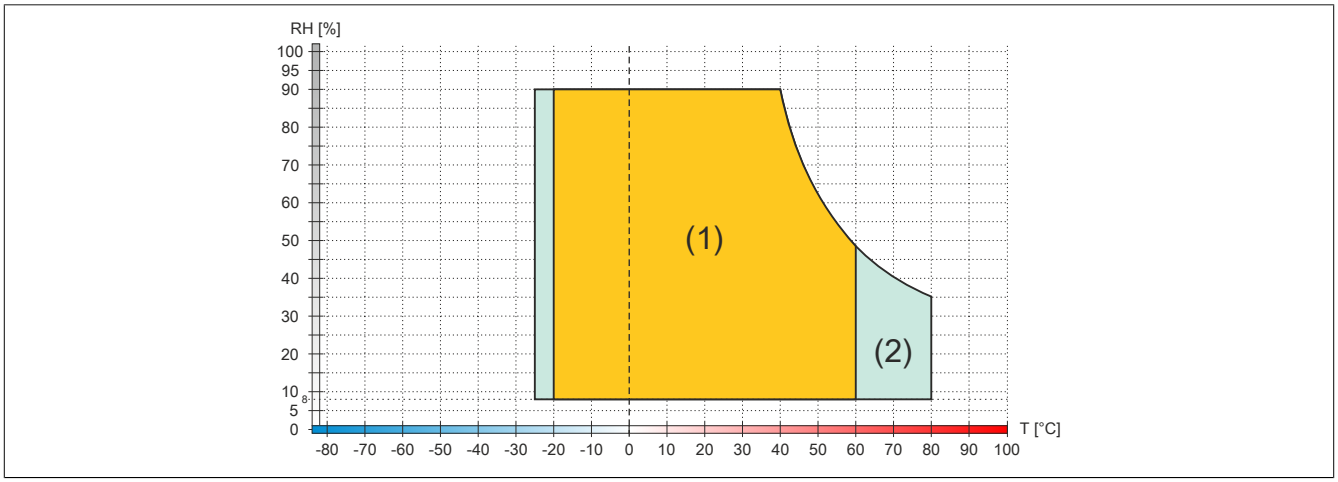


Figure 47: 5AP1120.1505-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.15 5AP1180.1505-000

4.2.1.15.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3100
- 15.0" TFT XGA color display
- Single-touch (analog resistive)
- 32 function keys
- Front USB interface
- Control cabinet installation

4.2.1.15.2 Order data

Model number	Short description	Figure
	Panels	
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 - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP580.1505-00, 5AP980.1505-01	

Table 31: 5AP1180.1505-000 - Order data

4.2.1.15.3 Technical data

Information:

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

Model number	5AP1180.1505-000
General information	
B&R ID code	0xE7BD
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]
Display	
Type	TFT color
Diagonal	15.0"
Colors	16.7 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 [2)]	50,000 h
Touch screen [3)]	
Type	AMT
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%

Table 32: 5AP1180.1505-000 - Technical data

Model number	5AP1180.1505-000
Interfaces	
USB	
Quantity	1
Type	USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)
Current-carrying capacity	Max. 500 mA
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 intensity	
Yellow	Typ. 38 mcd
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only
Mechanical properties	
Front [4]	
Frame	Aluminum, naturally anodized
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket
Dimensions	
Width	435 mm
Height	330 mm
Weight	4900 g

Table 32: 5AP1180.1505-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.15.4 Dimensions

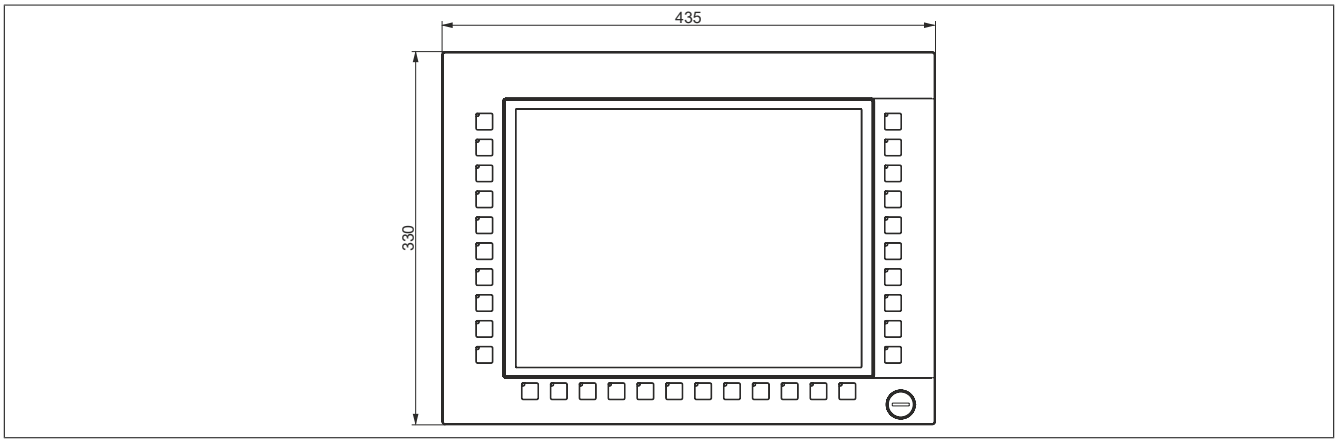


Figure 48: 5AP1180.1505-000 - Dimensions

4.2.1.15.5 Temperature/Humidity diagram

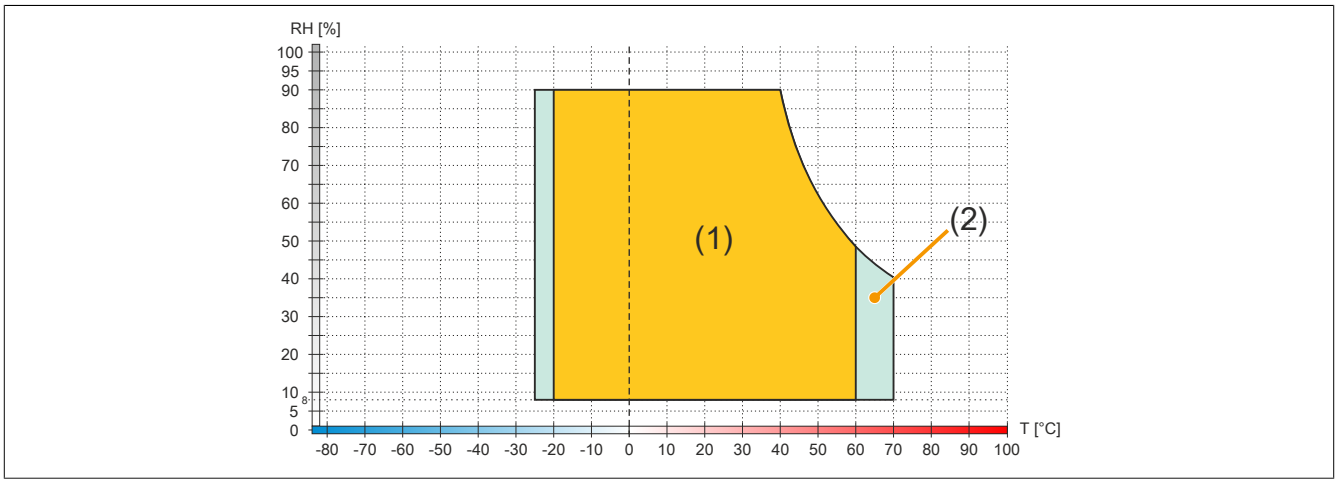


Figure 49: 5AP1180.1505-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.16 5AP1181.1505-000

4.2.1.16.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3100
- 15.0" TFT XGA color display
- Single-touch (analog resistive)
- 32 function keys
- 92 system keys
- Front USB interface
- Control cabinet installation

Information:

This Automation Panel is not approved for DVI operation.

4.2.1.16.2 Order data

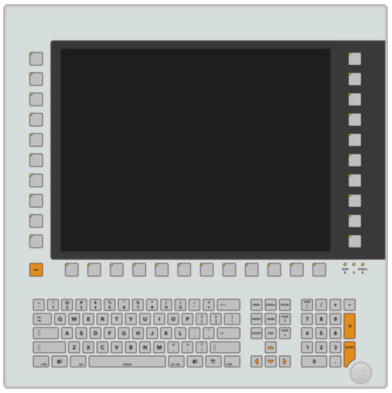
Model number	Short description	Figure
	Panels	
5AP1181.1505-000	Automation Panel 15" XGA TFT - 1024 x 768 pixels (4:3) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB - 32 function keys and 92 system keys - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5PP581.1505-000	

Table 33: 5AP1181.1505-000 - Order data

4.2.1.16.3 Technical data

Information:

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

Model number	5AP1181.1505-000
General information	
B&R ID code	0xEF61
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]
Display	
Type	TFT color
Diagonal	15.0"
Colors	16.7 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°

Table 34: 5AP1181.1505-000 - Technical data

Model number	5AP1181.1505-000
Backlight	
Type	LED
Brightness (dimmable)	Typ. 20 to 400 cd/m²
Half-brightness time 2)	50,000 h
Touch screen 3)	
Type	AMT
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%
Interfaces	
USB	
Quantity	1
Type	USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)
Current-carrying capacity	Max. 500 mA
Keys	
Function keys	32 with LED (yellow)
System keys	Alphanumeric keys, numeric keys, cursor block
Service life	>1,000,000 actuations at 1 ±0.3 N to 3 ±0.3 N actuating force
LED intensity	
Yellow	Typ. 38 mcd
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only
Mechanical properties	
Front 4)	
Frame	Aluminum, naturally anodized
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket
Dimensions	
Width	435 mm
Height	430 mm
Weight	6000 g

Table 34: 5AP1181.1505-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.16.4 Dimensions

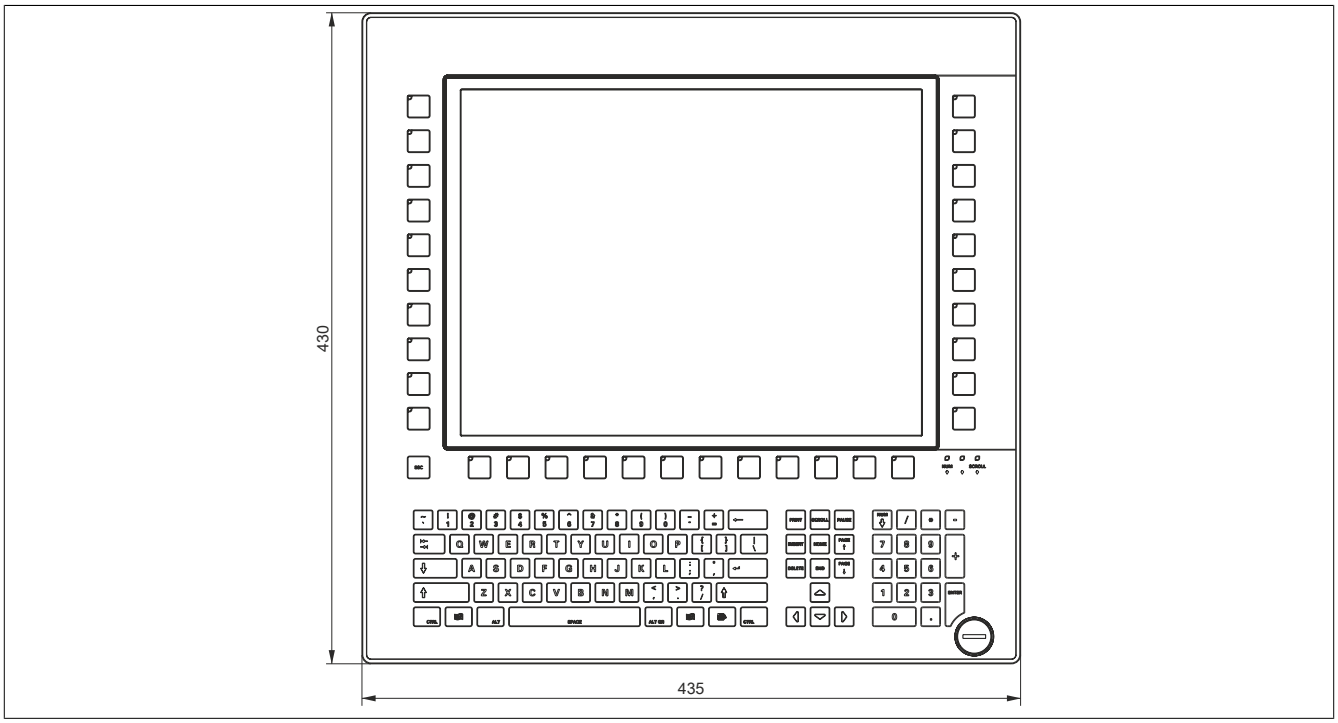


Figure 50: 5AP1181.1505-000 - Dimensions

4.2.1.16.5 Requirements

5AP1181.1505-000 is supported starting with the following firmware versions:

- Firmware V03.15 or later with SDL/DVI receiver 5DLSDL.1001-00
- Firmware V04.11 or later with SDL3 receiver 5DLSD3.1001-00
- Firmware V06.12 or later with SDL4 receiver 5DLSD4.1001-00

4.2.1.16.6 Temperature/Humidity diagram

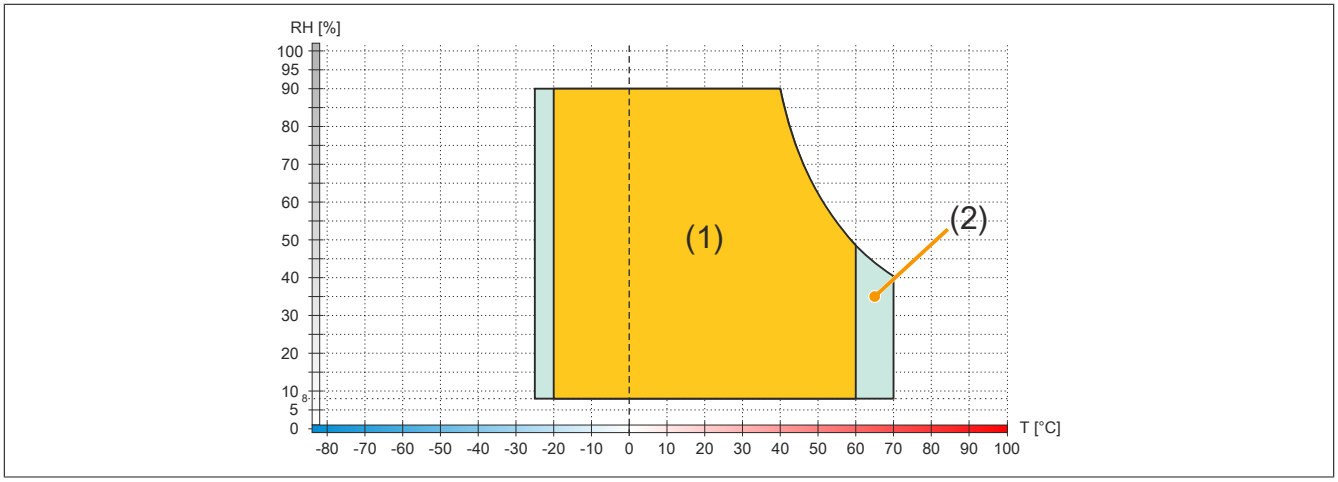


Figure 51: 5AP1181.1505-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.17 5AP1120.156B-000

4.2.1.17.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3100
- 15.6" TFT HD color display
- Single-touch (analog resistive)
- Control cabinet installation

4.2.1.17.2 Order data

Model number	Short description	Figure
	Panels	
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/PPC3100/PPC2200 - For link modules	

Table 35: 5AP1120.156B-000 - Order data

4.2.1.17.3 Technical data

Information:

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

Model number	5AP1120.156B-000
General information	
B&R ID code	0xE8E5
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4 [1)]
Display	
Type	TFT color
Diagonal	15.6"
Colors	16.7 million
Resolution	HD, 1366 x 768 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. 40 to 400 cd/m²
Half-brightness time [2)]	70,000 h
Touch screen [3)]	
Type	AMT
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only

Table 36: 5AP1120.156B-000 - Technical data

Model number	5AP1120.156B-000
Mechanical properties	
Front [4]	
Frame	Aluminum, coated
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket
Dimensions	
Width	414 mm
Height	258.5 mm
Weight	4200 g

Table 36: 5AP1120.156B-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.17.4 Dimensions

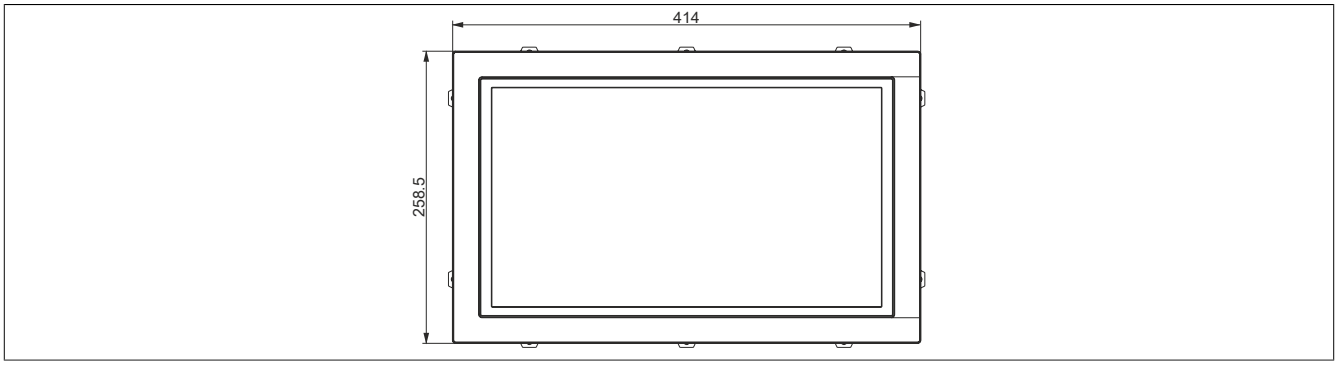


Figure 52: 5AP1120.156B-000 - Dimensions

4.2.1.17.5 Temperature/Humidity diagram

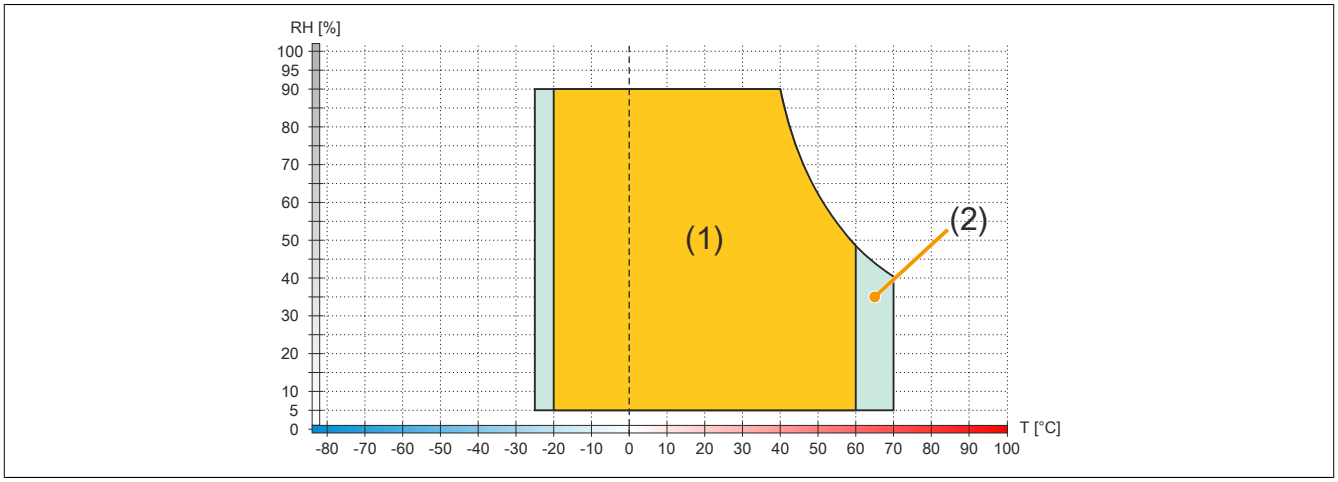


Figure 53: 5AP1120.156B-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.18 5AP1130.156C-000

4.2.1.18.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3100
- 15.6" FHD color display
- Multi-touch (projected capacitive)
- Control cabinet installation

4.2.1.18.2 Order data

Model number	Short description	Figure
	Panels	
5AP1130.156C-000	Automation Panel 15.6" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules	

Table 37: 5AP1130.156C-000 - Order data

4.2.1.18.3 Technical data

Information:

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

Model number	5AP1130.156C-000
General information	
B&R ID code	0xEC5D
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck)[2)]
Display	
Type	TFT color
Diagonal	15.6"
Colors	16.7 million
Resolution	FHD, 1920 x 1080 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. 40 to 400 cd/m²
Half-brightness time [3)]	70,000 h
Touch screen [4)]	
Type	3M
Technology	Projected capacitive touch (PCT)
Controller	3M
Transmittance	See appendix A, section "Touch screen".

Table 38: 5AP1130.156C-000 - Technical data

Model number	5AP1130.156C-000
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only
Mechanical properties	
Front [5]	
Frame	Aluminum, coated
Design	Black
Gasket	3 mm fixed gasket
Dimensions	
Width	414 mm
Height	258.5 mm
Weight	3700 g

Table 38: 5AP1130.156C-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV GL certificate for the product family.
3) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
4) The specifications for the touch screen driver must be taken into account. See chapter 4 "Software", section "Multi-touch drivers".
5) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.18.4 Dimensions

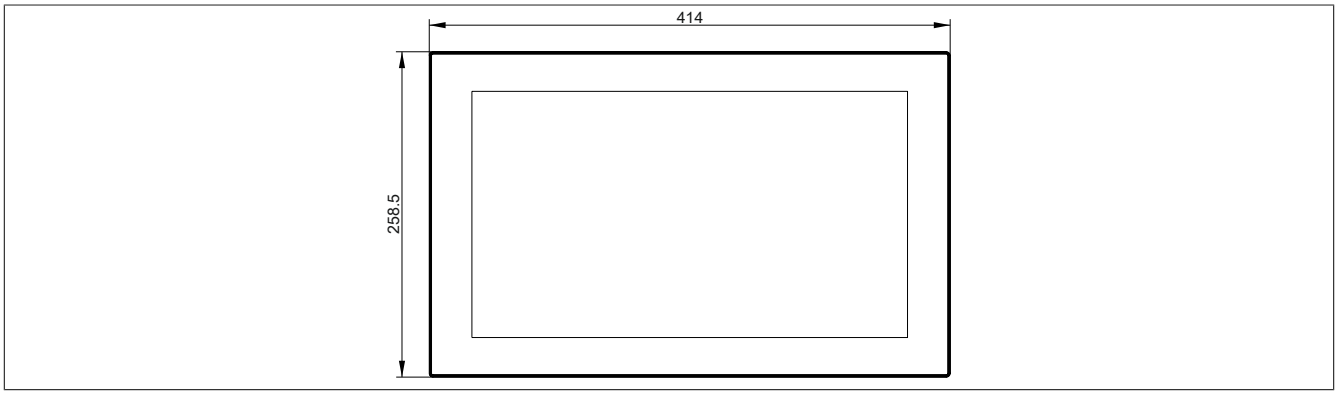


Figure 54: 5AP1130.156C-000 - Dimensions

4.2.1.18.5 Temperature/Humidity diagram

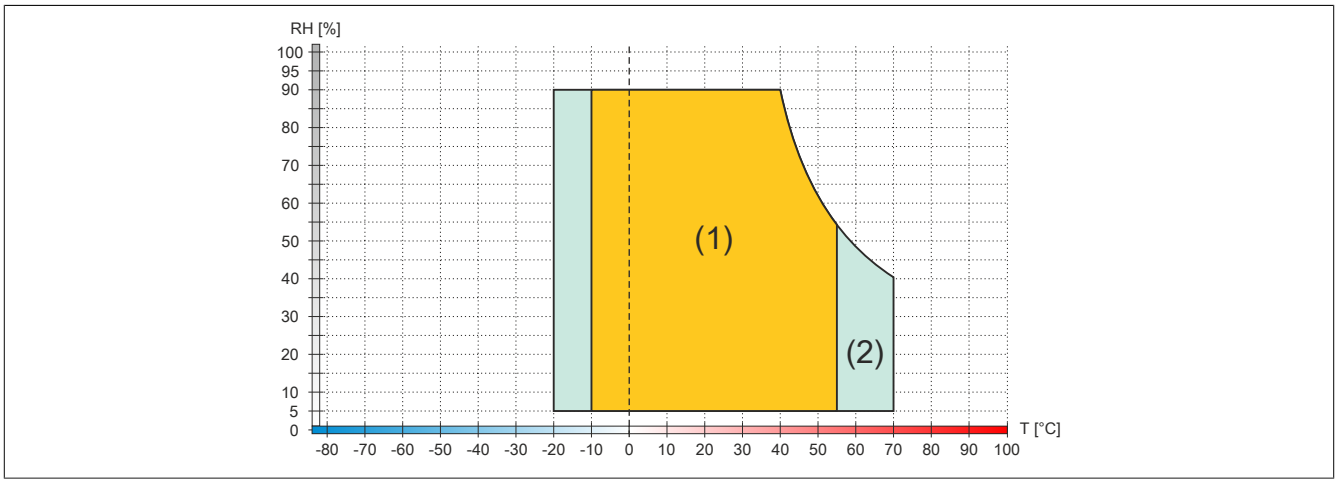


Figure 55: 5AP1130.156C-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.19 5AP1130.185C-000

4.2.1.19.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3100
- 18.5" FHD color display
- Multi-touch (projected capacitive)
- Control cabinet installation

4.2.1.19.2 Order data

Model number	Short description	Figure
	Panels	
5AP1130.185C-000	Automation Panel 18.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules	

Table 39: 5AP1130.185C-000 - Order data

4.2.1.19.3 Technical data

Information:

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

Model number	5AP1130.185C-000
General information	
B&R ID code	0xEC5E
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4 [1)]
Display	
Type	TFT color
Diagonal	18.5"
Colors	16.7 million
Resolution	FHD, 1920 x 1080 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. 40 to 400 cd/m²
Half-brightness time [2)]	50,000 h
Touch screen [3)]	
Type	3M
Technology	Projected capacitive touch (PCT)
Controller	3M
Transmittance	See appendix A, section "Touch screen".
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)

Table 40: 5AP1130.185C-000 - Technical data

Model number	5AP1130.185C-000
Degree of protection per UL 50	Front: Type 4X indoor use only
Mechanical properties	
Front [4]	
Frame	Aluminum, coated
Design	Black
Gasket	3 mm fixed gasket
Dimensions	
Width	475 mm
Height	295 mm
Weight	4700 g

Table 40: 5AP1130.185C-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
3) The specifications for the touch screen driver must be taken into account. See chapter 4 "Software", section "Multi-touch drivers".
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.19.4 Dimensions

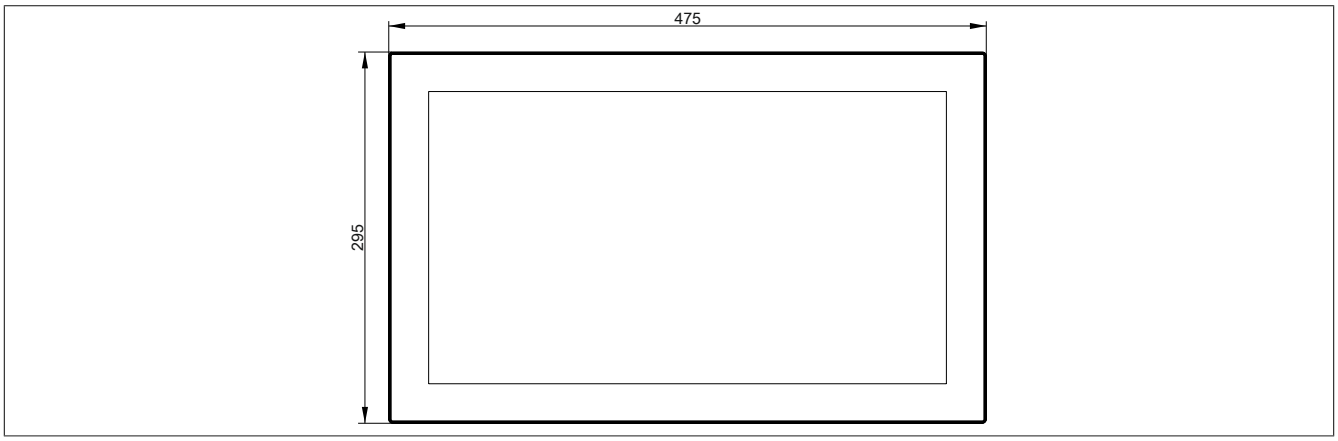


Figure 56: 5AP1130.185C-000 - Dimensions

4.2.1.19.5 Temperature/Humidity diagram

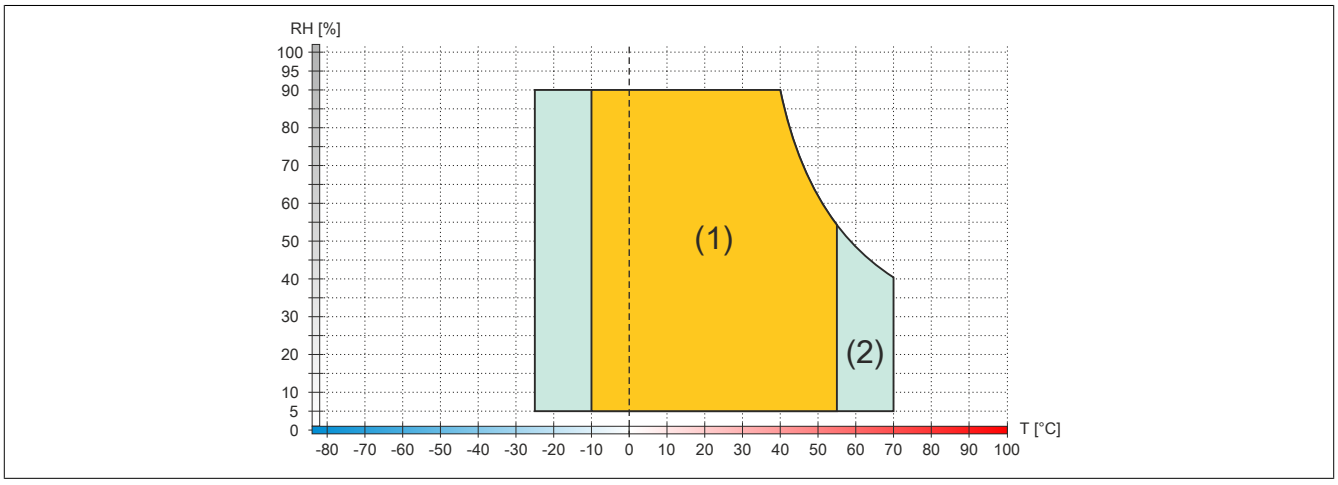


Figure 57: 5AP1130.185C-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.20 5AP1120.1906-000

4.2.1.20.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3100
- 19.0" TFT SXGA color display
- Single-touch (analog resistive)
- Front USB interface
- Control cabinet installation

4.2.1.20.2 Order data

Model number	Short description	Figure
	Panels	
5AP1120.1906-000	Automation Panel 19.0" SXGA TFT - 1280 x 1024 pixels (5:4) - Single-touch (analog resistive) - Control cabinet installation - Landscape format - Front USB - For PPC900/PPC2100/PPC3100/PPC2200 - For link modules - Compatible with 5AP920.1906-01, 5PC720.1906-00, 5PC820.1906-00	

Table 41: 5AP1120.1906-000 - Order data

4.2.1.20.3 Technical data

Information:

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

Model number	5AP1120.1906-000
General information	
B&R ID code	0xE7BE
Certifications	
CE	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck)[2)]
Display	
Type	TFT color
Diagonal	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/m²
Half-brightness time [3)]	70,000 h
Touch screen [4)]	
Type	AMT
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%

Table 42: 5AP1120.1906-000 - Technical data

Model number	5AP1120.1906-000
Interfaces	
USB	
Quantity	1
Type	USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)
Current-carrying capacity	Max. 500 mA
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	Front: IP65 Back: IP20 (only with installed link module or installed system unit)
Degree of protection per UL 50	Front: Type 4X indoor use only
Mechanical properties	
Front [5]	
Frame	Aluminum, naturally anodized
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket
Dimensions	
Width	527 mm
Height	421 mm
Weight	7300 g

Table 42: 5AP1120.1906-000 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV GL certificate for the product family.
3) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
4) Touch screen drivers for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).
5) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.20.4 Dimensions

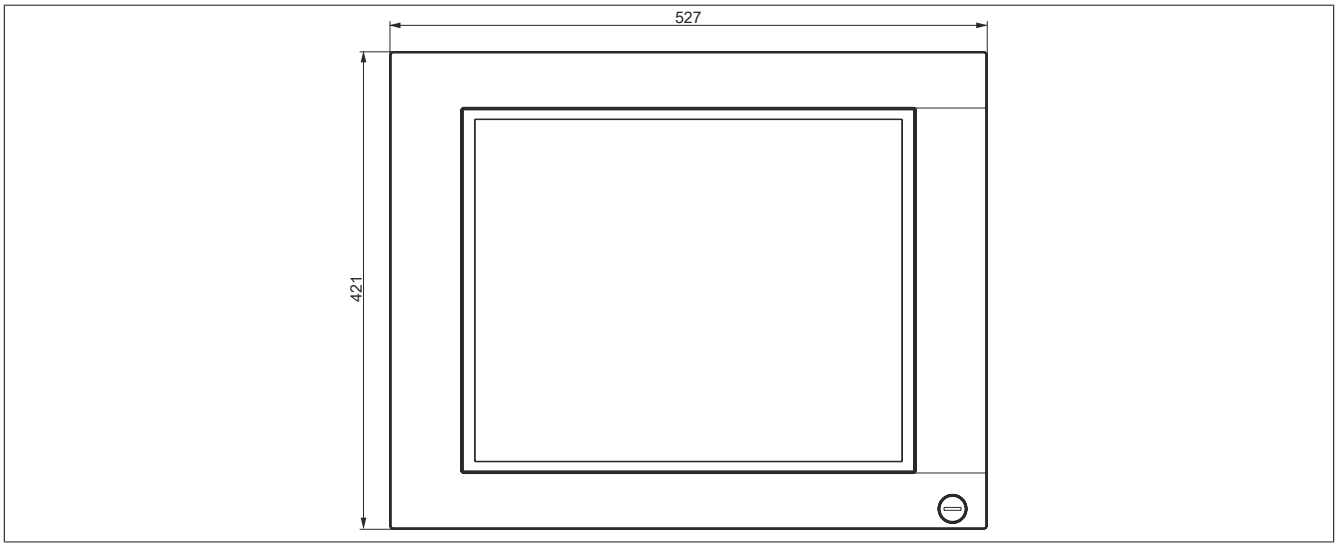


Figure 58: 5AP1120.1906-000 - Dimensions

4.2.1.20.5 Temperature/Humidity diagram

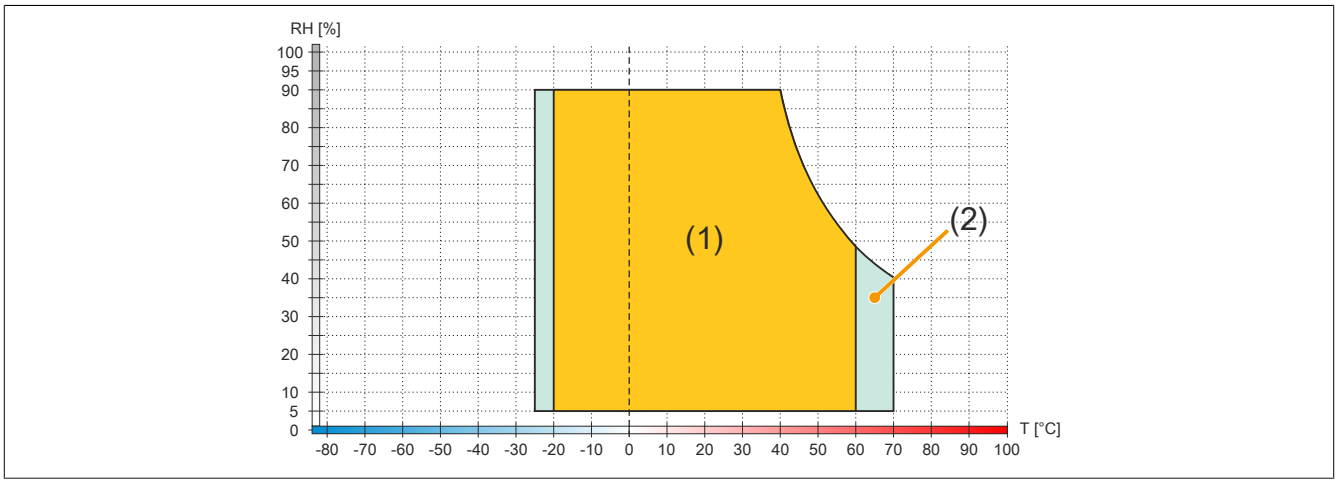


Figure 59: 5AP1120.1906-000 - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.2 Link modules

4.2.2.1 5DLSDL.1001-00

4.2.2.1.1 General information

- Link module for Automation Panel 9x3/1000/5000
- 1x SDL/DVI Panel In interface
- 2x USB 2.0 type A
- 1x USB In (USB type B)
- 1x RS232 interface
- Display brightness buttons

4.2.2.1.2 Order data

Model number	Short description	Figure
	Link modules	
5DLSDL.1001-00	Automation Panel link module - SDL/DVI receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	
	Required accessories	
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm²	
0TB103.91	Connector 24 VDC - 3-pin female - Cage clamp terminal block 3.31 mm²	

Table 43: 5DLSDL.1001-00 - Order data

4.2.2.1.3 Technical data

Information:

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

Model number	5DLSDL.1001-00
General information	
B&R ID code	0xE1A4
Brightness buttons	Yes [1]
Certifications	
CE	Yes
EAC	Product family certification
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[2]
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck)[3]
Interfaces	
COM	
Type	RS232, modem supported, not galvanically isolated
Variant	DSUB, 9-pin, female
UART	16550-compatible, 16-byte FIFO buffer
Max. baud rate	115 kbit/s
USB	
Quantity	3 (2x Type A; 1x Type B)
Type	USB 2.0 [4]
Variant	2x type A 1x type B
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)
Current-carrying capacity	Total max. 1 A [5]
Panel In	
Variant	DVI-D
Type	SDL/DVI
Electrical properties	
Nominal voltage	24 VDC ±25%, SELV [6]

Table 44: 5DLSDL.1001-00 - Technical data

Model number	5DLSDL.1001-00
Nominal current	Max. 3 A
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Mechanical properties	
Dimensions	
Width	190 mm
Height	110 mm
Depth	23.6 mm
Weight	538 g

Table 44: 5DLSDL.1001-00 - Technical data

1) The brightness controls can be used to set the brightness of the backlight on the Automation Panel in DVI operation.
2) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
3) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV GL certificate for the product family.
4) Max. USB 1.1 is possible in "SDL operation without USB cable".
5) For the 2 USB type A female connectors.
6) EN 60950 requirements must be observed; see section "+24 VDC power supply" of the user's manual.

4.2.2.2 5DLSD3.1001-00

4.2.2.2.1 General information

- Link module for Automation Panel 9x3/1000/5000
- 1x SDL3 Panel In interface
- 2x USB 2.0 type A

4.2.2.2.2 Order data

Model number	Short description	Figure
	Link modules	
5DLSD3.1001-00	Automation Panel link module - SDL3 receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	
	Required accessories	
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm²	
0TB103.91	Connector 24 VDC - 3-pin female - Cage clamp terminal block 3.31 mm²	
	Optional accessories	
	SDL3/SDL4/PoE cables	
5CASD3.0030-00	SDL3/SDL4/PoE cable - 3 m	
5CASD3.0050-00	SDL3/SDL4/PoE cable - 5 m	
5CASD3.0100-00	SDL3/SDL4/PoE cable - 10 m	
5CASD3.0150-00	SDL3/SDL4/PoE cable - 15 m	
5CASD3.0200-00	SDL3/SDL4/PoE cable - 20 m	
5CASD3.0300-00	SDL3/SDL4/PoE cable - 30 m	
5CASD3.0500-00	SDL3/SDL4/PoE cable - 50 m	
5CASD3.1000-00	SDL3/SDL4/PoE cable - 100 m	

Table 45: 5DLSD3.1001-00 - Order data

4.2.2.2.3 Technical data

Information:

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

Model number	5DLSD3.1001-00
General information	
LEDs	Status, Link
B&R ID code	0xE3FC
Certifications	
CE	Yes
EAC	Product family certification
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]
Interfaces	
USB	
Quantity	2
Type	USB 2.0
Variant	2x type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
Current-carrying capacity	Total max. 1 A
SDL3 In	
Variant	RJ45, shielded
Type	SDL3
Electrical properties	
Nominal voltage	24 VDC ±25%, SELV [2)]
Nominal current	Max. 3 A
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2

Table 46: 5DLSD3.1001-00 - Technical data

Model number	5DLSD3.1001-00
Mechanical properties	
Dimensions	
Width	190 mm
Height	110 mm
Depth	23.6 mm
Weight	527 g

Table 46: 5DLSD3.1001-00 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) EN 60950 requirements must be observed; see section "+24 VDC power supply" of the user's manual.

4.2.2.3 5DLSD4.1001-00

4.2.2.3.1 General information

- Link module for Automation Panel 9x3/1000/5000
- 1x SDL4 Panel In interface
- 2x USB 2.0 type A

4.2.2.3.2 Order data

Model number	Short description	Figure
	Link modules	
5DLSD4.1001-00	Automation Panel link module - SDL4 receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	
	Required accessories	
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm²	
0TB103.91	Connector 24 VDC - 3-pin female - Cage clamp terminal block 3.31 mm²	
	Optional accessories	
	SDL3/SDL4/PoE cables	
5CASD3.0030-00	SDL3/SDL4/PoE cable - 3 m	
5CASD3.0050-00	SDL3/SDL4/PoE cable - 5 m	
5CASD3.0100-00	SDL3/SDL4/PoE cable - 10 m	
5CASD3.0150-00	SDL3/SDL4/PoE cable - 15 m	
5CASD3.0200-00	SDL3/SDL4/PoE cable - 20 m	
5CASD3.0300-00	SDL3/SDL4/PoE cable - 30 m	
5CASD3.0500-00	SDL3/SDL4/PoE cable - 50 m	
5CASD3.1000-00	SDL3/SDL4/PoE cable - 100 m	

Table 47: 5DLSD4.1001-00 - Order data

4.2.2.3.3 Technical data

Information:

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

Model number	5DLSD4.1001-00
General information	
LEDs	Status, Link
B&R ID code	0xECE3
Certifications	
CE	Yes
EAC	Product family certification
UL	cULus E115267 Industrial control equipment
Interfaces	
USB	
Quantity	2
Type	USB 2.0
Variant	2x type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)
Current-carrying capacity	Total max. 1 A
SDL4 In	
Variant	RJ45, shielded
Type	SDL4
Electrical properties	
Nominal voltage	24 VDC ±25%, SELV [1)]
Nominal current	Max. 3 A
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2

Table 48: 5DLSD4.1001-00 - Technical data

Model number	5DLSD4.1001-00
Mechanical properties	
Dimensions	
Width	190 mm
Height	110 mm
Depth	23.6 mm
Weight	525 g

Table 48: 5DLSD4.1001-00 - Technical data

1) EN 60950 requirements must be observed; see section "+24 VDC power supply" of the data sheet.

5 Installation and wiring

5.1 Basic information

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

Unpacking

The following activities must be performed before unpacking the device:

- Check the packaging for visible transport damage.
- If transport damage is noticeable, document this immediately and submit a complaint. If possible, have the damage confirmed by the carrier/delivery service.
- Check the contents of the shipment for completeness and damage.
- If the contents of the packaging are incomplete, damaged or do not correspond to your order, you must immediately inform your responsible sales office or B&R Headquarters.
- Keep the original packaging for further transport.

Power supply

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

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

Installation

Information:

Optional sets are available that contain all necessary tools for installation. For more information about tool sets, see section "General accessories" on page 140.

Before installation

Caution!

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

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

- Allow sufficient space for installation, operation and maintenance of the device.
- The device must be installed on a flat, clean and burr-free surface.
- The wall or control cabinet plate must be able to support four times the total weight of the device. If necessary, bracing must be attached to reinforce the mounting surface.
- To avoid overheating, the device is not permitted to be placed near other heat sources.

Information about the device's environment

- Observe the notes and regulations regarding the power supply and functional ground.
- Observer the specified bend radius when connecting cables.
- Any ventilation holes are not permitted to be covered.
- This device is only approved for use in closed rooms and not permitted to be exposed to direct sunlight.
- The climatic and ambient conditions must be taken into account, see "Environmental properties" on page 33.

General installation instructions

- Inclined installation reduces the air convection through the device and thus the maximum permissible ambient temperature for operation. If there is sufficient external ventilation in an inclined mounting orientation, the maximum permissible ambient temperature must be checked in each individual case. Failure to do so may result in damage to the equipment and void the certifications and warranty for the device.
- When installing the device, the permissible mounting orientations must be observed - .
- The device must be installed in such a way that it can be optimally viewed by the user.
- The device must be installed in such a way that reflections on the screen are avoided as far as possible.
- When installed in a closed housing, there must be sufficient volume for air circulation,
- When connecting installed or connected peripherals, follow the instructions in the peripheral device's documentation.

Information about the gasket

The gasket must be inspected at regular intervals as well as during installation and reinstallation. If any defects are determined on the gasket during this inspection, it must be replaced and the entire device inspected. The following points must also be observed:

- Do not stretch the gasket unnecessarily.
- Avoid contact between the gasket and the corners and edges of the frame.
- It is important to ensure that the gasket is completely inserted into the installation notch.
- The housing components must be secured using the specified tightening torque.

Transport and storage

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

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

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

5.2 Installing the AP1000 with retaining clips

The Automation Panel 1000 is installed in the installation cutout using retaining clips. The number of retaining clips depends on the panel.

The following Automation Panel 1000 devices are installed using retaining clips:

- 5AP1120.0573-000
- 5AP1151.0573-000
- 5AP1120.0702-000
- 5AP1130.0702-000
- 5AP1120.101E-000
- 5AP1130.101E-000
- 5AP1120.1043-000
- 5AP1180.1043-000
- 5AP1120.121E-000
- 5AP1130.121E-000
- 5AP1120.156B-000
- 5AP1130.156C-000
- 5AP1130.185C-000

The thickness of the wall or control cabinet plate must be at least 1 mm and is not permitted to exceed 6 to10 mm (depending on the Panel used).

A 2.5 mm hex screwdriver is needed to tighten and remove the screw on the retaining clips. The maximum tightening torque of the retaining clips is 1 Nm.

The device must be installed on a flat, clean and burr-free surface since tightening screws on an uneven area can result in damage to the display or the ingress of dust and water.

Procedure

1. Check whether the supplied mounting screws (1) are screwed into the retaining clips (2). If this is not the case, then the mounting screws must be screwed into the retaining clips with a 2.5 mm hex screwdriver (view A). The mounting screws are only permitted to be screwed in to the point where they do not project beyond the retaining clip (view B).

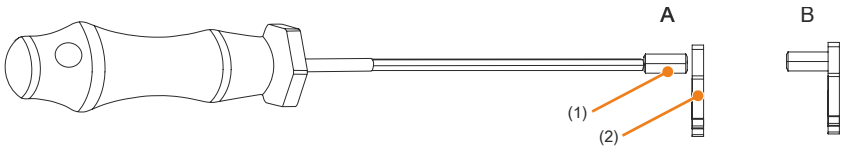


Figure 60: Preparing the retaining clips

2. Insert the device into the front of the prepared, burr-free and flat installation cutout. For the dimensions of the installation cutout, see Fig. X "AP1000 panels with retaining clips - Installation diagrams" on page .
3. Install the retaining clips on the device. To do this, insert all retaining clips into the recesses (marked with orange circles) on the device. The number of retaining clips may vary depending on the panel. For the exact number, see Fig. X "AP1000 panels with retaining clips - Installation diagrams" on page .

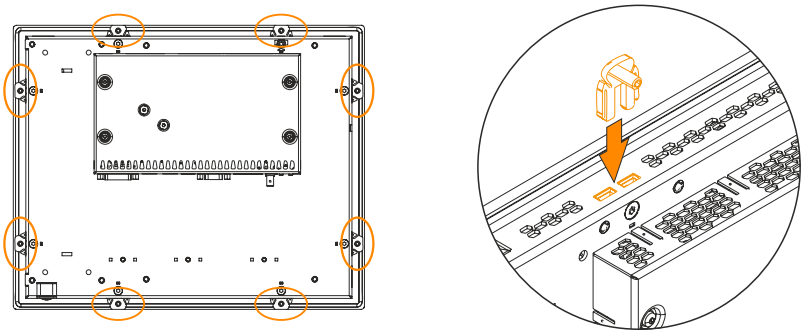


Figure 61: Inserting the retaining clips

4. Secure the retaining clips to the wall or control cabinet plate (1) by alternately tightening the mounting screws with a 2.5 mm hex screwdriver. The tightening torque for optimal sealing should be max. 1 Nm.

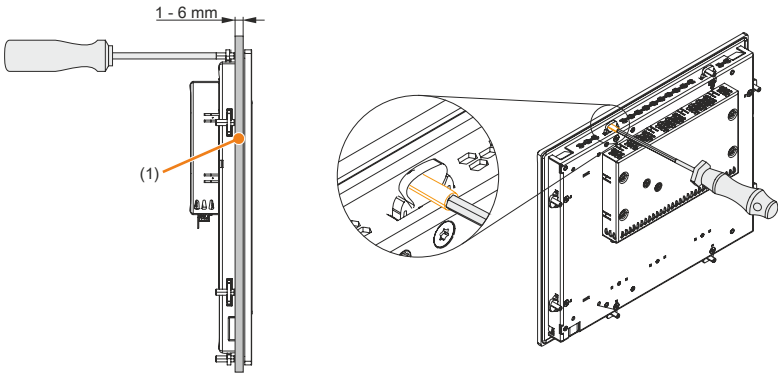


Figure 62: Fastening the retaining clips

5.3 Installing the AP1000 with clamping blocks

The Automation Panel 1000 is installed in the installation cutout using clamping blocks. The number of clamping blocks depends on the panel.

The following Automation Panel 1000 systems are installed using clamping blocks:

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

The thickness of the wall or control cabinet plate must be at least 2 mm and is not permitted to exceed 10 mm.

A 3 mm hex screwdriver is needed to tighten or remove the screw on the clamping block. The maximum tightening torque of the screw is 0.5 Nm.

The device must be installed on a flat, clean and burr-free surface since tightening screws on an uneven area can result in damage to the display or the ingress of dust and water.

Procedure

1. Insert the device into the front of the prepared, burr-free and flat installation cutout.
   For the dimensions of the installation cutout and the number of clamping blocks for the panel, see section "Installation diagrams" on page 27.

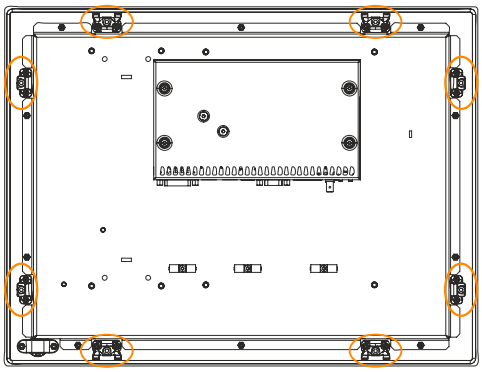


Figure 63: Position of the clamping blocks

2. Secure the clamping blocks to the wall or control cabinet plate (1) by alternately tightening the mounting screws with a 3 mm hex screwdriver. The mounting screws push the clamping lever downwards, which in turn clamps the device to the wall or control cabinet plate. The tightening torque for optimal sealing should be max. 0.5 Nm.

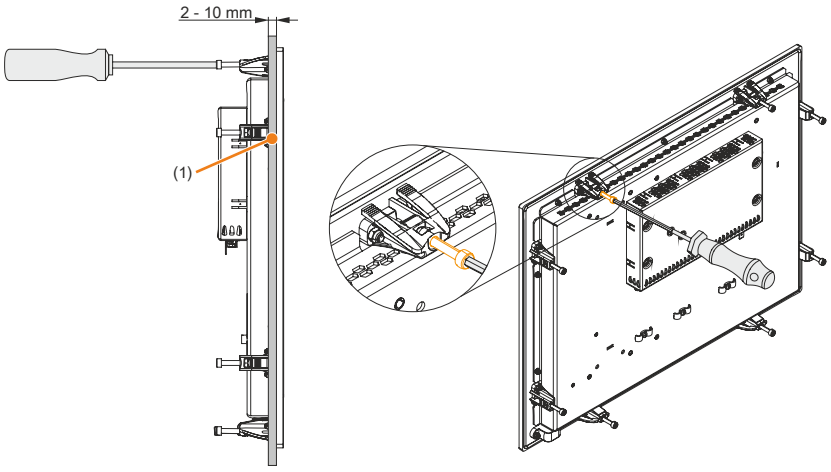


Figure 64: Fastening the clamping blocks

5.4 Switch the link module

1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at 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 figure.

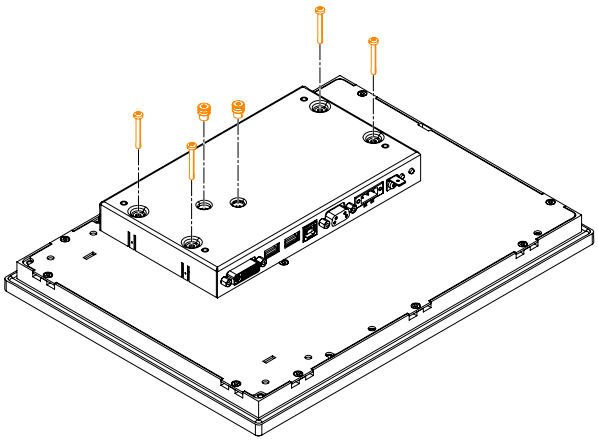


Figure 65: Removing the Torx screws

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

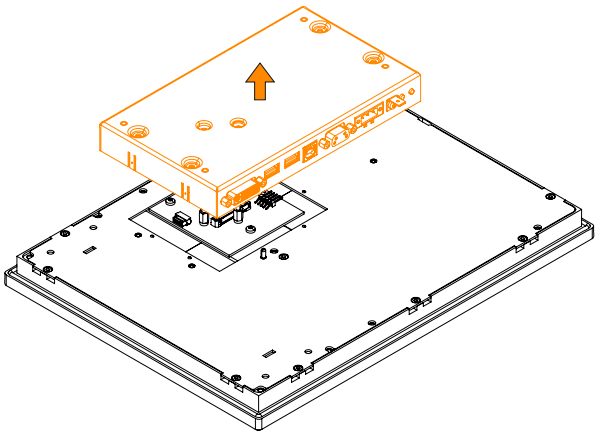


Figure 66: Removing the link module

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

5.5 Connecting to the power grid

Danger!

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

5.5.1 Installing the DC power cable

Danger!

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

5.5.1.1 Wiring

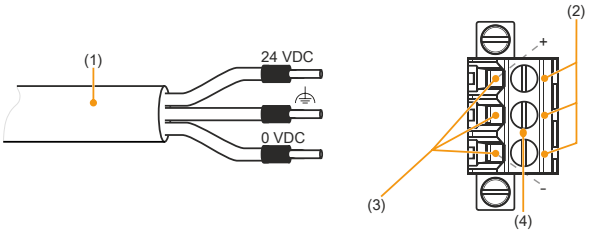
Install the DC power cable on the terminal block (power supply connector) as shown in the figure below. Conductors with a cross section of 0.75 mm² to 1.5 mm² and wire end sleeve must be used.

Caution!

The pinout of the power supply interface must be observed!

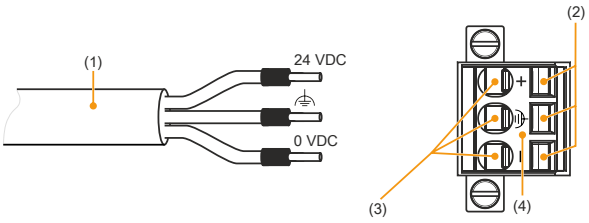
Installing screw clamp terminal block 0TB103.9

Secure the conductors with wire end sleeves in the terminal contacts ② as shown in the figure below and tighten the screw clamp terminals ① with a screwdriver (max. tightening torque 0.4 Nm).



Installing cage clamp terminal block 0TB103.91

Insert a screwdriver into the cage clamp terminals ① and secure the conductors with wire end sleeves in the terminal contacts ② as shown in the figure below. Close the terminal contact by removing the screwdriver.



5.5.2 Connecting the power supply to a B&R device

Danger!

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

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

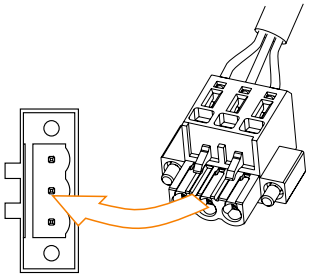


Figure 67: Connecting the power supply connector to a B&R device

5.5.3 Grounding concept - Functional ground

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

The device is equipped with 2 functional ground connections:

- Functional ground connection of the power supply
- Ground connection

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

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

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

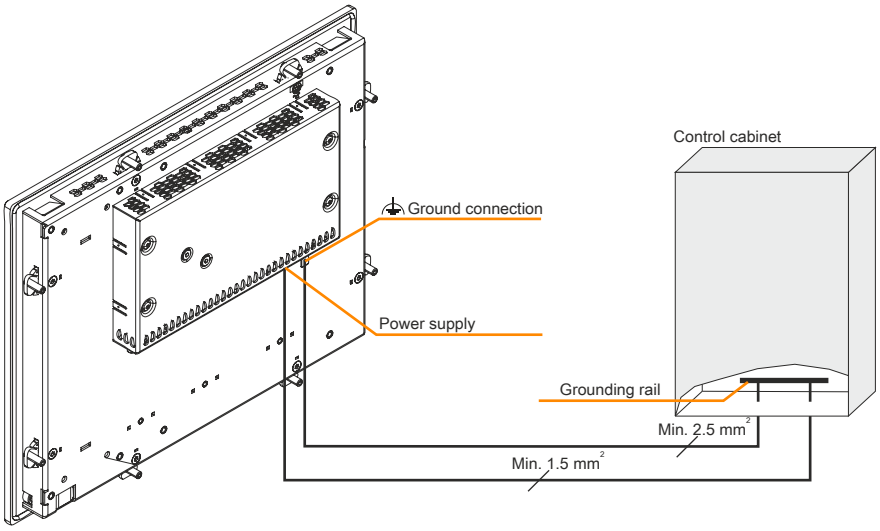


Figure 68: Automation Panel 1000 - Grounding concept

5.6 Connecting cables

Information:

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

When connecting or installing cables, the bend radius specification must be observed. For this specification, see the technical data of the respective cable.

The maximum tightening torque of the locating screws is 0.5 Nm.

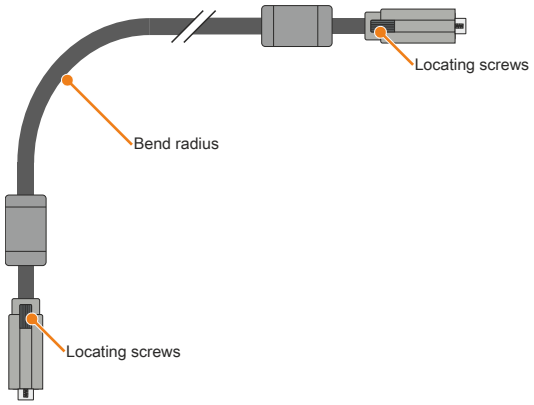


Figure 69: Connecting cables - Bend radius

6 Commissioning

6.1 Basic information

Before the device is started up, it must be gradually adapted to room temperature!

6.2 Switching on the device for the first time

6.2.1 General information before switching on the device

Checklist

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

- Have the installation instructions been observed as described in "Installation and wiring" on page 115?
- Have the permissible ambient conditions and environmental conditions for the device been taken into account?
- Is the power supply connected correctly and have the values been checked?
- Is the ground cable correctly connected to the ground connection?
- Before installing additional hardware, the device must have been started up.

Caution!

Before the device is started up, it must be gradually adapted to room temperature! Exposure to direct heat radiation is not permitted.

When transporting at low temperatures or in the event of large temperature fluctuations, the collection of moisture in or on the device is not permitted.

Moisture can cause short circuits in electrical circuits and damage the device.

Requirements

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

- The protective film has been removed from the panel.
- The functional ground connections are as short as possible and connected to the central grounding point using the largest possible wire cross section.
- All connection cables are connected correctly.
- A USB keyboard and USB mouse are connected (optional).
- An Automation PC or Panel PC is connected (via DVI, SDL, SDL3 or SDL4).

6.2.2 Switching on the Automation Panel

Procedure

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

6.3 Touch screen calibration

B&R touch screen devices are equipped with a B&R touch controller that supports hardware calibration. This means that these devices are pre-calibrated at the factory. This feature offers great advantages especially for replacement parts since recalibration is usually no longer required when replacing a device (identical model/type). We still recommend calibration for best results and to adapt the touch screen to the needs of the user.

6.3.1 Single-touch (analog resistive)

6.3.1.1 Windows 10 IoT Enterprise 2016 LTSB

After starting Windows 10 IoT Enterprise 2016 LTSB on a Panel PC for the first time, the appropriate touch screen driver is installed automatically.

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

6.3.1.2 Windows 10 IoT Enterprise 2015 LTSB

After starting Windows 10 IoT Enterprise 2015 LTSB on a Panel PC for the first time, the appropriate touch screen driver is installed automatically.

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

6.3.1.3 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 subsequently installed to operate the touch screen. The appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.3.1.4 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 appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.3.1.5 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 when installing Windows Embedded Standard 7 or if an Automation Panel has been connected after installation. The appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.3.1.6 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 appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.3.1.7 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 subsequently installed to operate the touch screen. The appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.3.2 Multi-touch (projected capacitive - PCT)

6.3.2.1 Windows 10 IoT Enterprise 2016 LTSB

Microsoft multi-touch drivers are installed on the device during installation of Windows 10 IoT Enterprise 2016 LTSB. After successful installation of Windows 10 IoT Enterprise 2016 LTSB, the device is immediately ready for operation.

6.3.2.2 Windows 10 IoT Enterprise 2015 LTSB

Microsoft multi-touch drivers are installed on the device during installation of Windows 10 IoT Enterprise 2015 LTSB. After successful installation of Windows 10 IoT Enterprise 2015 LTSB, the device is immediately ready for operation.

6.3.2.3 Windows Embedded 8.1 Industry Pro

Microsoft multi-touch drivers are installed on the device during installation of Windows Embedded 8.1 Industry Pro. After successful installation of Windows Embedded 8.1 Industry Pro, the device is immediately ready for operation.

6.3.2.4 Windows 7 Professional / Ultimate

Microsoft multi-touch drivers are installed on the device during installation of Windows 7. After successful installation of Windows 7, the device is immediately ready for operation.

6.3.2.5 Windows Embedded Standard 7 Premium

Microsoft multi-touch drivers are installed on the device during installation of Windows Embedded Standard 7 Premium. After successful installation of Windows Embedded Standard 7 Premium, the device is immediately ready for operation.

6.4 Display brightness control

In SDL, SDL3 or SDL4 operation, the brightness of the display can be configured using the B&R Control Center on the connected B&R industrial PC, for example. In DVI operation, the brightness can only be controlled using the two brightness controls provided on the SDL/DVI receiver.

6.4.1 Adjusting in SDL / SDL3 / SDL4 mode

1. Open **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.

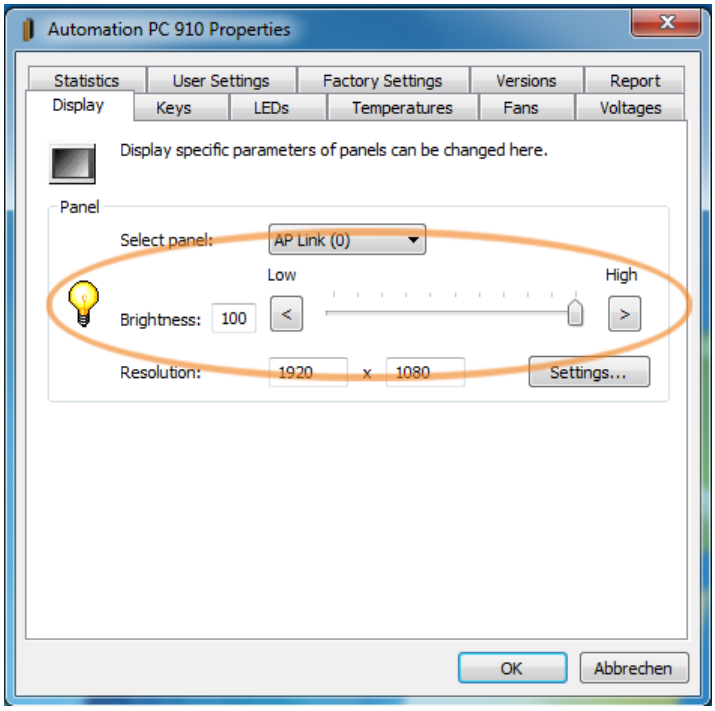


Figure 70: Adjusting the display brightness

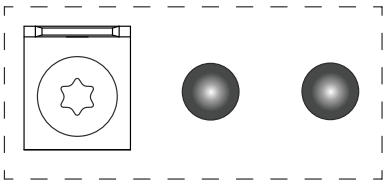
Information:

The changed settings are displayed online but only applied by the system (and used after the next restart) if the Control Center is exited with *OK*.

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

6.4.2 Adjusting in DVI operation

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



7 Software

7.1 Upgrade information

Warning!

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

7.1.1 Firmware upgrade - Automation Panels

With "Firmware upgrade (Automation Panel, SDL3 Converter)", it is possible to update the firmware of several controllers (SDLR, SDL3R, SDL4R, SDL3 Converter) depending on the variant of the system.

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

Caution!

The Automation Panel is not permitted to be switched off or reset while performing an upgrade!

7.2 Multi-touch drivers

Multi-touch panels are approved as human-interface devices (i.e. multi-touch support from the operating system) for the following operating systems:

- Windows 10 IoT Enterprise 2016 LTSB
- Windows 10 IoT Enterprise 2015 LTSB
- Windows Embedded 8.1 Industry Pro
- Windows 7 Professional/Ultimate
- Windows Embedded Standard 7 Premium
- B&R Linux 8 and 9

No guarantee can be given for multi-touch or single-touch operation, compatibility and functionality for operation with other operating systems and/or individual touch screen drivers.

7.3 Automation Runtime

7.3.1 General information

The Automation Runtime real-time operating system is an integral part of Automation Studio. This real-time operating system makes up the software kernel that allows applications to run on a target system.

- Guarantees the highest possible performance for the hardware used
- Runs on all B&R target systems
- Makes the application hardware-independent
- Easy portability of applications between B&R target systems
- Guaranteed determinism through cyclic system
- Configurable jitter tolerance in all task classes
- Support for all relevant programming languages, such as IEC 61131-3 languages and C
- Rich function library per IEC 61131-3 and additionally the extended B&R Automation Library
- Integrated in Automation NET. Access to all networks and bus systems via function calls or by configuration in Automation Studio™

B&R Automation Runtime is fully embedded in the corresponding target system (hardware on which Automation Runtime is installed). It thus enables application programs to access I/O systems (also via the fieldbus) and other devices such as interfaces and networks.

7.3.2 Automation Runtime Embedded (ARemb)

The following software versions (or higher) are required to operate Automation Runtime Embedded with an Automation Panel 1000:

- Automation Studio V4.0.17.x
  - There is support starting from this version exclusively for 5AP1120* single-touch panels.
- Automation Studio V4.1.4.x
  - There is support with single-touch functionality starting with this version for single-touch Panel 5AP1120.101E-000.
- Automation Studio V4.2.5 and ARemb upgrade AR M4.10 or AR I4.25
  - There is support with single-touch functionality starting with this version for multi-touch panels 5AP1130.0702-000, 5AP1130.101E-000 and 5AP1130.121E-000.
- Automation Studio V4.2.5 and ARemb upgrade AR N4.10 or AR A4.26
  - There is support with single-touch functionality starting with this version for multi-touch panels 5AP1130.156C-000 and 5AP1130.185C-000.

Information:

For exact information regarding model numbers and Automation Runtime Windows (ARwin) support, see the user's manual for the B&R industrial PC being used. This is available in the Downloads section of the B&R website (www.br-automation.com).

7.4 Control Center

The Automation Device Interface (ADI) allows access to specific functions of B&R devices. The settings of these devices can be read out and changed in Windows using the B&R Control Center in the Control Panel.

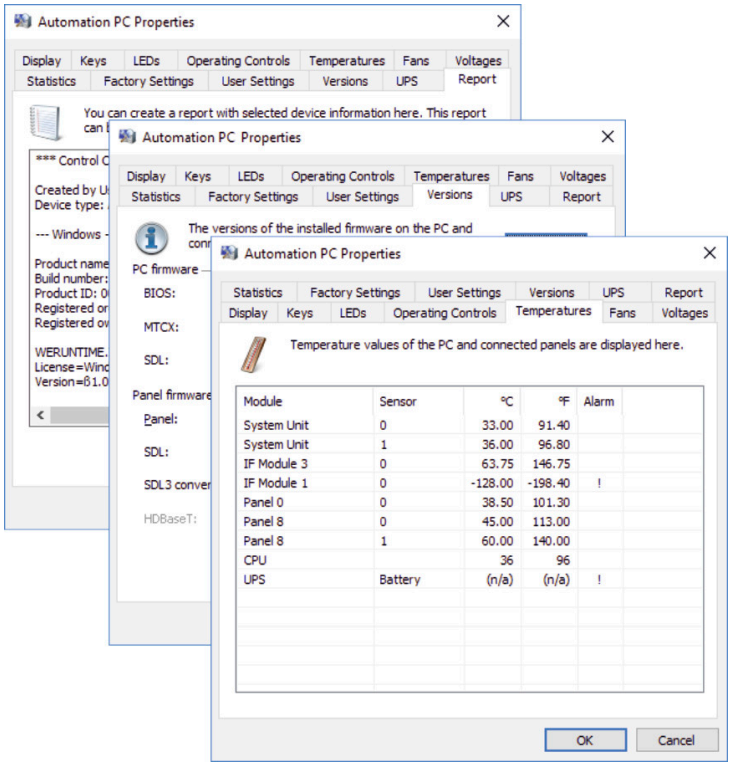


Figure 71: B&R Control Center screenshots - Examples

Information:

The displayed temperature and voltage values (e.g. CPU temperature, core voltage, battery voltage) represent uncalibrated information values. No conclusions about possible alarms or hardware malfunctions can be drawn from this. The hardware components used have automatic diagnostic functions in the event of error.

7.4.1 Functions

Information:

The functions available in the Control Center depend on the device family.

- Changing display-specific parameters
- Reading out device-specific keys
- Updating the key configuration
- Testing keys or device-specific LEDs of a membrane keypad
- Reading out or calibrating control devices (e.g. key switch, handwheel, joystick, potentiometer)
- Reading out temperatures, fan speeds, switch positions and statistical data
- Reading out operating hours (power-on hours)
- Reading user settings and factory settings
- Reading software versions
- Updating and backing up BIOS and firmware
- Creating reports for the current system (support)
- Setting the SDL equalizer value for the SDL cable adjustment
- Changing the user serial ID

Depending on the version, a detailed description of the Control Center is available either in the integrated help documentation or in the user documentation.

7.4.2 Installation

The B&R Automation Device Interface (ADI) driver (also includes the Control Center) and user documentation can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

Information:

The ADI driver is included in most B&R Windows operating systems or can be installed on request.

If a more recent ADI driver version exists (see the Downloads section of the B&R website), it can be installed later. The write filter must be disabled during installation.

7.5 Development kit

This software allows functions of the B&R Automation Device Interface (ADI) to be accessed from Windows applications created with Microsoft Visual Studio, for example:

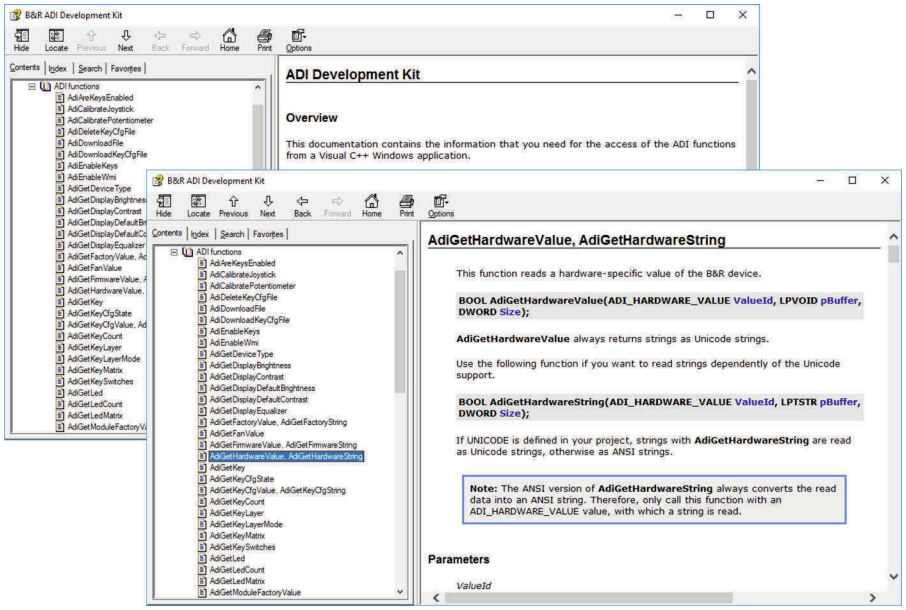


Figure 72: ADI Development Kit screenshots

Features:

- Header files and import libraries
- Help files
- Example projects
- ADI DLL (for testing applications if no ADI driver is installed)

The appropriate ADI driver for the device must be installed on the mentioned product family. The ADI driver is already included in B&R images of embedded operating systems.

For a detailed description of how to use ADI functions, see Automation Help.

The B&R ADI Development Kit can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

7.6 .NET SDK

This software allows functions of the B&R Automation Device Interface (ADI) to be accessed from .NET applications created with Microsoft Visual Studio.

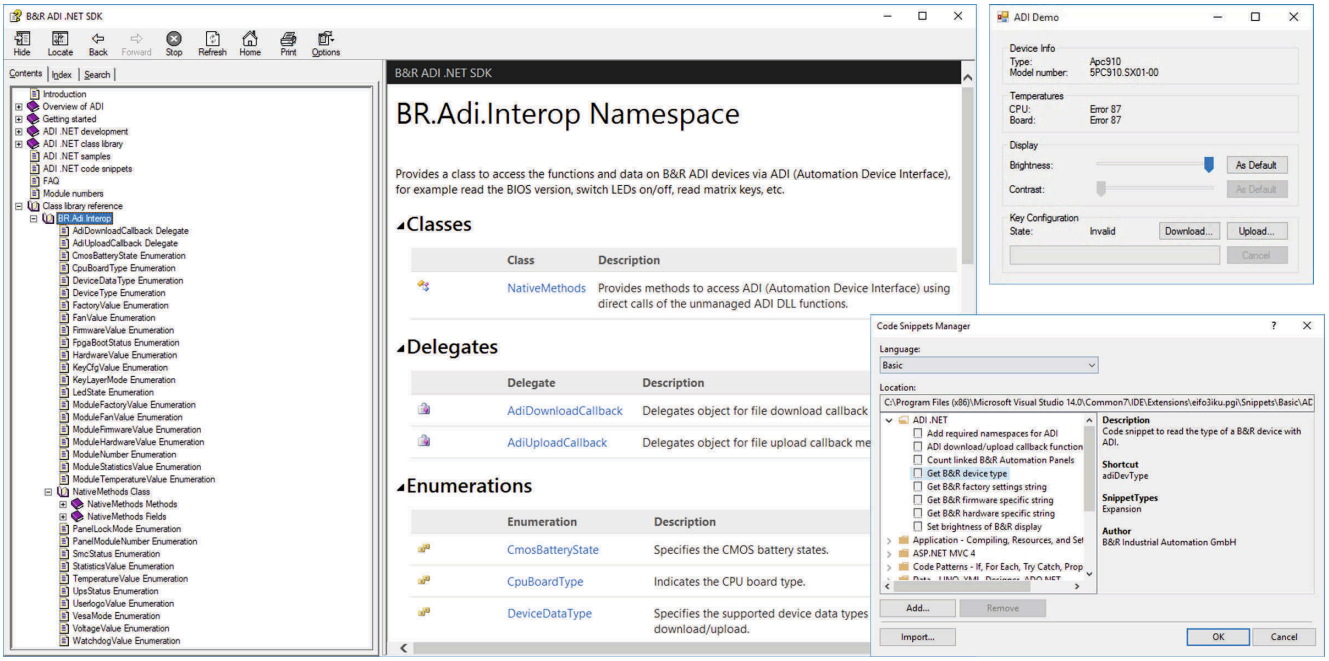


Figure 73: ADI .NET SDK screenshots

Features:

- ADI .NET class library
- Help files (help documentation is in English)
- Sample projects and code snippets
- ADI DLL (for testing applications if no ADI driver is installed)

The appropriate ADI driver for the device must be installed on the mentioned product family. The ADI driver is already included in B&R images of embedded operating systems.

For a detailed description of how to use ADI functions, see Automation Help.

The ADI .NET SDK can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

7.7 B&R Key Editor

A frequently occurring requirement for panels is adapting function keys and LEDs to the application software. With the B&R Key Editor, individual adaptation to the application is possible quickly and easily.

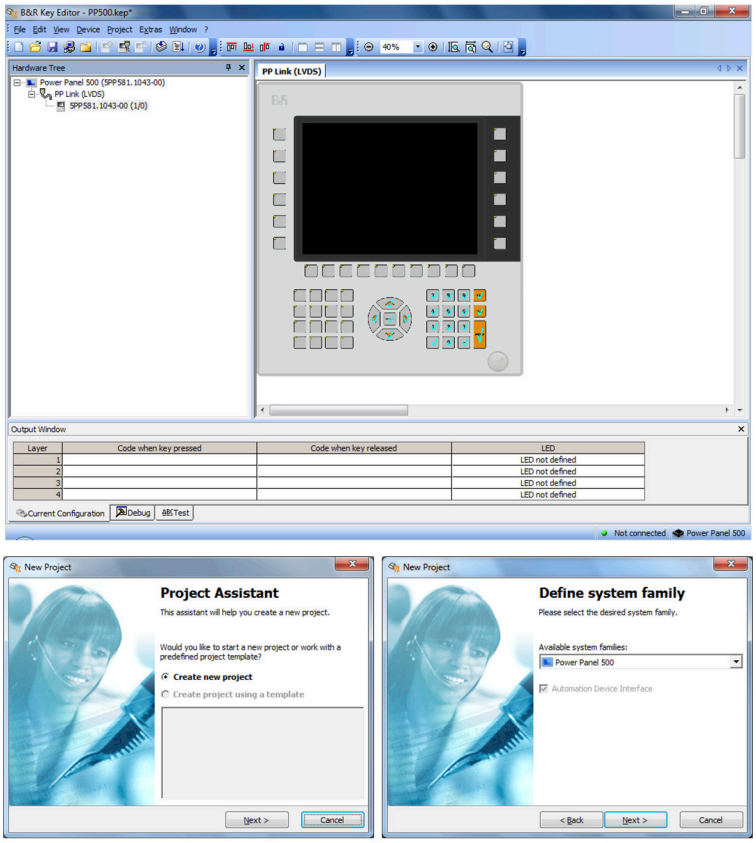


Figure 74: B&R Key Editor screenshots (symbolic image)

Features:

- Configuration of normal keys like on a keyboard (A, B, C, etc.)
- Keyboard shortcuts (CTRL+C, SHIFT+DEL, etc.) on one key
- 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 lock time when connecting several Automation Panel devices to Automation PCs and Panel PCs

For detailed instructions about configuring keys and LEDs and installing the key configuration on the target system, see the help documentation for the B&R Key Editor. The B&R Key Editor and help documentation can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

7.8 B&R KCF Editor

The B&R KCF Editor can be used as a simple alternative to the B&R Key Editor. It can also be used to adapt function keys and LEDs to the application software. In contrast to the B&R Key Editor, operation does not take place using a graphical representation of the device, but via a simple Windows dialog box. The B&R KCF Editor can therefore also 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 directly from a USB flash drive without installation on the target device, for example. An installed ADI driver is required for the full range of functions.

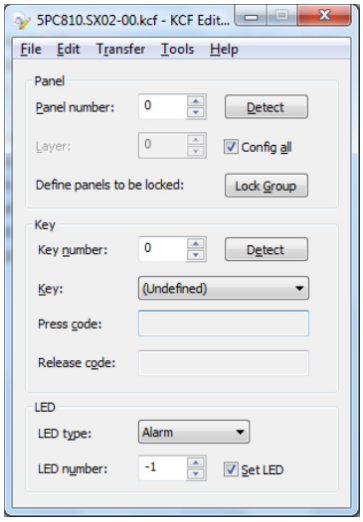


Figure 75: B&R KCF Editor version 1.0 screenshot

Features

- Configuration of normal keys like on a keyboard (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 lock time when connecting several Automation Panel devices to B&R PCs.
- Export and import of the configuration (via INI files)
- Save configuration as report (text file)

Additional features if the KCF Editor is executed on the target device[3)]

- Panel and key detection
- LED test
- Download/Upload the configuration

[3)] The ADI driver must be installed on the B&R PC for these features.

7.9 HMI Service Center

7.9.1 5SWUTI.0001-000

7.9.1.1 General information

The HMI Service Center is software for testing B&R industrial PCs and Automation Panels. Testing covers different categories such as COM, network and SRAM.

The test system consists of a USB flash drive with the Windows PE operating system and HMI Service Center installed on it.

For details about the HMI Service Center, see the HMI Service Center user's manual. This can be downloaded at no cost from the B&R website (www.br-automation.com).

7.9.1.2 Order data

Model number	Short description	Figure
	Accessories	
5SWUTI.0001-000	HMI Service Center USB flash drive - Hardware diagnostic software - For APC810/PPC800 - For APC910/PPC900 - For APC2100/PPC2100 - For APC2200/PPC2200 - For APC3100/PPC3100 - For APC51x/PP500 - For Automation Panel 800/900 - For Automation Panel 1000/5000	

Table 49: 5SWUTI.0001-000 - Order data

8 Maintenance

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

Information:

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

8.1 Cleaning

Danger!

The device is only permitted to be cleaned when it is switched off in order to avoid triggering unintentional functions by touching the touch screen or pressing keys.

Use a damp cloth to clean the device. Use only water with detergent, screen cleaner or alcohol (ethanol) to moisten the cleaning cloth. Apply the cleaning agent to the cloth first; do not spray it directly onto the device! Never use aggressive solvents, chemicals, abrasive cleaners, compressed air or steam cleaners.

Information:

Displays with a touch screen should be cleaned at regular intervals.

8.2 User tips for increasing the service life of the display

8.2.1 Backlight

The service life of the backlight is specified by its "half-brightness time". An operating time of 50,000 hours would mean that the display brightness would still be 50% after this time.

8.2.1.1 How can the service life of backlights be extended?

- Set the display brightness to the lowest value comfortable for the eyes.
- Use dark images.
- Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

8.2.2 Image persistence

Image persistence refers to the "burning in" of a static image on a display after being displayed for a long time. It does not only occur with static images, however. Image persistence is also referred to in the technical literature as screen burn-in, image retention, memory effect, memory sticking or ghost image.

There are 2 different types:

- Area type: This type can be seen in a dark gray image. The effect disappears if the display is switched off for a long time.
- Line type: This can result in permanent damage.

8.2.2.1 What causes image persistence?

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

8.2.2.2 How can image persistence be reduced?

- Switch continuously between static and dynamic images.
- Prevent excessive differences in brightness between foreground and background elements.
- Use colors with similar brightness.
- Use complementary colors for subsequent images.
- Use screensavers.

8.3 Pixel errors

Information:

Displays can contain faulty pixels (pixel errors) due to the manufacturing process. They are not grounds for initiating a complaint or warranty claim.

8.4 Repairs/Complaints and replacement parts

Danger!

Unauthorized opening or repair of the device may result in personal injury and/or serious damage to property. Therefore, do not carry out any repairs yourself. Repairs are only permitted to be carried out by authorized qualified personnel at the manufacturer's premises.

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

9 Accessories

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

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

9.1 General accessories

The following accessories can be ordered for the Automation PC and Panel PC:

- Grounding clip
- Tool set for control cabinet installation (torque wrench with bit set)

9.1.1 Accessories - Order data

Material number	Description
5ACCRHMI.0000-000	REP HMI grounding clip
5ACCRHMI.0006-000	REP HMI installation tool for control cabinet

9.2 Power supply connectors

9.2.1 0TB103.9x

9.2.1.1 General information

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

9.2.1.2 Order data

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

Table 50: 0TB103.9, 0TB103.91 - Order data

9.2.1.3 Technical data

Information:

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

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

Table 51: 0TB103.9, 0TB103.91 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV GL certificate for the product family.
3) The cage clamp terminal block cannot be used side by side.
4) The respective limit data of the I/O modules must be taken into account!

9.3 USB flash drives

9.3.1 5MMUSB.xxxx-01

9.3.1.1 General information

USB flash drives are easily replaceable storage media. Due to the fast data transfer (USB 2.0), USB flash drives offer optimal values for use as portable storage media. Without additional drivers, the USB flash drive immediately reports itself as another drive from which data can be read or to which data can be written (hot plugging).

Information:

Due to the large number of USB flash drives available on the market and their short lifecycles, we reserve the right to supply alternative products. It may therefore be necessary to take the following measures in order to also boot from these USB flash drives:

- **The USB flash drive must be reformatted or, in some cases, repartitioned (set partition as active).**
- **The USB flash drive must be in the first position in the boot sequence; alternatively, the IDE controllers can be disabled in BIOS. In most cases, this can be avoided by running "fdisk / mbr" on the USB flash drive.**

9.3.1.2 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 52: 5MMUSB.2048-01, 5MMUSB.4096-01 - Order data

9.3.1.3 Technical data

Information:

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

Model number	5MMUSB.2048-01	5MMUSB.4096-01
General information		
Capacity	2 GB	4 GB
LEDs	1 LED (green) [1)]	
MTBF	>3,000,000 hours	
Type	USB 1.1, USB 2.0	
Servicing	None	
Default file system	FAT32	
Certifications		
CE	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) to 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 memory	Yes	
Data retention	>10 years	
Data reliability	<1 unrecoverable error per 10^{14} bits read	
Mating cycles	>1500	

Table 53: 5MMUSB.2048-01, 5MMUSB.4096-01 - Technical data

Model number	5MMUSB.2048-01	5MMUSB.4096-01
Support		
Operating systems		
Windows 10 IoT Enterprise LTSB 64-bit	Yes	
Windows Embedded 8.1 Industry Pro 32-bit	Yes	
Windows Embedded 8.1 Industry Pro 64-bit	Yes	
Windows 7 32-bit	Yes	
Windows 7 64-bit	Yes	
Windows Embedded Standard 7 32-bit	Yes	
Windows Embedded Standard 7 64-bit	Yes	
Windows XP Professional	Yes	
Windows XP Embedded	Yes	
Windows 2000	Yes	
Windows CE 5.0	Yes	
Windows CE 4.2	Yes	
B&R Linux 9	Yes	
B&R Linux 8	Yes	
Electrical properties		
Current consumption	Max. 500 µA in sleep mode, max. 120 mA read/write	
Ambient conditions		
Temperature		
Operation	0 to 70°C [2]	0 to 70°C [2]
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 [2]	Max. 3048 m [2]
Storage	Max. 12192 m	
Transport	Max. 12192 m	
Mechanical properties		
Dimensions		
Width	17.97 mm	
Length	67.85 mm	
Height	8.35 mm	

Table 53: 5MMUSB.2048-01, 5MMUSB.4096-01 - Technical data

1) Signals data transfer (reception and transmission).
2) The maximum ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.

9.3.1.4 Temperature/Humidity diagram

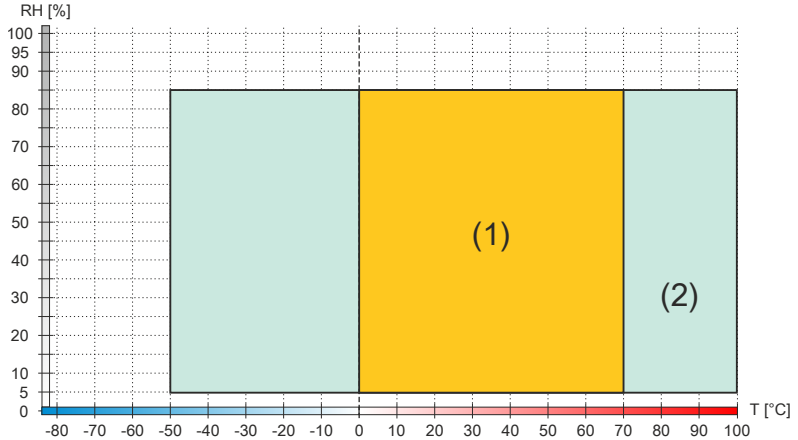


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

9.3.2 5MMUSB.032G-02

9.3.2.1 General information

USB flash drives are easily replaceable storage media. Due to the fast data transfer (USB 3.0), USB flash drives offer optimal values for use as portable storage media. Without additional drivers, the USB flash drive immediately reports itself as another drive from which data can be read or to which data can be written (hot plugging). USB 3.0 (XHCI) is supported in Windows 7 and later (USB 3.0 driver required).

Information:

Due to the large number of USB flash drives available on the market and their short lifecycles, we reserve the right to supply alternative products. It may therefore be necessary to take the following measures in order to also boot from these USB flash drives:

- **The USB flash drive must be reformatted or, in some cases, repartitioned (set partition as active).**
- **The USB flash drive must be in the first position in the boot sequence; alternatively, the IDE controllers can be disabled in BIOS. In most cases, this can be avoided by running "fdisk / mbr" on the USB flash drive.**

9.3.2.2 Order data

Model number	Short description	Figure
	USB accessories	
5MMUSB.032G-02	USB 3.0 flash drive 32 GB MLC	

Table 54: 5MMUSB.032G-02 - Order data

9.3.2.3 Technical data

Information:

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

Model number	5MMUSB.032G-02
General information	
Capacity	32 GB
LEDs	1 LED (green) [1]
MTBF	>3,000,000 hours
Type	USB 2.0, USB 3.0
Servicing	None
Certifications	
CE	Yes
Interfaces	
USB	
Type	USB 2.0, USB 3.0
Connection	To any USB type A interface
Transfer rate	High speed (480 Mbit/s) to SuperSpeed (4 Gbit/s)
Sequential reading	USB 3.0 max. 100 MB/s
Sequential writing	USB 3.0 max. 50 MB/s
Endurance	
MLC flash memory	Yes
Data reliability	<1 unrecoverable error per 10^{14} bits read
Mating cycles	>1500
Electrical properties	
Current consumption	Max. 67 mA in sleep mode, max. 122 mA read, max. 141 mA write
Ambient conditions	
Temperature	
Operation	0 to 70°C [2]
Storage	-55 to 95°C
Transport	-55 to 95°C

Table 55: 5MMUSB.032G-02 - Technical data

Model number	5MMUSB.032G-02
Relative humidity	
Operation	10 to 95%, non-condensing
Storage	10 to 95%, non-condensing
Transport	10 to 95%, non-condensing
Vibration	
Operation	7 to 2000 Hz: 20 g
Storage	7 to 2000 Hz: 20 g
Transport	7 to 2000 Hz: 20 g
Shock	
Operation	1500 g, 0.5 ms
Storage	1500 g, 0.5 ms
Transport	1500 g, 0.5 ms
Elevation	
Operation	Max. 3048 m [2]
Storage	Max. 12192 m
Transport	Max. 12192 m
Mechanical properties	
Dimensions	
Width	16.58 mm
Length	48.30 mm
Height	7.60 mm
Weight	10 g
Vendor information	
Manufacturer	Innodisk
Manufacturer's product ID	DEUA1-32GI61BCH88 (USB Drive 3ME)

Table 55: 5MMUSB.032G-02 - Technical data

1) Signals data transfer (reception and transmission).
2) The maximum ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.

9.3.2.4 Temperature/Humidity diagram

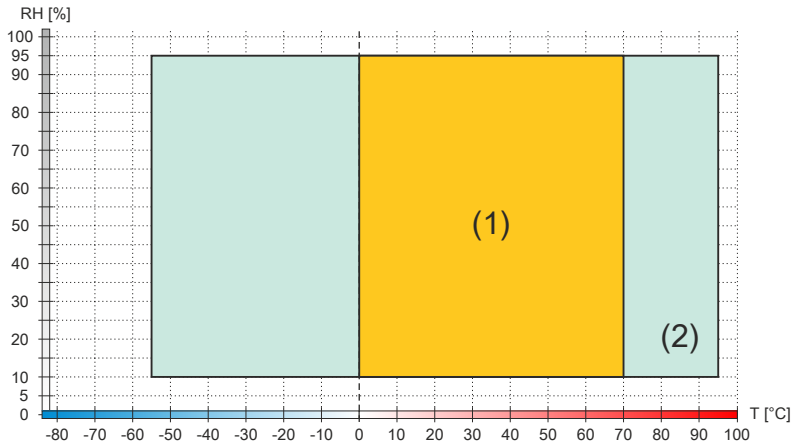


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

9.4 Cables

9.4.1 DVI cables

9.4.1.1 5CADVI.0xxx-00

9.4.1.1.1 General information

5CADVI.0xxx-00 DVI cables are designed for use in fixed installations.

> **Caution!**
>
> **The cable is only permitted to be connected/disconnected when the power is switched off.**

9.4.1.1.2 Order data

Model number	Short description	Figure
	DVI cable	
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 56: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Order data

9.4.1.1.3 Technical data

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

Model number	5CADVI.0018-00	5CADVI.0050-00	5CADVI.0100-00
General information			
Certifications			
CE	Yes		
UL	cULus E115267 Industrial control equipment		
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck)[1)]		
Cable construction			
Wire cross section	28 AWG		
Shield	Individual cable pairs, entire cable		
Cable shield	Tinned copper braiding, optical coverage > 86%		
Outer jacket			
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		
Mating cycles	100		
Locating screw tightening torque	Max. 0.5 Nm		
Electrical properties			
Conductor resistance	Max. 237 Ω/km		
Insulation resistance	Min. 100 MΩ/km		
Operating conditions			
Pollution degree per EN 61131-2	Pollution degree 2		
Mechanical properties			
Dimensions			
Length	1.8 m ±50 mm	5 m ±80 mm	10 m ±100 mm
Diameter	Max. 8.5 mm		
Bend radius	≥5x cable diameter (connector to ferrite bead and ferrite bead to ferrite bead)		
Weight	Approx. 260 g	Approx. 460 g	Approx. 790 g

Table 57: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV GL certificate for the product family.

9.4.1.1.4 Bend radius specification

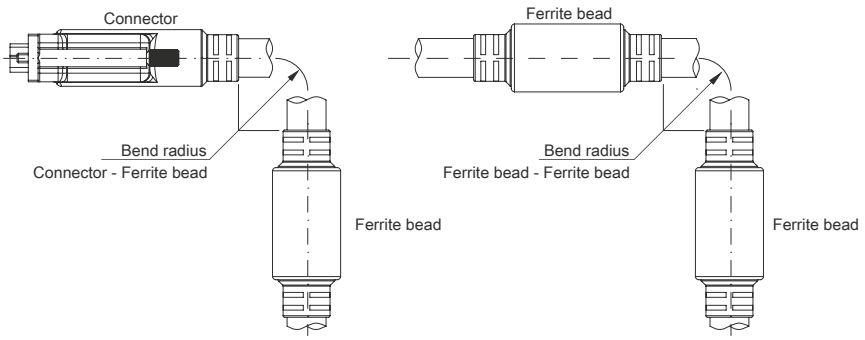


Figure 76: Bend radius specification

9.4.1.1.5 Dimensions

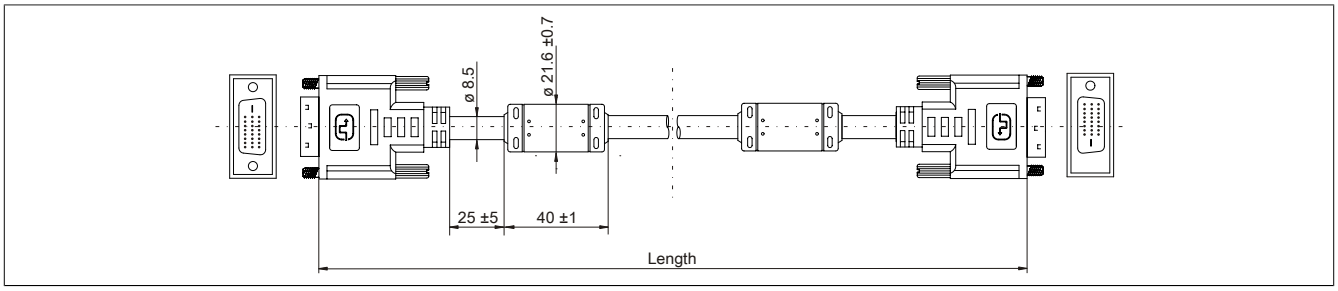


Figure 77: 5CADVI.0xxx-00 - Dimensions

9.4.1.1.6 Cable pinout

If you wish to assemble a suitable cable yourself, the cable must be wired according to this pinout.

Information:

Functionality is only guaranteed for the cables available from B&R.

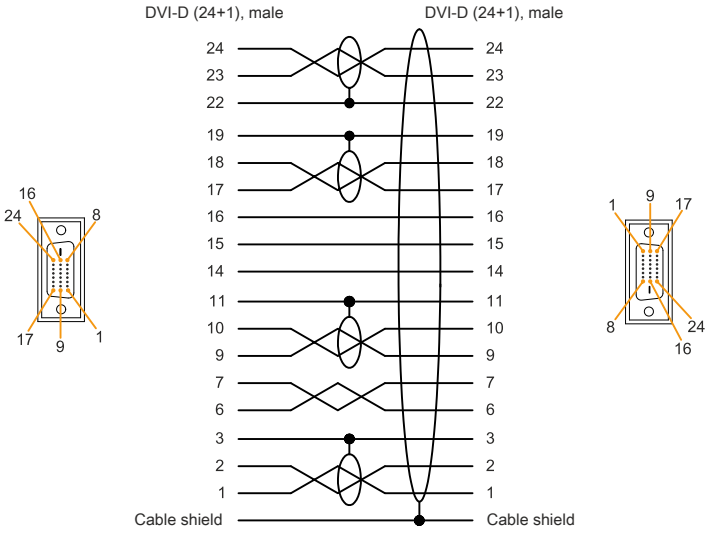


Figure 78: 5CADVI.0xxx-00 - Pinout

9.4.2 SDL cables

9.4.2.1 5CASDL.0xxx-00

9.4.2.1.1 General information

5CASDL.0xxx-00 SDL cables are designed for use in fixed installations. For flexible installations (e.g. swing arm systems), the use of 5CASDL.0xxx-03 SDL flex cables is required.

Caution!

The cable is only permitted to be connected/disconnected when the power is switched off.

9.4.2.1.2 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.0060-00	SDL cable - 6 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 58: 5CASDL.0008-00, 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0060-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Order data

9.4.2.1.3 Technical data

Information:

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

Model number	5CASDL. 0008-00	5CASDL. 0018-00	5CASDL. 0050-00	5CASDL. 0060-00	5CASDL. 0100-00	5CASDL. 0150-00	5CASDL. 0200-00	5CASDL. 0250-00	5CASDL. 0300-00
General information									
Certifications									
CE	Yes								
UL	cULus E115267 Industrial control equipment								
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]								
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck)[2)]								
Cable construction									
Wire cross section	28 AWG				24 AWG				
Shield	Individual cable pairs, entire cable								
Cable shield	Tinned copper braiding, optical coverage > 85%								
Outer jacket									
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								
Mating cycles	100								
Contacts	Gold-plated								
Mechanical protection	Metal cover with crimped strain relief								
Locating screw tightening torque	Max. 0.5 Nm								
Electrical properties									
Conductor resistance									
24 AWG	-				≤93 Ω/km				
28 AWG	≤237 Ω/km				-				

Table 59: 5CASDL.0008-00, 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0060-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Technical data

Model number	5CASDL. 0008-00	5CASDL. 0018-00	5CASDL. 0050-00	5CASDL. 0060-00	5CASDL. 0100-00	5CASDL. 0150-00	5CASDL. 0200-00	5CASDL. 0250-00	5CASDL. 0300-00
Insulation resistance	Min. 10 MΩ/km								
Operating conditions									
Pollution degree per EN 61131-2	Pollution degree 2								
Mechanical properties									
Dimensions									
Length	0.8 m ±25 mm	1.8 m ±30 mm	5 m ±30 mm	6 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				Typ. 11 ±0.2 mm Max. 11.5 mm				
Bend radius	≥5x cable diameter (connector to ferrite bead and ferrite bead to ferrite bead)								
Flexibility	Conditionally flexible, applies from ferrite bead to ferrite bead (tested 100 cycles at 5x cable diameter, 20 cycles/minute)								
Weight	Approx. 206 g	Approx. 300 g	Approx. 580 g	Approx. 700 g	Approx. 1500 g	Approx. 2250 g	Approx. 2880 g	Approx. 4800 g	Approx. 5520 g

Table 59: 5CASDL.0008-00, 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0060-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV GL certificate for the product family.

9.4.2.1.4 Bend radius specification

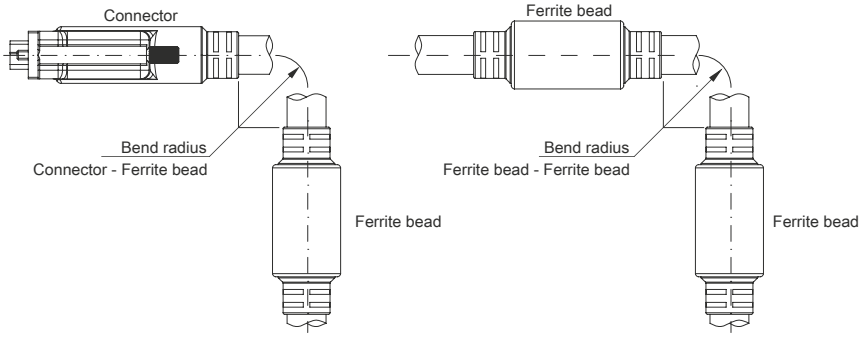


Figure 79: Bend radius specification

9.4.2.1.5 Dimensions

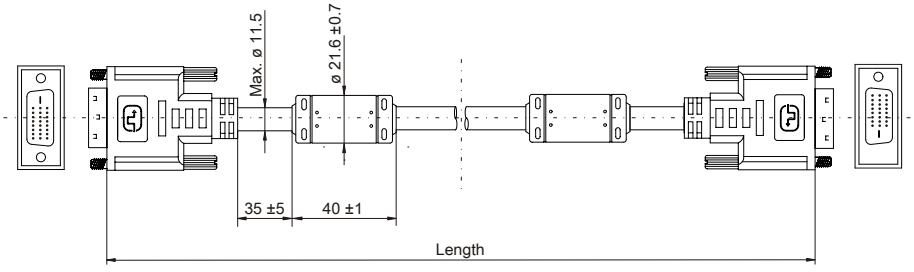


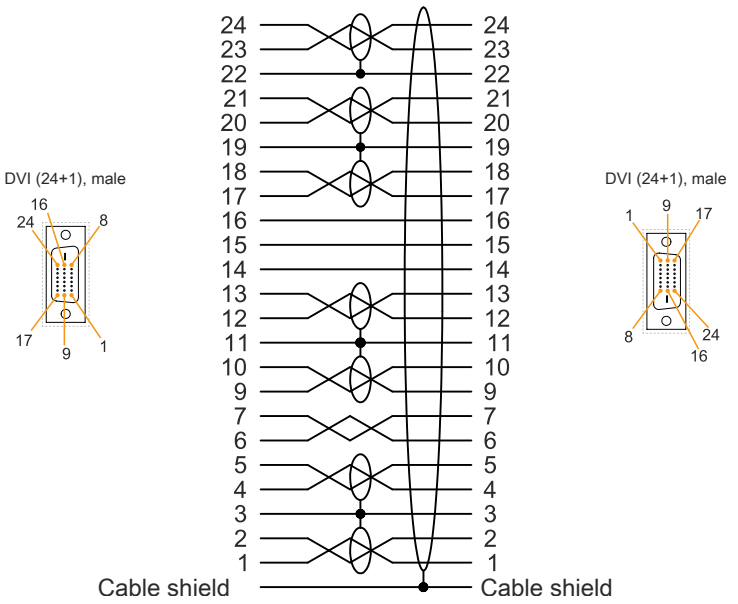
Figure 80: 5CASDL.0xxx-00- Dimensions

9.4.2.1.6 Cable pinout

Field-assembled cables must be created according to the following assignment.

Information:

Functionality is only guaranteed for the cables available from B&R.



Pin	Pinout	Pin	Pinout
1	TMDS data 2 negative	13	XUSB0 positive
2	TMDS data 2 positive	14	+5 V
3	Shielding TMDS data 2 and SDL	15	GND
4	SDL negative	16	Hot plug detection
5	SDL positive	17	TMDS data 0 negative
6	DDC data	18	TMDS data 0 positive
7	DDC clock	19	Shielding TMDS data 0 and XUSB1
8	Not connected	20	XUSB1 negative
9	TMDS data 1 negative	21	XUSB1 positive
10	TMDS data 1 positive	22	TMDS data shield
11	TMDS data 1 and XUSB0 shield	23	TMDS clock positive
12	XUSB0 negative	24	TMDS clock negative

9.4.3 SDL cables with 45° connector

9.4.3.1 5CASDL.0xxx-01

9.4.3.1.1 General information

5CASDL.0xxx-01 SDL cables with 45° connector are designed for use in fixed installations.

> **Caution!**
>
> **The cable is only permitted to be connected/disconnected when the power is switched off.**

9.4.3.1.2 Order data

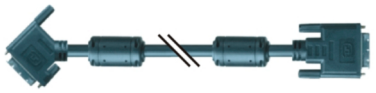
Model number	Short description	Figure
	SDL cables with 45° connector	
5CASDL.0018-01	SDL cable - 45-degree connector - 1.8 m	
5CASDL.0050-01	SDL cable - 45-degree connector - 5 m	
5CASDL.0100-01	SDL cable - 45-degree connector - 10 m	
5CASDL.0150-01	SDL cable - 45-degree connector - 15 m	

Table 60: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Order data

9.4.3.1.3 Technical data

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

Model number	5CASDL.0018-01	5CASDL.0050-01	5CASDL.0100-01	5CASDL.0150-01
General information				
Certifications				
CE	Yes			
UL	cULus E115267 Industrial control equipment			
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]			
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck)[2)]			
Cable construction				
Wire cross section	28 AWG		24 AWG	
Shield	Individual cable pairs, entire cable			
Cable shield	Tinned copper braiding, optical coverage > 85%			
Outer jacket				
Material	PVC			
Color	Black			
Connector				
Type	2x DVI-D (24+1), male			
Mating cycles	100			
Contacts	Gold-plated			
Mechanical protection	Metal cover with crimped strain relief			
Locating screw tightening torque	Max. 0.5 Nm			
Electrical properties				
Conductor resistance				
24 AWG	-		≤93 Ω/km	
28 AWG	≤237 Ω/km		-	
Insulation resistance	Min. 10 MΩ/km			
Operating conditions				
Pollution degree per EN 61131-2	Pollution degree 2			
Mechanical properties				
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	

Table 61: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Technical data

Model number	5CASDL.0018-01	5CASDL.0050-01	5CASDL.0100-01	5CASDL.0150-01
Bend radius				
Fixed installation	≥5x cable diameter (connector to ferrite bead and ferrite bead to ferrite bead)			
Flexibility	Conditionally flexible, applies from ferrite bead to ferrite bead (tested 100 cycles at 5x cable diameter, 20 cycles/minute)			
Weight	Approx. 300 g	Approx. 590 g	Approx. 2800 g	Approx. 2860 g

Table 61: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV GL certificate for the product family.

9.4.3.1.4 Bend radius specification

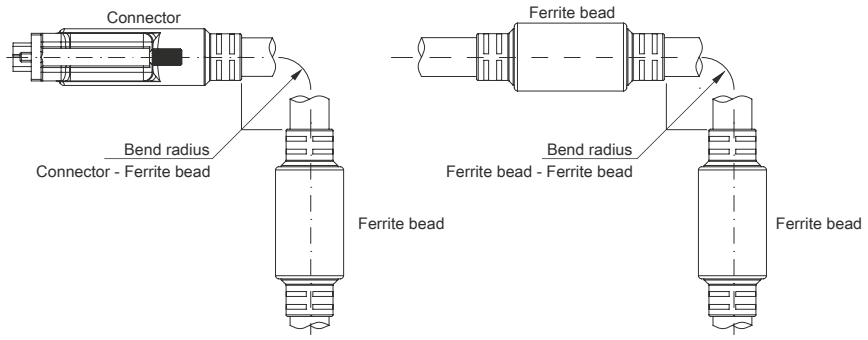


Figure 81: Bend radius specification

9.4.3.1.5 Dimensions

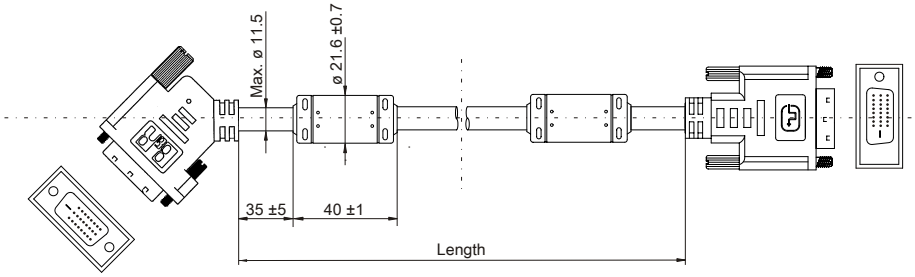


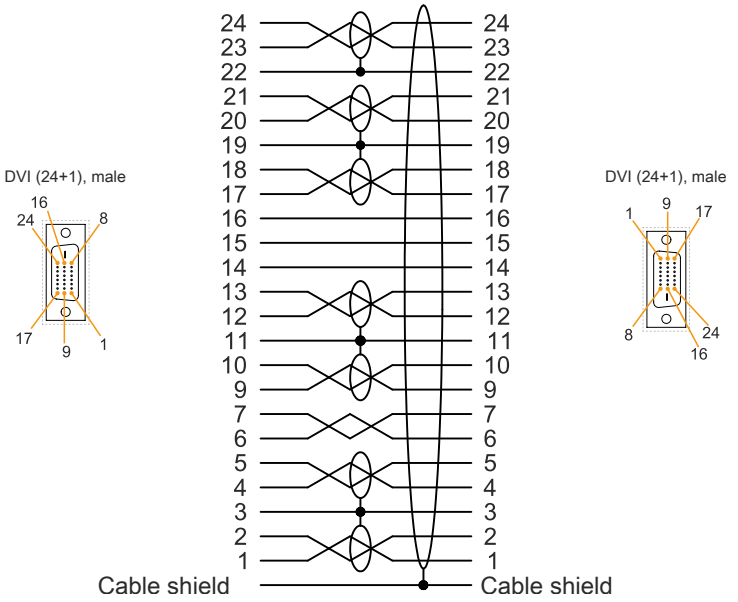
Figure 82: 5CASDL.0xxx-01 - Dimensions

9.4.3.1.6 Cable pinout

Field-assembled cables must be created according to the following assignment.

Information:

Functionality is only guaranteed for the cables available from B&R.



Pin	Pinout	Pin	Pinout
1	TMDS data 2 negative	13	XUSB0 positive
2	TMDS data 2 positive	14	+5 V
3	Shielding TMDS data 2 and SDL	15	GND
4	SDL negative	16	Hot plug detection
5	SDL positive	17	TMDS data 0 negative
6	DDC data	18	TMDS data 0 positive
7	DDC clock	19	Shielding TMDS data 0 and XUSB1
8	Not connected	20	XUSB1 negative
9	TMDS data 1 negative	21	XUSB1 positive
10	TMDS data 1 positive	22	TMDS data shield
11	TMDS data 1 and XUSB0 shield	23	TMDS clock positive
12	XUSB0 negative	24	TMDS clock negative

9.4.4 SDL flex cables

9.4.4.1 5CASDL.0xxx-03

9.4.4.1.1 General information

5CASDL.0xxx-03 SDL flex cables are designed for use in fixed as well as flexible installations (e.g. swing arm systems).

Caution!

The cable is only permitted to be connected/disconnected when the power is switched off.

9.4.4.1.2 Order data

Model number	Short description	Figure
	SDL flex cable	
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 62: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Order data

9.4.4.1.3 Technical data

Information:

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

Model number	5CASDL. 0018-03	5CASDL. 0050-03	5CASDL. 0100-03	5CASDL. 0150-03	5CASDL. 0200-03	5CASDL. 0250-03	5CASDL. 0300-03
General information							
Certifications							
CE	Yes						
UL	cULus E115267 Industrial control equipment						
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]						
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck)[2)]						
Cable construction							
Wire cross section	24 AWG (control wires) 26 AWG (DVI, USB, data)						
Properties	Halogen- and silicone-free						
Shield	Individual cable pairs, entire cable						
Cable shield	Aluminum-clad foil and tinned copper braiding						
Outer jacket							
Material	Special semi-matte TMPU						
Color	Black						
Labeling	(B&R) SDL Cable (UL) AWM 20236 80°C 30V E 63216						
Connector							
Type	2x DVI-D (24+1), male						
Mating cycles	Min. 200						
Contacts	Gold-plated						
Mechanical protection	Metal cover with crimped strain relief						
Locating screw tightening torque	Max. 0.5 Nm						
Electrical properties							
Operating voltage	≤30 V						

Table 63: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Technical data

Model number	5CASDL. 0018-03	5CASDL. 0050-03	5CASDL. 0100-03	5CASDL. 0150-03	5CASDL. 0200-03	5CASDL. 0250-03	5CASDL. 0300-03
Test voltage							
Wire/Wire	1 kV						
Wire/Shield	0.5 kV						
Wave impedance	100 ±10 Ω						
Conductor resistance							
24 AWG	≤95 Ω/km						
26 AWG	≤145 Ω/km						
Insulation resistance	>200 MΩ/km						
Operating conditions							
Pollution degree per EN 61131-2	Pollution degree 2						
Approbation	UL AWM 20236 80°C 30 V						
Flame-retardant	Per UL 758 (cable vertical flame test)						
Oil and hydrolysis resistance	Per VDE 0282-10						
Ambient conditions							
Temperature							
Storage	-20 to 80°C						
Fixed installation	-20 to 80°C						
Flexible installation	-5 to 60°C						
Mechanical properties							
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						
Bend radius							
Fixed installation	≥3.5x cable diameter						
Flexible installation	≥15x cable diameter (from ferrite bead to ferrite bead)						
Flexibility	Flexible, applies from ferrite bead to ferrite bead (tested 300000 cycles at 15x cable diameter, 4800 cycles/hour)						
Drag chain data							
Flex cycles	300,000						
Speed	4800 cycles/hour						
Bend 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							
In operation	≤50 N						
During installation	≤400 N						

Table 63: 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, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV GL certificate for the product family.

9.4.4.1.4 Bend radius specification

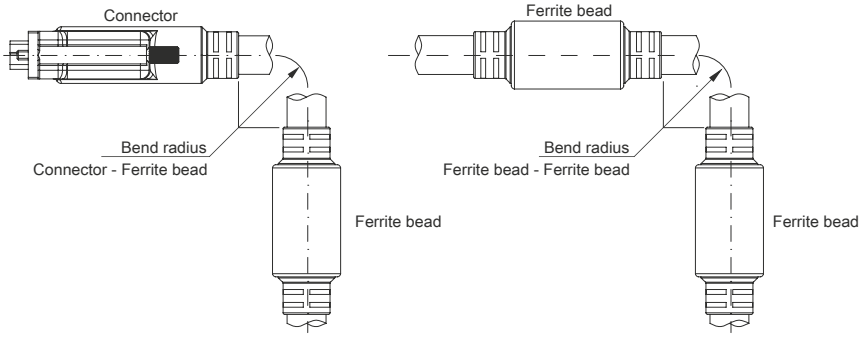


Figure 83: Bend radius specification

9.4.4.1.5 Dimensions

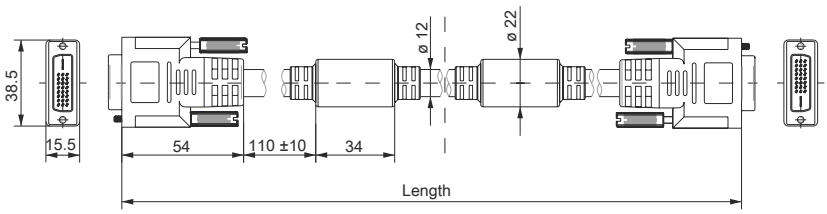


Figure 84: 5CASDL.0xxx-03 ≥ Rev. E0 - Dimensions

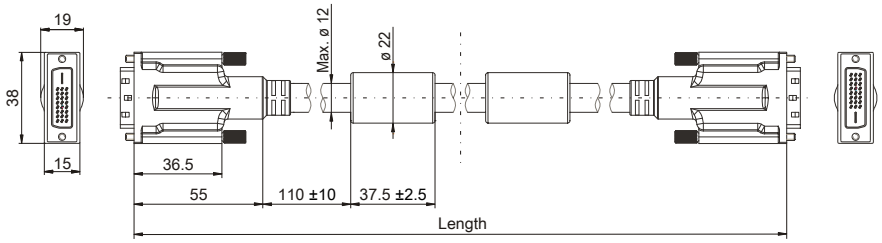
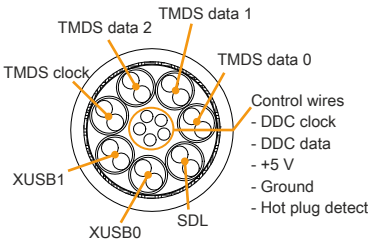


Figure 85: 5CASDL.0xxx-03 ≤ Rev. D0 - Dimensions

9.4.4.1.6 Structure 5CASDL.0xxx-03

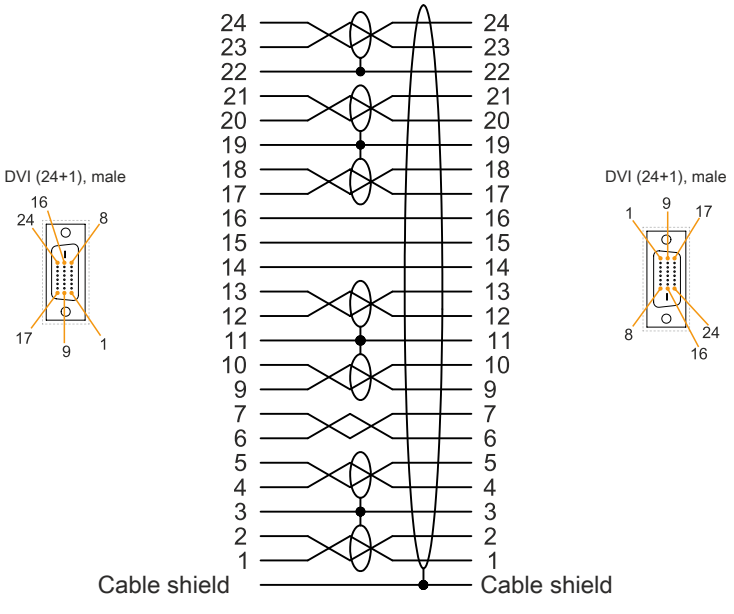
Element	Pinout	Cross section	
DVI	TMDS data 0	26 AWG	
	TMDS data 1	26 AWG	
	TMDS data 2	26 AWG	
	TMDS clock	26 AWG	
USB	XUSB0	26 AWG	
	XUSB1	26 AWG	
Data	SDL	26 AWG	
Control wires	DDC clock	24 AWG	
	DDC data	24 AWG	
	+5 V	24 AWG	
	Ground	24 AWG	
	Hot plug detection	24 AWG	

9.4.4.1.7 Cable pinout

Field-assembled cables must be created according to the following assignment.

Information:

Functionality is only guaranteed for the cables available from B&R.



Pin	Pinout	Pin	Pinout
1	TMDS data 2 negative	13	XUSB0 positive
2	TMDS data 2 positive	14	+5 V
3	Shielding TMDS data 2 and SDL	15	GND
4	SDL negative	16	Hot plug detection
5	SDL positive	17	TMDS data 0 negative
6	DDC data	18	TMDS data 0 positive
7	DDC clock	19	Shielding TMDS data 0 and XUSB1
8	Not connected	20	XUSB1 negative
9	TMDS data 1 negative	21	XUSB1 positive
10	TMDS data 1 positive	22	TMDS data shield
11	TMDS data 1 and XUSB0 shield	23	TMDS clock positive
12	XUSB0 negative	24	TMDS clock negative

9.4.5 SDL flex cables with extender

9.4.5.1 5CASDL.0xx0-13

9.4.5.1.1 General information

5CASDL.0xx0-13 SDL flex cables with extender are designed for use in fixed as well as flexible installations (e.g. swing arm systems).

> **Caution!**
>
> **The cable is only permitted to be connected/disconnected when the power is switched off.**

9.4.5.1.2 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 64: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Order data

9.4.5.1.3 Technical data

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

Model number	5CASDL.0300-13	5CASDL.0400-13	5CASDL.0430-13
General information			
Certifications			
CE	Yes		
UL	cULus E115267 Industrial control equipment		
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]		
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck)[2)]		
Cable construction			
Wire cross section	24 AWG (control wires) 26 AWG (DVI, USB, data)		
Properties	Halogen- and silicone-free		
Shield	Individual cable pairs, entire cable		
Cable shield	Aluminum-clad foil and tinned copper braiding		
Outer jacket			
Material	Special semi-matte TMPU		
Color	Black		
Labeling	(B&R) SDL Cable (UL) AWM 20236 80°C 30V E63216		
Connector			
Type	2x DVI-D (24+1), male		
Mating cycles	Min. 200		
Contacts	Gold-plated		
Mechanical protection	Metal cover with crimped strain relief		
Locating screw tightening torque	Max. 0.5 Nm		
Electrical properties			
Operating voltage	≤30 V		
Test voltage			
Wire/Wire	1 kV		
Wire/Shield	0.5 kV		
Wave impedance	100 ±10 Ω		
Conductor resistance			
24 AWG	≤95 Ω/km		
26 AWG	≤145 Ω/km		
Insulation resistance	>200 MΩ/km		

Table 65: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

Model number	5CASDL.0300-13	5CASDL.0400-13	5CASDL.0430-13
Operating conditions			
Pollution degree per EN 61131-2		Pollution degree 2	
Approbation		UL AWM 20236 80°C 30 V	
Flame-retardant		Per UL 758 (cable vertical flame test)	
Oil and hydrolysis resistance		Per VDE 0282-10	
Ambient conditions			
Temperature			
Storage		-20 to 60°C	
Fixed installation		-20 to 60°C	
Flexible installation		-5 to 60°C	
Mechanical properties			
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	
Bend radius			
Fixed installation		≥6x cable diameter (from connector to ferrite bead) ≥10x cable diameter (from ferrite bead to ferrite bead)	
Flexible installation		≥15x cable diameter (from ferrite bead to ferrite bead)	
Flexibility		Flexible, applies from ferrite bead to ferrite bead (tested 300000 cycles at 15x cable diameter, 4800 cycles/hour)	
Drag chain data			
Flex cycles		300,000	
Speed		4800 cycles/hour	
Bend radius		180 mm, 15x cable diameter	
Hub		460 mm	
Weight	Approx. 5430 g	Approx. 7200 g	Approx. 7790 g
Tension			
In operation		≤50 N	
During installation		≤400 N	

Table 65: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV GL certificate for the product family.

9.4.5.1.4 Bend radius specification

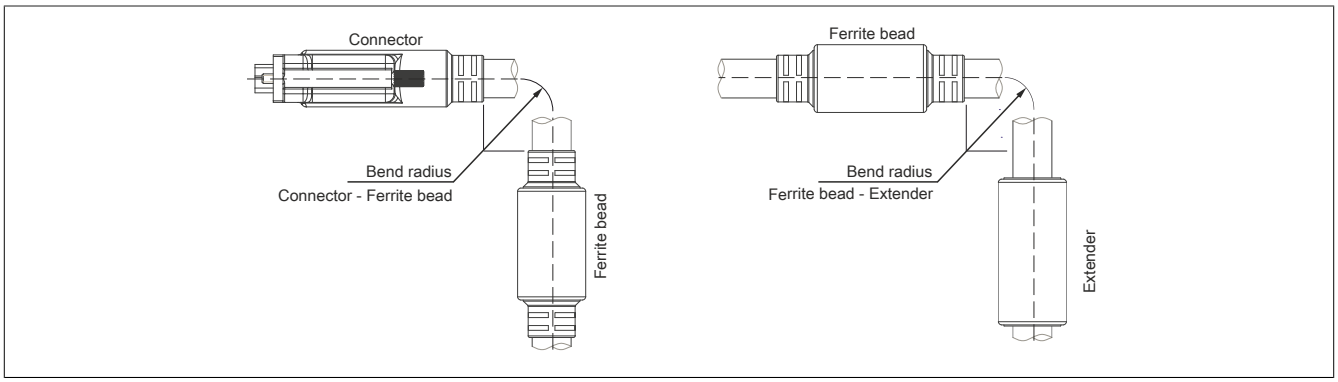


Figure 86: Bend radius specification with extender

9.4.5.1.5 Dimensions

All dimensions in mm.

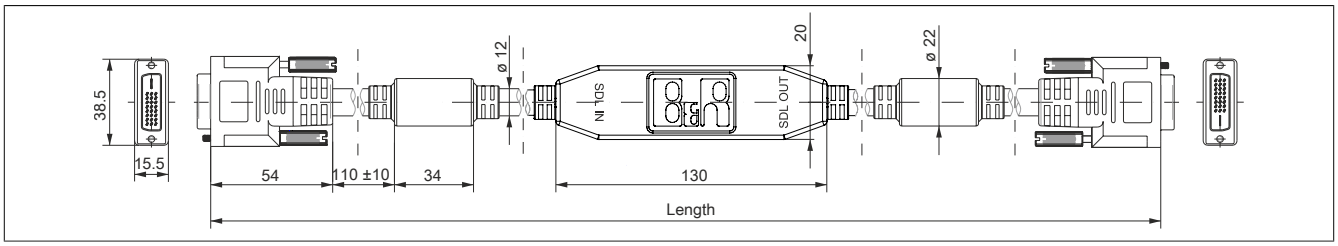


Figure 87: 5CASDL.xxxx-13 ≥ Rev. E0 - Dimensions

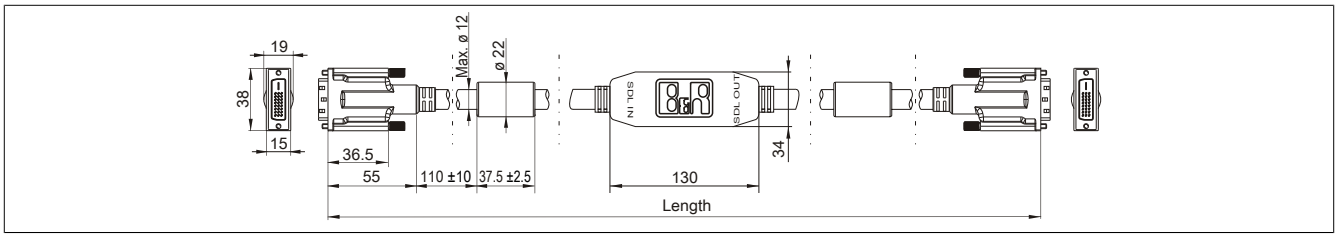


Figure 88: 5CASDL.0xx0-13 ≤ Rev. D0 - Dimensions

9.4.5.1.6 Cable pinout

If you wish to assemble a suitable cable yourself, the cable must be wired according to this pinout.

Information:

Functionality is only guaranteed for the cables available from B&R.

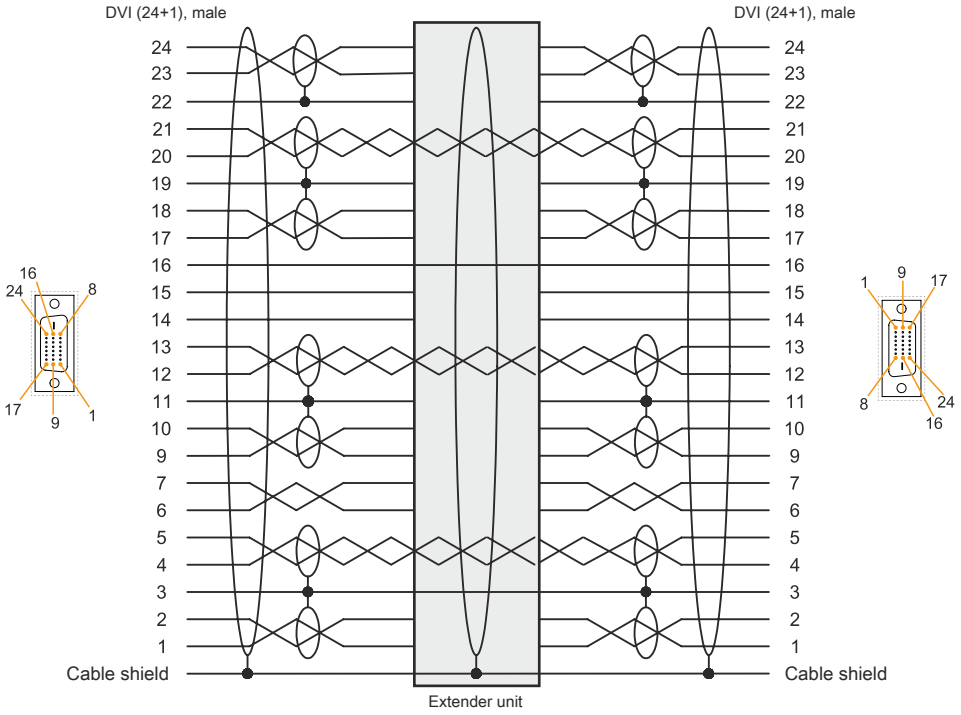


Figure 89: 5CASDL.0xx0-13 - Pinout

Pin	Pinout	Pin	Pinout
1	TMDS data 2 negative	13	XUSB0 positive
2	TMDS data 2 positive	14	+5 V
3	Shielding TMDS data 2 and SDL	15	GND
4	SDL negative	16	Hot plug detection
5	SDL positive	17	TMDS data 0 negative
6	DDC data	18	TMDS data 0 positive
7	DDC clock	19	Shielding TMDS data 0 and XUSB1
8	Not connected	20	XUSB1 negative
9	TMDS data 1 negative	21	XUSB1 positive
10	TMDS data 1 positive	22	TMDS data shield
11	TMDS data 1 and XUSB0 shield	23	TMDS clock positive
12	XUSB0 negative	24	TMDS clock negative

9.4.5.1.7 Cable connection

The SDL flex cable with extender must be connected in the correct direction between the B&R industrial PC and Automation Panel. For this purpose, the signal direction is indicated on the extender unit.

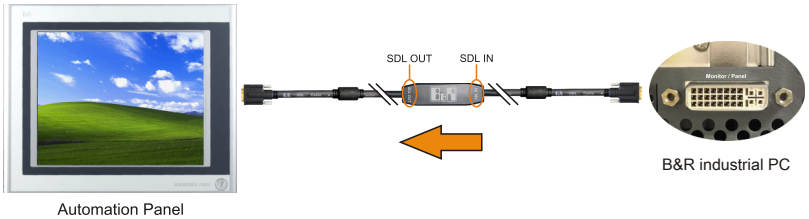


Figure 90: Example for the signal direction of the SDL flex cable with extender

9.4.6 SDL3/SDL4 cables

9.4.6.1 5CASD3.xxxx-00

9.4.6.1.1 General information

5CASD3.xxxx-00 SDL3/SDL4 cables are designed to transfer SDL3/SDL4 data and enable easy cable installation. Due to the RJ45 connector, the cable is also suitable for narrow feed-throughs, e.g. in swing arm shafts.

Caution!

The cable is only permitted to be connected/disconnected when the power is switched off.

9.4.6.1.2 Order data

Model number	Short description	Figure
	SDL3/SDL4/PoE cables	
5CASD3.0030-00	SDL3/SDL4 cable - 3 m	
5CASD3.0050-00	SDL3/SDL4 cable - 5 m	
5CASD3.0100-00	SDL3/SDL4 cable - 10 m	
5CASD3.0150-00	SDL3/SDL4 cable - 15 m	
5CASD3.0200-00	SDL3/SDL4 cable - 20 m	
5CASD3.0300-00	SDL3/SDL4 cable - 30 m	
5CASD3.0500-00	SDL3/SDL4 cable - 50 m	
5CASD3.1000-00	SDL3/SDL4 cable - 100 m	

Table 66: 5CASD3.0030-00, 5CASD3.0050-00, 5CASD3.0100-00, 5CASD3.0150-00, 5CASD3.0200-00, 5CASD3.0300-00, 5CASD3.0500-00, 5CASD3.1000-00 - Order data

9.4.6.1.3 Technical data

Information:

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

Model number	5CASD3. 0030-00	5CASD3. 0050-00	5CASD3. 0100-00	5CASD3. 0150-00	5CASD3. 0200-00	5CASD3. 0300-00	5CASD3. 0500-00	5CASD3. 1000-00
General information								
Certifications								
CE	Yes							
EAC	Yes							
UL	cULus E115267 Industrial control equipment							
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]							
Cable construction								
Wire cross section	4x 2x 26/7 AWG					4x 2x 23/1 AWG		
Properties	Flame-retardant, halogen-free, lead-free							
Outer jacket								
Material	Polyurethane (PUR)							
Color	Yellow, RAL 1021							
Labeling	HARTING INDUSTRIAL CABLE S/FTP CAT 6A PUR 4x2xAWG26/7					HARTING INDUSTRIAL INSTALLATION CABLE S/FTP CAT 7 PUR 4x2xAWG23/1		
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 composed of tinned copper wires							
Type	Bare copper strand, 4x 2x 26/7 AWG					Bare copper strand, 4x 2x 23/1 AWG		
Connector								
Type	2x RJ45, male							
Mating cycles	Min. 750							
Contacts	8							
Electrical properties [2)]								
Operating voltage	≤100 V					≤125 V		
Conductor resistance	≤290 Ω/km					≤75 Ω/km		
Wave impedance	100 ±5 Ω (at 100 MHz)							

Table 67: 5CASD3.0030-00, 5CASD3.0050-00, 5CASD3.0100-00, 5CASD3.0150-00, 5CASD3.0200-00, 5CASD3.0300-00, 5CASD3.0500-00, 5CASD3.1000-00 - Technical data

Model number	5CASD3. 0030-00	5CASD3. 0050-00	5CASD3. 0100-00	5CASD3. 0150-00	5CASD3. 0200-00	5CASD3. 0300-00	5CASD3. 0500-00	5CASD3. 1000-00
Transfer properties	Category 6A / Class EA up to 500 MHz per ISO/IEC 11801 (EN 50173-1), ISO/IEC 24702 (EN 50173-3)					Category 7 / Class F up to 600 MHz per ISO/IEC 11801 (EN 50173-1), ISO/IEC 24702 (EN 50173-3)		
Insulation resistance	≥500 MΩ/km					≥5 GΩ/km		
Operating conditions								
Pollution degree per EN 61131-2	Pollution degree 2							
Flame-retardant	IEC 60332-1-2							
Oil and hydrolysis resistance	EN 60811-2-1 (90°C / 7x24 h)							
Degree of protection per EN 60529								
Cables	IP20							
RJ45 connector	IP20, only when properly connected							
Ambient conditions								
Temperature								
Storage	-40 to 70°C							
Fixed installation	-40 to 70°C							
Flexible installation	-40 to 70°C					-10 to 50°C		
Mechanical properties								
Dimensions								
Length	3 m	5 m	10 m	15 m	20 m	30 m	50 m	100 m
Diameter	6.7 mm					8.3 mm		
Bend radius								
Fixed installation	≥5x diameter					≥4x diameter		
Flexible installation	≥10x diameter					≥8x diameter		
Weight	250 g		500 g	700 g	950 g	2150 g	3500 g	6950 g
Tension								
In operation	≤70 N					≤110 N		
During installation	≤70 N					≤110 N		

Table 67: 5CASD3.0030-00, 5CASD3.0050-00, 5CASD3.0100-00, 5CASD3.0150-00, 5CASD3.0200-00, 5CASD3.0300-00, 5CASD3.0500-00, 5CASD3.1000-00 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) At 20°C ambient temperature.

9.4.6.1.4 Bend radius specification

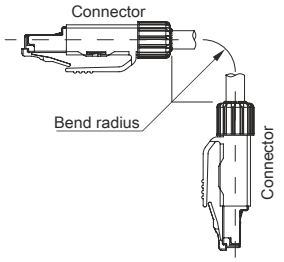


Figure 91: SDL3/SDL4 - Bend radius specification

9.4.6.1.5 Dimensions

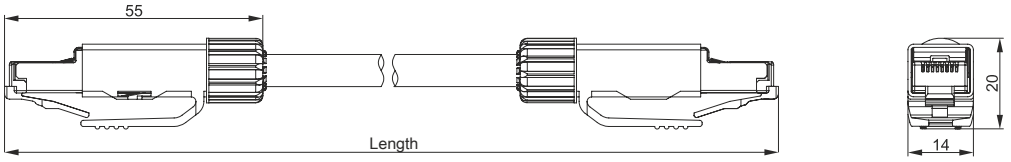


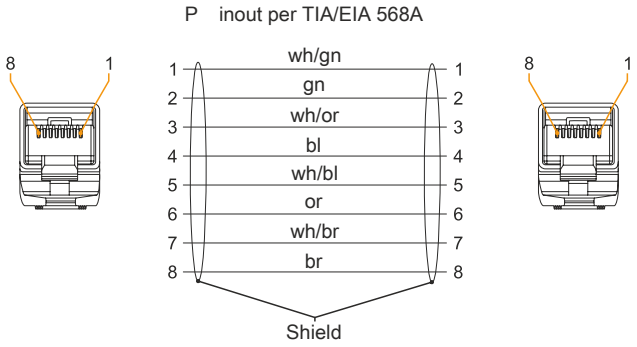
Figure 92: 5CASD3.xxxx-00 - Dimensions

9.4.6.1.6 Cable pinout

If you wish to assemble a suitable cable yourself, the cable must be wired according to this pinout.

Information:

Functionality is only guaranteed for the cables available from B&R.



9.4.6.1.7 Wiring

The following information and figure apply if a field-assembled cable is used and connected to an RJ45 network connector (e.g. patch panel) instead of directly to a B&R device.

The wiring must comply with category 6A (Cat 6A) or 7 (Cat 7) requirements. The maximum total length of 100 m is not permitted to be exceeded.

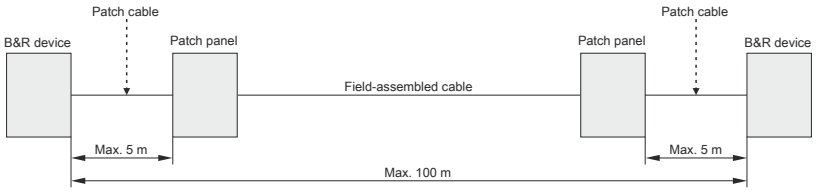


Figure 93: Wiring with a field-assembled cable

9.4.7 USB cables

9.4.7.1 5CAUSB.00xx-00

9.4.7.1.1 General information

USB cables are designed for USB 2.0 transfer rates.

9.4.7.1.2 Order data

Model number	Short description	Figure
	USB cable	
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 68: 5CAUSB.0018-00, 5CAUSB.0050-00 - Order data

9.4.7.1.3 Technical data

Information:

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

Model number	5CAUSB.0018-00	5CAUSB.0050-00
General information		
Certifications		
CE	Yes	
UL	cULus E115267 Industrial control equipment	
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck)[1)]	
Cable construction		
Wire cross section	24, 28 AWG	
Shield	Entire cable	
Outer jacket		
Color	Beige	
Connector		
Type	USB type A male and USB type B male	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Mechanical properties		
Dimensions		
Length	1.8 m ±30 mm	5 m ±50 mm
Diameter	Max. 5 mm	
Bend radius	Min. 100 mm	

Table 69: 5CAUSB.0018-00, 5CAUSB.0050-00 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV GL certificate for the product family.

9.4.7.1.4 Cable pinout

If you wish to assemble a suitable cable yourself, the cable must be wired according to this pinout.

Information:

Functionality is only guaranteed for the cables available from B&R.

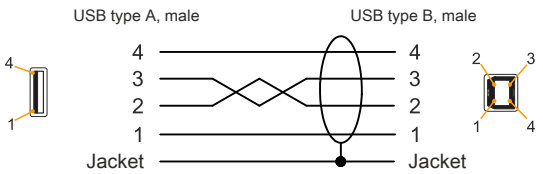


Figure 94: 5CAUSB.00xx-00 USB cables - Pinout

9.4.8 RS232 cables

9.4.8.1 9A0014.xx

9.4.8.1.1 General information

RS232 cables serve as extension cables between two RS232 interfaces.

9.4.8.1.2 Order data

Model number	Short description	Figure
	RS232 cable	
9A0014.02	RS232 extension cable for operating a remote panel with touch screen, 1.8 m.	
9A0014.05	RS232 extension cable for operating a remote panel with touch screen, 5 m.	
9A0014.10	RS232 extension cable for operating a remote panel with touch screen, 10 m.	

Table 70: 9A0014.02, 9A0014.05, 9A0014.10 - Order data

9.4.8.1.3 Technical data

Information:

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

Model number	9A0014.02	9A0014.05	9A0014.10
General information			
Certifications			
CE		Yes	
Cable construction			
Wire cross section		26 AWG	
Shield		Entire cable	
Outer jacket			
Color		Beige	
Connector			
Type		9-pin DSUB connector, male/female	
Locating screw tightening torque		Max. 0.5 Nm	
Operating conditions			
Pollution degree per EN 61131-2		Pollution degree 2	
Mechanical properties			
Dimensions			
Length	1.8 m ±50 mm	5 m ±80 mm	10 m ±100 mm
Diameter		Max. 5 mm	
Bend radius		Min. 70 mm	

Table 71: 9A0014.02, 9A0014.05, 9A0014.10 - Technical data

9.4.8.1.4 Cable pinout

If you wish to assemble a suitable cable yourself, the cable must be wired according to this pinout.

Information:

Functionality is only guaranteed for the cables available from B&R.

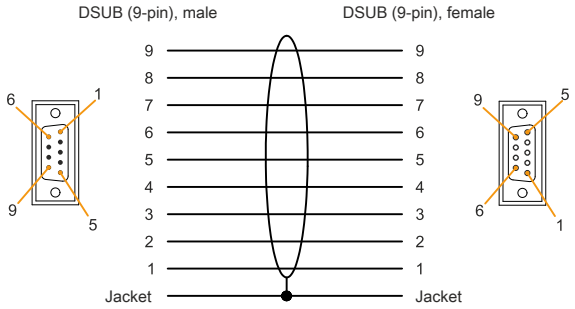


Figure 95: 9A0014.xx RS232 cables - Pinout

9.5 Line filter

9.5.1 5AC804.MFLT-00

9.5.1.1 General information

Line filter 5AC804.MFLT-00 may be necessary to satisfy maritime requirements regarding conducted disturbances in supply lines in accordance with the GL (Germanischer Lloyd) or DNVGL.

The line filter should be installed as close to the end device as possible; the supply line from the end device to the line filter should be kept as short as possible.

9.5.1.2 Order data

Model number	Short description	Figure
	Accessories	
5AC804.MFLT-00	Line filter	

Table 72: 5AC804.MFLT-00 - Order data

9.5.1.3 Technical data

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

Model number	5AC804.MFLT-00
General information	
Certifications	
CE	Yes
EAC	Product family certification
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4[1)]
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck)[2)]
Terminal block	
Connection cross section	
With wire end sleeves	1.5 mm²
Flexible	0.2 to 1.5 mm²
Inflexible	0.2 to 2.5 mm²
Electrical properties	
Nominal voltage	24 VDC -25% / +30%, SELV [3)]
Nominal current	8 A
Overvoltage category per EN 61131-2	II
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Ambient conditions	
Temperature	
Operation	-25 to 65°C
Storage	-25 to 65°C
Transport	-25 to 65°C
Mechanical properties	
Housing	
Material	Galvanized plate

Table 73: 5AC804.MFLT-00 - Technical data

Model number	5AC804.MFLT-00
Dimensions	
Width	54 mm
Length	94 mm
Depth	32.15 mm
Weight	205 g

Table 73: 5AC804.MFLT-00 - Technical data

1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
2) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV GL certificate for the product family.
3) EN 60950 requirements must be observed; see section "+24 VDC power supply" of the user's manual.

9.5.1.4 Dimensions

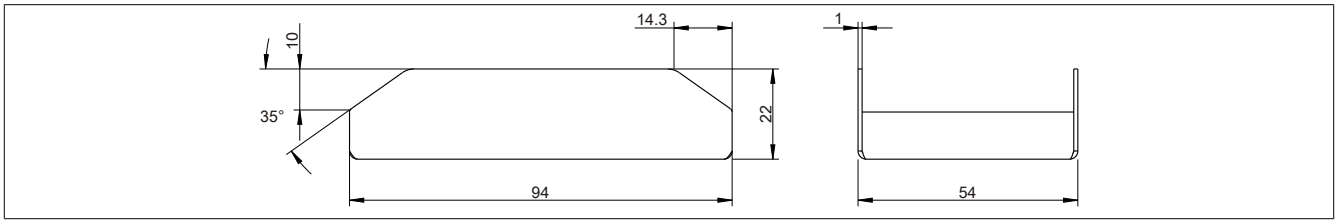


Figure 96: 5AC804.MFLT-00 - Dimensions

9.5.1.5 Drilling template

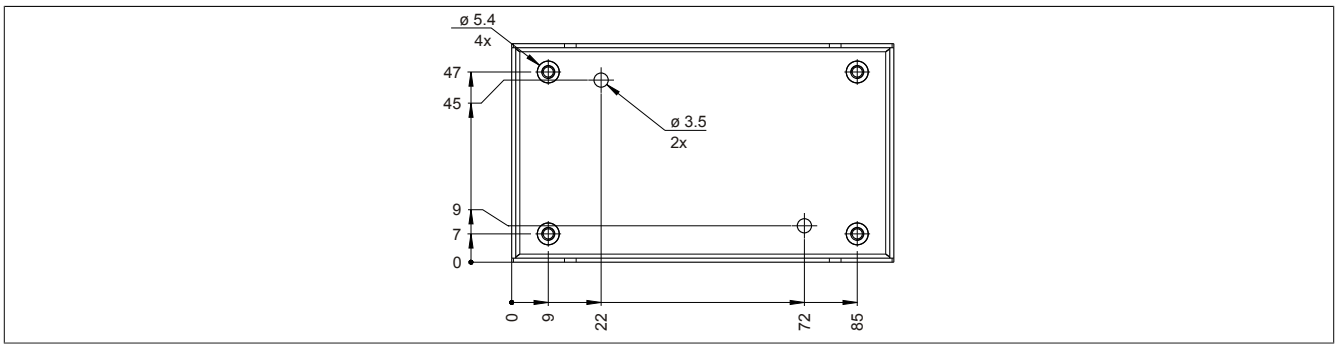


Figure 97: 5AC804.MFLT-00 - Drilling template

9.5.1.6 Connecting to the end device

The line filter must be connected between the power supply and the end device.

The following points must be observed:

- Use shielded, twisted wires.
- Keep the lines as short as possible (power supply - line filter - end device).
- The line filter must be installed on an uncoated, oil-free metallic surface.

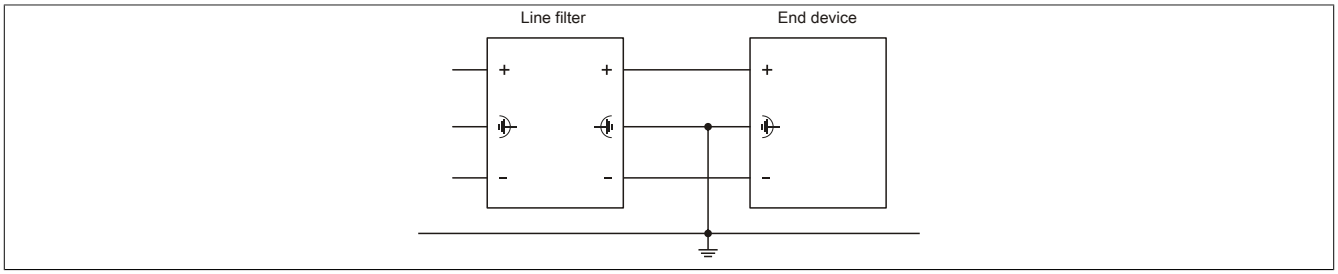


Figure 98: Connection example

9.6 Clamping blocks

9.6.1 5AC900.BLOC-00

9.6.1.1 General information

These replacement clamping blocks are used for mounting B&R panel devices.

9.6.1.2 Order data

Model number	Short description	Figure
	Accessories	
5AC900.BLOC-00	Clamping block with swing arms, 10 pcs., replacement part	

Table 74: 5AC900.BLOC-00 - Order data

9.6.2 5AC900.BLOC-01

9.6.2.1 General information

These replacement clamping blocks are used for mounting B&R panel devices.

9.6.2.2 Order data

Model number	Short description	Figure
	Accessories	
5AC900.BLOC-01	Terminal block without swing arms, 10 pcs; replacement part	

Table 75: 5AC900.BLOC-01 - Order data

9.7 USB interface cover

9.7.1 5AC900.1201-00

9.7.1.1 General information

Flat front-side USB interface cover for Automation Panel 1000, Automation Panel 900, Power Panel 500, Panel PC 700 and Panel PC 800 devices.

9.7.1.2 Order data

Model number	Short description	Figure
	Accessories	
5AC900.1201-00	USB interface cover M20 IP65, flat	

Table 76: 5AC900.1201-00 - Order data

9.7.2 5AC900.1201-01

9.7.2.1 General information

Round front-side knurled USB interface cover (with anti-loss strap) for Automation Panel 1000, Automation Panel 900, Power Panel 500, Panel PC 700 and Panel PC 800 devices.

9.7.2.2 Order data

Model number	Short description	Figure
	Accessories	
5AC900.1201-01	USB interface cover M20 IP65 curved	

Table 77: 5AC900.1201-01 - Order data

10 International and national certifications

10.1 Directives and declarations

10.1.1 CE marking

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

10.1.2 Radio Equipment Directive (RED)

These products meet the requirements of EU directive "Radio Equipment Directive 2014/53/EU" and are designed for industrial use:

Information:

The rear side of the device must be installed in an appropriate fire protection housing for operation per EN 60950-1.

EN 61131-2:2007	Programmable controllers - Part 2: Equipment requirements and tests
EN 61000-6-2:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4:2007	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
EN 300 328 V2.1.1	Data transmission equipment operating in the 2.4 GHz ISM band and using wide band modulation techniques
EN 300 330 V2.1.1	Short range devices (SRD) - Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz
EN 301 489-3 V2.1.1	Electromagnetic compatibility (EMC) standard for radio equipment and services - Part 3: Specific conditions for short-range devices (SRD) operating on frequencies between 9 kHz and 246 GHz
EN 301 489-17 V3.1.1	Electromagnetic compatibility (EMC) standard for radio equipment and services - Part 17: Specific conditions for broadband data transmission systems
EN 60950-1:2013	Information technology equipment - Safety - Part 1: General requirements
EN 62479:2010	Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)
EN 50364:2010	Limitation of human exposure to electromagnetic fields from devices operating in the frequency range 0 Hz to 300 GHz, used in electronic article surveillance (EAS), radio frequency identification (RFID) and similar applications
EN 62369-1:2010	Evaluation of human exposure to electromagnetic fields from short-range devices (SRDs) in various applications over the frequency range 0 GHz to 300 GHz - Part 1: Fields produced by devices used for electronic article surveillance, radio frequency identification and similar systems

10.1.3 EMC Directive

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

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

Information:

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

10.2 Certifications

Danger!

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

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

Information:

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

10.2.1 UL certification

Ind. Cont. Eq.
E115267

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

Underwriters Laboratories (UL) per standard UL 508
Canadian (CSA) standard per C22.2 no. 142-M1987

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

It is important to note that the device is classified as "open type" when used in the area of "Industrial control equipment" per UL 508. The device must therefore be installed in a UL 508-compliant housing as a requirement for certification or operation per UL 508.

10.2.2 EAC

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

10.2.3 KC

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

10.2.4 RCM

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

10.2.5 DNV GL certification

Products with this certification are certified by the classification society DNV GL and are suitable for the maritime sector. DNV GL certificates (type approval) are generally accepted by other classification societies during ship acceptance procedures.

DNV GL per standard DNVGL-CG-0339 from November 2016
IACS E10
EN 60945 section 1c

These products are suitable for the following DNV GL ambient conditions (DNV GL classes):

Temperature	B
Moisture	B
Vibration	A
EMV	B
Housing	For onboard installation, the regulations for compliance with the required degree of protection must be observed.

Products used on a ship's bridge must be dimmable using software in accordance with the regulations and guidelines from the respective classification society.

Windows 7 operating systems are only permitted to be used as embedded variants. There are no limitations for all other operating systems approved by B&R.

Information:

The line filter 5AC804.MFLT-00 in the power supply line is mandatory for use in the maritime environment. For more information, see section "Connecting to the end device" on page 170.

The following table lists the revisions from which DNV GL certification applies to individual components.

Model number	Description	DNV GL starting with Rev.
5AP1120.1906-000	Automation Panel 19.0" SXGA TFT 1280 x 1024 pixels (5:4) - Single-touch (analog resistive) - Control cabinet installation- Landscape format - Front USB interface - For PPC900 / PPC2100 / PPC3100 / link modules - Compatible with 5AP920.1906-01 / 5PC720.1906-00 / 5PC820.1906-00	D0
5AP1130.156C-000	Automation Panel 15.6" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC900 / PPC2100 / PPC3100 / link modules	C0
5CADVI.0018-00	DVI-D cable - 1.8 m	D0
5CADVI.0050-00	DVI-D cable - 5 m	D0
5CADVI.0100-00	DVI-D cable - 10 m	D0
5CASDL.0008-00	SDL cable - 0.8 m	A0
5CASDL.0010-03	SDL flex cable - 1 m	D0
5CASDL.0018-00	SDL cable - 1.8 m	D0
5CASDL.0018-01	SDL cable - 45-degree connector - 1.8 m	D0
5CASDL.0018-03	SDL flex cable - 1.8 m	D0
5CASDL.0050-00	SDL cable - 5 m	D0
5CASDL.0050-01	SDL cable - 45-degree connector - 5 m	D0
5CASDL.0050-03	SDL flex cable - 5 m	D0
5CASDL.0070-03	SDL flex cable - 7.0 m	D0
5CASDL.0100-00	SDL cable - 10 m	D0
5CASDL.0100-01	SDL cable - 45-degree connector - 10 m	D0
5CASDL.0100-03	SDL flex cable - 10 m	D0
5CASDL.0150-00	SDL cable - 15 m	D0
5CASDL.0150-01	SDL cable - 45-degree connector - 15 m	D0
5CASDL.0150-03	SDL flex cable - 15 m	D0

Model number	Description	DNV GL starting with Rev.
5CASDL.0200-00	SDL cable - 20 m	D0
5CASDL.0200-03	SDL flex cable - 20 m	D0
5CASDL.0250-00	SDL cable - 25 m	D0
5CASDL.0250-03	SDL flex cable - 25 m	D0
5CASDL.0300-00	SDL cable - 30 m	D0
5CASDL.0300-03	SDL flex cable - 30 m	D0
5CASDL.0300-13	SDL flex cable with extender - 30 m	D0
5CASDL.0400-13	SDL flex cable with extender - 40 m	D0
5CASDL.0430-13	SDL flex cable with extender - 43 m	D0
5CAUSB.0018-00	USB 2.0 connection cable - Type A - type B connector - 1.8 m	D0
5CAUSB.0050-00	USB 2.0 connection cable - Type A - type B connector - 5 m	D0
5DLSDL.1001-00	Automation Panel link module - SDL/DVI receiver - For Automation Panel 923/933/1000	E0
0TB103.9	Connector 24 VDC - 3-pin female - Screw clamp terminal block 3.31 mm²	D0
0TB103.91	Connector 24 VDC - 3-pin female - Cage clamp terminal block 3.31 mm²	D0
5AC804.MFLT-00	Line filter	D0

For the DNV GL certificates with information about the permissible ambient conditions, see the B&R website Downloads - Certificates - Maritime - DNV GL.

Certificates for compass safe distance are available at Downloads - Certificates - Maritime - Compass safe distance.

10.2.6 UL Haz. Loc. certification

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

Underwriters Laboratories (UL) per standard ANSI/ISA 12.12.01
Canadian (CSA) standard per C22.2 no. 213-16

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

Ind. Cont. Eq.
for Haz. Locs.
Cl. I, Div. 2,
Groups ABCD
E180196 (T4)

10.2.6.1 General safety guidelines

AP1000 panels with SDL or SDL3 link module that are certified for use in potentially explosive environments and carry the marking above are suitable for use in Class 1, Division 2, Groups A, B, C and D or in nonexplosive environments and correspond to the following standards: UL Std. 508 - 17th Edition, ANSI/ISA 12.12.01:2015, CSA Std. C22.2 No. 213-16.

10.2.6.2 Assembly and installation

Explosion-protected devices must be used as intended and are only permitted to be operated by qualified and instructed specialists in accordance with these installation instructions and the additional information in the user's manual. Any other operation endangers the safety and function of the devices and connected systems. The operator is responsible for compliance with applicable safety and accident prevention regulations and standards.

Devices must be installed in a suitable protective housing that can only be opened using a tool. In order to ensure sufficient air circulation, the specified clearances must be observed. Use only in environments with pollution degree 2. The maximum ambient temperature varies depending on the individual components used, see section "Temperature specifications" on page 33.

Before any installation or use of a device in potentially explosive atmospheres, the certification mark on the device must be checked. Additional equipment must be suitable for the place of use. Final assembly must be approved by the responsible local authorities. Wiring must be carried out in accordance with national regulations and the requirements of the authorities.

Devices must be disconnected from the power supply until installation work has been completed. The tightening torque for power supply terminals is 0.5 Nm. Cables must be suitable for a surface temperature of 75°C. AP1000 panels with SDL or SDL3 link module are only permitted to be operated with 24 VDC.

Unshielded/ungrounded cables are never permitted to be used in potentially explosive atmospheres. Devices must be securely connected to equipotential bonding. Power supply, communication and accessory cables must be secured to the device or control cabinet. Power supply, communication and accessory cables are not permitted to exert excessive strain on connections. Possible vibrations in the environment must be taken into account.

10.2.6.3 Operation

To switch AP1000 panels with SDL or SDL3 link modules on/off in a potentially explosive atmosphere, either a switch must be located outside the potentially explosive atmosphere or a switch certified for use in potentially explosive atmospheres must be used.

> **Danger!**
>
> **Explosion hazard: Accessories are not permitted to be connected or disconnected when the power is switched on unless the area is considered nonhazardous and is free of ignitable concentrations!**
>
> **Explosion hazard: Replacing components may impair eligibility for Class I, Division 2!**

> **Danger !**
>
> **Risque d'explosion – Ne pas connecter ou déconnecter un quelconque équipement lorsque le circuit est sous tension, à moins que la zone soit connue comme étant sans risque et sans concentrations inflammables!**
>
> **Risque d'explosion – Le remplacement de composants peut compromettre l'aptitude au respect de la Classe I, Division 2!**

With the exception of USB dongle 0TG1000.01 or in accordance with the requirements listed in "USB connection with the Automation Panel 1000", USB interfaces are not certified for operation in potentially explosive areas and are only permitted to be used for service purposes.

10.2.6.4 Servicing, disturbances and disassembly

Devices must be taken out of operation and protected against accidental startup. The actual disconnection of the power supply must be checked with a suitable voltmeter.

Before removing or installing accessories, components or cables, the power supply to AP1000 panels with SDL or SDL3 link modules and power supplies must be interrupted. Defective devices are only permitted to be replaced by trained personnel. Before switching on or connecting to the power supply, all covers or components of the system must be reinstalled and secured.

> **Danger!**
>
> **Failure to follow this instruction can result in death, serious bodily injury or damage to property!**

> **Danger !**
>
> **Le non-respect de ces instructions peut entraîner des blessures graves ou mortelles!**

10.2.6.5 USB connection with the Automation Panel 1000

10.2.6.5.1 Introduction

The information below describes the use of USB peripheral devices on the front USB interface of the B&R Automation Panel 1000 in hazardous locations Class I, Division 2, Groups A, B, C and D.

Danger!

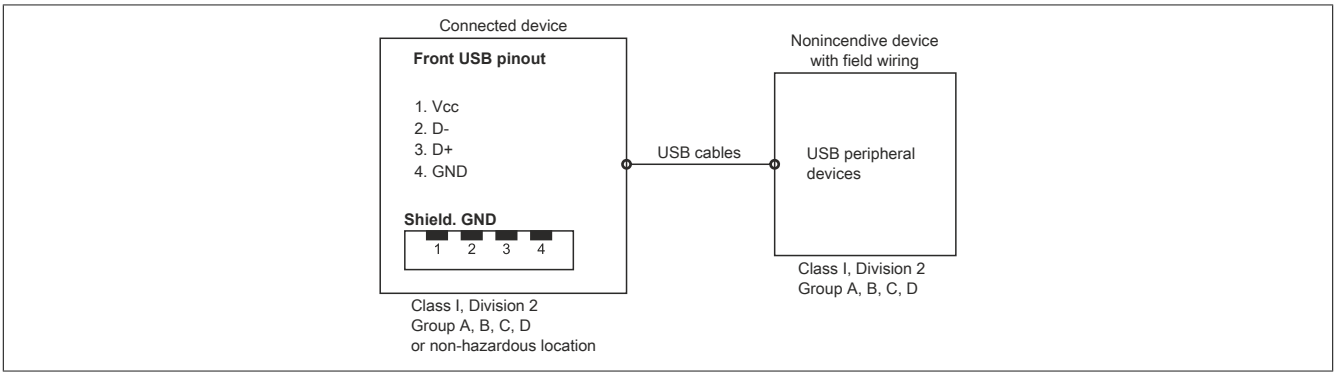
EXPLOSIONSGEFAHR

- **Before installation or use in potentially explosive atmospheres, the explosion protection class of the device must be checked according to ANSI/ISA 12.12.01 and CSA C22.2 N°213.**
- **To switch on/off B&R devices installed in potentially explosive atmosphere, one of the following conditions must be met:**
  - **A switch outside the hazardous area must be used, or**
  - **A switch certified according to hazardous location class and division for "tube use" must be used.**
- **As long as the electrical circuit is activated, cables or lines are not permitted to be connected or disconnected unless the area is knowingly free of flammable concentrations of vapors, gases and other flammable or combustible materials. This applies to all connections and circuits. This includes power, ground and network connections as well as series and parallel connections.**
- **Unshielded/ungrounded cables are never permitted to be used in potentially explosive atmospheres.**
- **Only configurations with nonincendive USB devices are permitted to be used.**
- **The doors and openings of housings must always remain closed. This prevents the accumulation of foreign bodies within the workstation.**

Failure to follow this instruction can result in death, serious bodily injury or damage to property!

10.2.6.5.2 Description

Nonincendive devices (keyboards, mouse) are certified for use on the front USB interface of the B&R Automation Panel 1000 (connected device) and are permitted to be connected and disconnected during operation. In addition to the nonincendive property, devices that can be connected to the front USB interface must meet the following criteria.



Front USB interface (USB 2.0):	
Open-circuit voltage [V_{oc}]	5.04 V
Short-circuit current [I_{sc}]	1170 mA
Connected capacity [$_{Ca}$]	20 µF
Connected inductance [$_{La}$]	16.8 µH

Table 78: Nonincendive electrical circuit parameters for the front USB interface

The unit concept allows the interconnection of nonincendive devices with connected devices with non-specifically tested combinations as a system. For this purpose, the permissible values of V_{oc} (or U_o) and I_{sc} (or I_o) for the connected device must be less than or equal to V_{max} (U_i) and I_{max} (I_i) for the nonincendive device, the permissible values of C_a (C_o) and L_a (L_o) for the connected device must be greater than or equal to $C_i + C_{Cable}$ and $L_i + L_{Cable}$ for the nonincendive device with field wiring.

The nonincendive device with field wiring must meet the following criteria:

B&R device (connected device)	-	Connected, nonincendive device with field wiring (mouse, keyboard)
V_{oc}	≤	V_{max}
I_{sc}	≤	I_{max}
C_a	≥	$C_i + C_{Cable}$
L_a	≥	$L_i + L_{Cable}$

Table 79: Connected, nonincendive device with field wiring

If the electrical parameters of the cable are unknown, the following values can be used:

Where C_{Cable} = 196.85 pF/m (60 pF/ft) if unknown

Where L_{Cable} = 0.656 µH/m (0.20 µH/ft) if unknown

Wiring must be carried out in accordance with national regulations and the requirements of the authorities.

The B&R device must be installed in a suitable protective housing. For installations in Class I, Division 2 hazardous locations, the housing must be capable of withstanding one or more Division 2 wiring methods.

Warning!

- **Replacing components may impair the suitability of the Division 2 hazardous location (classified) under certain circumstances.**
- **As long as the area is knowingly at risk of explosion, the device is not permitted to be switched on or off.**
- **The nonincendive device with field wiring is not permitted to be connected via a parallel connection. This is valid unless the device has received express permission for this.**

The B&R device is suitable for use in Class I, Division 2, Groups A, B, C and D areas. It also provides nonincendive field wiring for devices in Class I, Division 2, Groups A, B, C and D.

10.2.6.6 USB connection with the SDL or SDL3 link module

10.2.6.6.1 Introduction

The information below describes the use of USB peripheral devices on the front USB interfaces of the B&R SDL or SDL3 link module in hazardous locations Class I, Division 2, Groups A, B, C and D.

Danger!

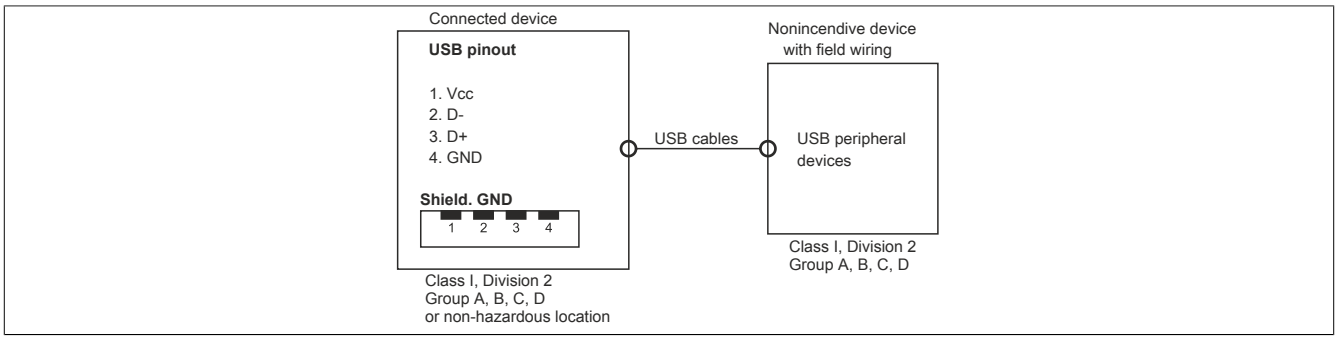
EXPLOSIONSGEFAHR

- **Before installation or use in potentially explosive atmospheres, the explosion protection class of the device must be checked according to ANSI/ISA 12.12.01 and CSA C22.2 N°213.**
- **To switch on/off B&R devices installed in potentially explosive atmosphere, one of the following conditions must be met:**
  - **A switch outside the hazardous area must be used, or**
  - **A switch certified according to hazardous location class and division for "tube use" must be used.**
- **As long as the electrical circuit is activated, cables or lines are not permitted to be connected or disconnected unless the area is knowingly free of flammable concentrations of vapors, gases and other flammable or combustible materials. This applies to all connections and circuits. This includes power, ground and network connections as well as series and parallel connections.**
- **Unshielded/ungrounded cables are never permitted to be used in potentially explosive atmospheres.**
- **Only configurations with nonincendive USB devices are permitted to be used.**
- **The doors and openings of housings must always remain closed. This prevents the accumulation of foreign bodies within the workstation.**

Failure to follow this instruction can result in death, serious bodily injury or damage to property!

10.2.6.6.2 Description

Nonincendive devices (keyboards, mouse) are certified for use on the USB interfaces of the B&R SDL or SDL3 link module (connected device) and are permitted to be connected and disconnected during operation. In addition to the nonincendive property, devices that can be connected to the USB interfaces must meet the following criteria.



USB interfaces (USB 2.0):	
Open-circuit voltage [V_{oc}]	5.12 V
Short-circuit current [I_{sc}]	2131 mA
Connected capacity [$_{Ca}$]	20 µF
Connected inductance [$_{La}$]	16.8 µH

Table 80: Nonincendive circuit parameters for the USB interfaces

The unit concept allows the interconnection of nonincendive devices with connected devices with non-specifically tested combinations as a system. For this purpose, the permissible values of V_{oc} (or U_o) and I_{sc} (or I_o) for the connected device must be less than or equal to V_{max} (U_i) and I_{max} (I_i) for the nonincendive device, the permissible values of C_a (C_o) and L_a (L_o) for the connected device must be greater than or equal to $C_i + C_{Cable}$ and $L_i + L_{Cable}$ for the nonincendive device with field wiring.

The nonincendive device with field wiring must meet the following criteria:

B&R device (connected device)	-	Connected, nonincendive device with field wiring (mouse, keyboard)
V_{oc}	≤	V_{max}
I_{sc}	≤	I_{max}
C_a	≥	$C_i + C_{Cable}$
L_a	≥	$L_i + L_{Cable}$

Table 81: Connected, nonincendive device with field wiring

If the electrical parameters of the cable are unknown, the following values can be used:

Where C_{Cable} = 196.85 pF/m (60 pF/ft) if unknown

Where L_{Cable} = 0.656 µH/m (0.20 µH/ft) if unknown

Wiring must be carried out in accordance with national regulations and the requirements of the authorities.

The B&R device must be installed in a suitable protective housing. For installations in Class I, Division 2 hazardous locations, the housing must be capable of withstanding one or more Division 2 wiring methods.

Warning!

- **Replacing components may impair the suitability of the Division 2 hazardous location (classified) under certain circumstances.**
- **As long as the area is knowingly at risk of explosion, the device is not permitted to be switched on or off.**
- **The nonincendive device with field wiring is not permitted to be connected via a parallel connection. This is valid unless the device has received express permission for this.**

The B&R device is suitable for use in Class I, Division 2, Groups A, B, C and D areas. It also provides nonincendive field wiring for devices in Class I, Division 2, Groups A, B, C and D.

10.3 Notes for the manual pursuant to radio approval

B&R products meet the EMC requirements for operation in the USA and Canada and comply with FCC and IC regulations. Below are the corresponding "Radio Frequency Interference Statements" for the USA and Canada:

RF exposure statement	Complies with FCC and IC certifications
CE Conformity	Additional to the Low voltage and EMC directive the complete end-device must be conform to the radio equipment directive.
FCC and IC	B&R products satisfy EMC requirements for operation in the USA and Canada and are compliant with FCC and IC regulations. This must be verified with every device in which this B&R wireless board "RFM-2-NF and RFM-3-BTW" should be installed. Corresponding "Radio Frequency Interference Statements" for the USA and Canada:
USA: Federal Communications Commission (FCC)	This device complies with Part 15 of the FCC rules. Operation is subjected to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. NOTE: This equipment has been tested and found comply with the limits of Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a resident area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
Canada: Industry Canada (IC)	This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
Mexico: Instituto Federal de Telecomunicaciones (IFETEL)	

Products with RFM-3-BTW and/or RFM-2-NF boards are approved for use in the USA and Canada. The types can be identified by an adhesive label bearing the appropriate marks - identifiable by the information "Contains FCC ID:" and "Contains IC:".

11 Environmentally friendly disposal

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

11.1 Separation of materials

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

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

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

Appendix A

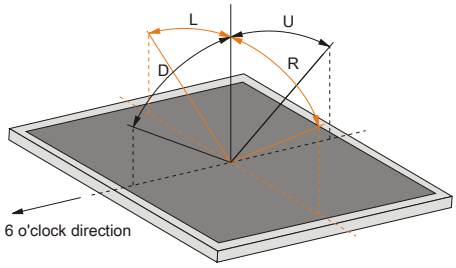
A.1 Abbreviations

Abbreviation	Stands for	Description
NC	Normally closed	Stands for a normally closed relay contact.
	Not connected	Used in pinout descriptions if a terminal or pin is not connected on the module side.
ND	Not defined	Stands for an undefined value in technical data tables. This may be because the cable manufacturer has not provided a value for certain technical data.
NO	Normally open	Stands for a normally open relay contact.
TBD	To be defined	Used in technical data tables if there is currently no value for specific technical data. The value will be supplied later.
MTBF	Mean time between failures	The expected value of the operating time between two consecutive failures.

Table 82: Abbreviations used in this user's manual

A.2 Viewing angles

For viewing angle specifications (R, L, U, D) of the display types, see the technical data of the individual components.



A.3 Chemical resistance

Single-touch panels are manufactured with the Autotex panel overlay.

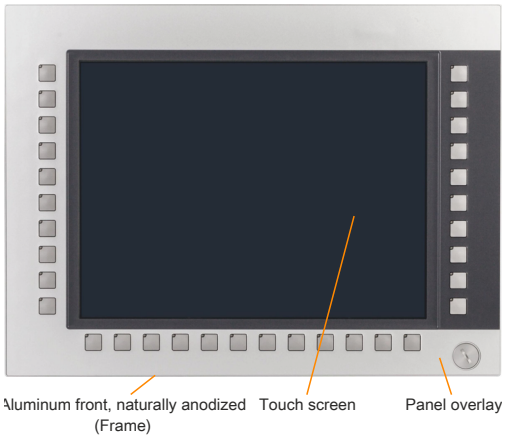


Figure 99: Single-touch panel with Autotex panel overlay, naturally anodized

The front of the following single-touch panels are coated:

- 5AP1120.101E-000
- 5AP1120.121E-000
- 5AP1120.156B-000

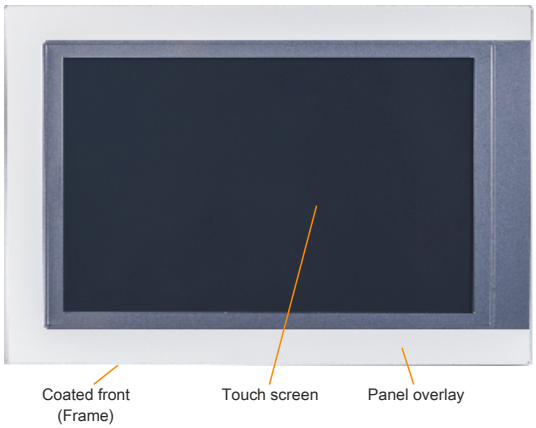


Figure 100: Single-touch panel with Autotex panel overlay, coated

The multi-touch panels are equipped with a continuous glass surface.

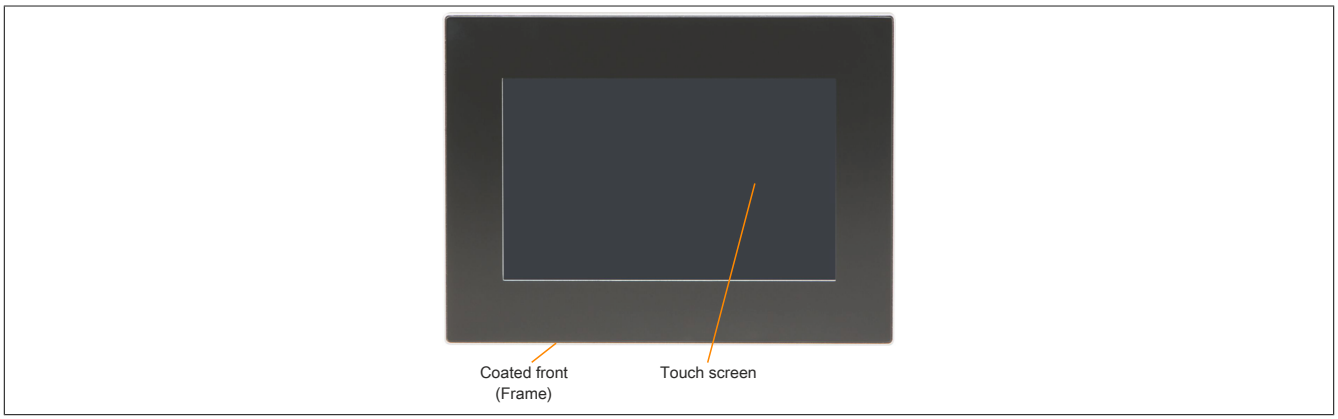


Figure 101: Multi-touch panel with glass surface

A.3.1 Autotex panel overlay (polyester)

Unless otherwise specified, the panel overlay is resistant to the following chemicals per DIN 42115 Part 2 when exposed for up to 24 hours without visible changes:

- 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
- Dowandol
- 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

Per DIN 42115 Part 2, the panel overlay is resistant to glacial acetic acid for less than one hour without visible damage.

A.3.2 Coated aluminum front

Unless otherwise specified, the coated aluminum front is resistant to the following chemicals per DIN 42115 Part 2 when exposed for up to 24 hours without visible changes:

- Formic acid < 50%
- Ammonia < 40%
- Brake fluid
- Hydrogen chloride < 10%
- Diesel
- Acetic acid < 50%
- Transmission fluid
- Lactic acid < 10%
- Isopropanol
- Coolant < 4%
- Sodium hydroxide < 40%
- Petroleum
- Phosphoric acid < 25%
- Saline < 10%
- Sulphuric acid < 25%
- Sidolin
- Skydrol

The coated aluminum front is not resistant to the following chemicals:

- Acetone
- Ethyl acetate

A.3.3 Touch screen

AMT touch screen (single-touch)

Unless otherwise specified, the AMT touch screen is resistant to the following chemicals when exposed for up to 1 hour (at 25°C) with no visible changes:

- Acetone
- Ammonia-based glass cleaner
- Beer
- Unleaded gasoline
- Chemical cleaning agents
- Hydrogen chloride < 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%
- Saline solution < 5%
- Tea
- Turpentine
- Lubricants
- Sulphuric acid < 40%
- Cooking oil

3M touch screen (multi-touch)

Unless otherwise specified, the 3M touch screen is resistant to the following chemicals per ASTM D 1308-02 and ASTM F 1598-95 when exposed for up to 24 hours without visible changes:

- Acetone
- Ammonia < 5%
- Gasoline
- Beer
- Lead
- Brake fluid
- Hydrogen chloride < 6%
- Coca-Cola
- Dimethylbenzene
- Ethanol
- Rubber cement
- Isopropanol
- Coffee
- Ink
- Lipstick
- Lysol
- Methylbenzene
- Methyl ethyl ketone
- Naphtha
- Nitric acid < 70%
- Lubricants
- Sulphuric acid < 40%
- Stamping ink
- Tea
- Trichloroethylene
- Water
- White wine vinegar
- Windex Original

A.4 Touch screen

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

A.4.1.1 Technical data

Information:

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

Model number	Touchscreen AMT 5-Draht
General information	
Technology	Analog, resistive
Release pressure	<1 N
Light transmission	81% ±3%
Service life	36,000,000 touch operations at the same position (release pressure: 250 g, interval: 0.5 s)
Operating conditions	
Activation	Finger, stylus, credit card, glove
Ambient 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
Vendor information	
Manufacturer	AMT

Table 83: Touchscreen AMT 5-Draht - Technical data

Note:

Drivers for this touch screen for approved operating systems are available for download in the Downloads section of the B&R website (https://www.br-automation.com).

A.4.1.2 Temperature/Humidity diagram

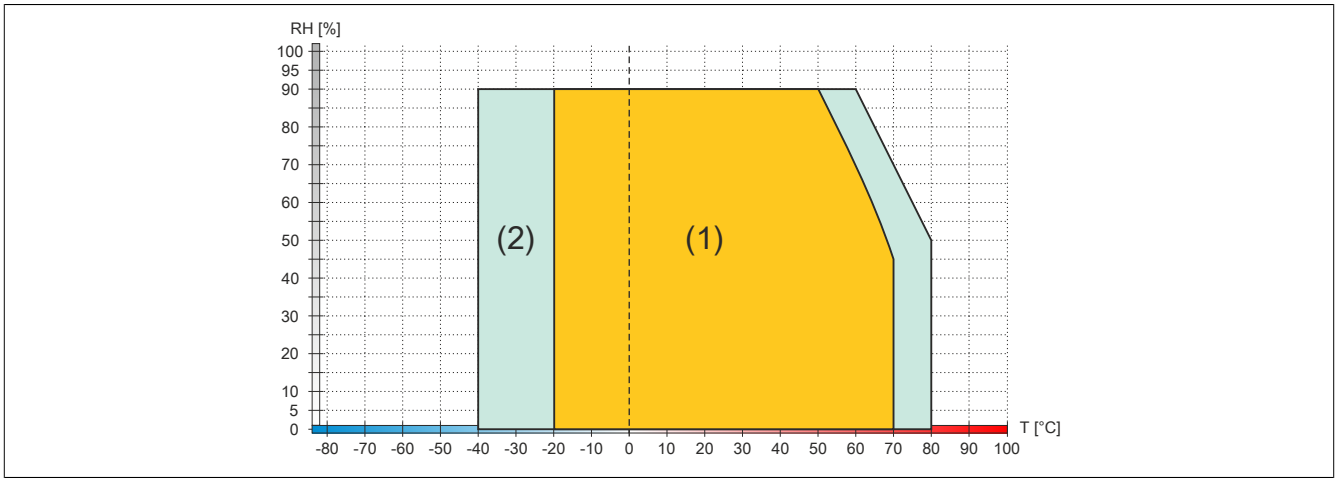


Figure 102: 5-wire AMT touch screen - Temperature/Humidity diagram

Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

A.4.2 3M touch screen (multi-touch generation 3)

A.4.2.1 Technical data

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

Model number	Touchscreen 3M
General information	
Technology	Projected capacitive touch (PCT)
Light transmission	>90%
Anti-glare coating	Optical/Gloss = 80
Operating conditions	
Activation	Finger, thin glove
Ambient conditions	
Temperature	
Operation	-10 to 70°C
Storage	-40 to 70°C
Transport	-40 to 70°C
Relative humidity	
Operation	Up to 90% at max. 35°C, see diagram for > 35°C.
Storage	Up to 90% at max. 35°C, see diagram for > 35°C.
Transport	Up to 90% at max. 35°C, see diagram for > 35°C.
Vendor information	
Manufacturer	3M

Table 84: Touchscreen 3M - Technical data

A.4.2.2 Temperature/Humidity diagram

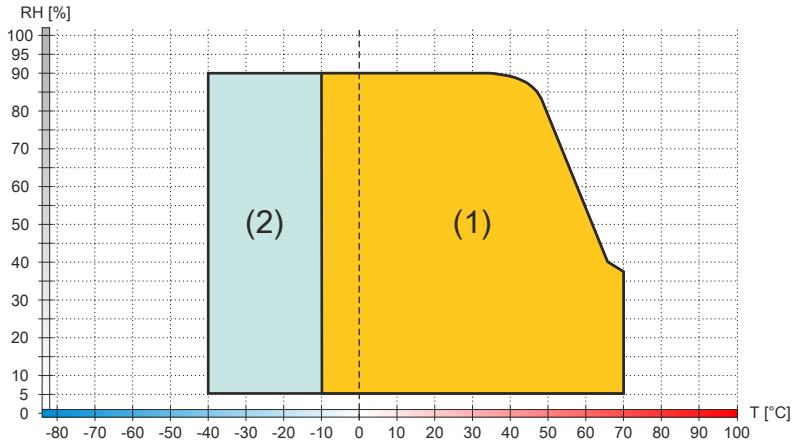


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

A.5 Installation 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, Panel PC 700 and Panel PC 800 devices depending on the respective device diagonals.

The external dimensions of the device types of the respective diagonals are identical.

Information:

Device designation "AP1000" refers to the Automation Panel 1000 as well as to the Panel PC 900, Panel PC 2100, Panel PC 2200 and Panel PC 3100 with an installed AP1000 panel.

The various device types are abbreviated as follows:

Device type	Short form
Power Panel xxx	PPxxx
Panel PC xxxx	PPCxxxx
Automation Panel xxxx	APxxxx

A.5.1 Compatibility overview

The following table gives a brief overview of the PP100/200, PP300/400, PP500, AP900, AP1000, PPC700 and PPC800 devices. For more information, see section "Compatibility details" on page 195.

Information:

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

Diagonal	Format		PP100/200	PP300/400	PP500	AP900	AP1000[1)]	PPC700	PPC800
5.7"	Landscape1	Outer dimensions	212 x 156			-	212 x 156	-	
		Installation dimensions	199 x 143			-	199 x 143	-	
	Landscape2	Outer dimensions	302 x 187			-			
		Installation dimensions	289 x 174			-			
	Portrait1	Outer dimensions	212 x 245			-	212 x 245	-	
		Installation dimensions	199 x 226.8		199 x 232	-	199 x 232	-	
7"	Landscape1	Outer dimensions	-		212 x 156	-	212 x 156	-	
		Installation dimensions	-		199 x 143	-	199 x 143	-	
10.4"	Landscape1	Outer dimensions	323 x 260						-
		Installation dimensions	303 x 243						-
	Landscape2	Outer dimensions	423 x 288						-
		Installation dimensions	402 x 266.5		403 x 271	402 x 271	403 x 271	402 x 271	-
	Portrait1	Outer dimensions	323 x 358						-
		Installation dimensions	303 x 336		303 x 341				-
12.1"	Landscape1	Outer dimensions	362 x 284						-
		Installation dimensions	345 x 267		342 x 267				-
15"	Landscape1	Outer dimensions	435 x 330						
		Installation dimensions	415 x 312		415 x 313	415 x 312	415 x 313	415 x 312	

Diagonal	Format		PP100/200	PP300/400	PP500	AP900	AP1000[1)]	PPC700	PPC800
	Portrait1	Outer dimensions	435 x 430				-	435 x 430	-
		Installation dimensions	415 x 412		415 x 413	415 x 412	-	415 x 412	-
17"	Landscape1	Outer dimensions	-			477 x 390	-	477 x 390	-
		Installation dimensions	-			460 x 373	-	460 x 373	-
19"	Landscape1	Outer dimensions	-			527 x 421			
		Installation dimensions	-			510 x 404			
21.3"	Landscape1	Outer dimensions	-			583 x 464	-		
		Installation dimensions	-			566 x 447	-		

1) Device designation "AP1000" refers to the Automation Panel 1000 as well as to Panel PCs installed on AP1000 panels.

A.5.2 Compatibility details

A.5.2.1 Example

The dimensions (mm) in the subsequent figures have the following meaning.

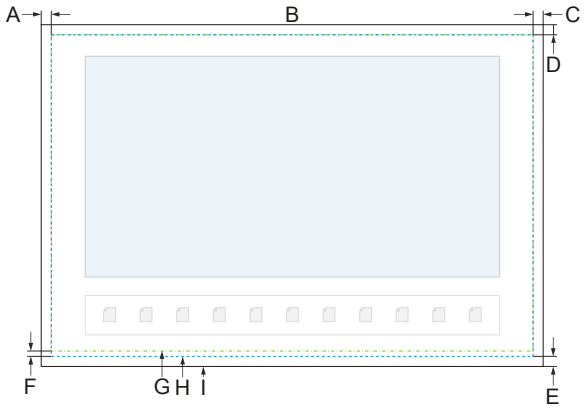


Diagram legend			
A	Spacing (left) to device edge	F	Difference value
B	Outer dimensions	G	Installation dimensions/Cutout for PP100/200/300/400 device
C	Spacing (right) to device edge	H	Installation dimensions/Cutout AP900/PP500/PPC700 device
D	Spacing (top) to device edge	I	Outer contour of device
E	Spacing (bottom) to device edge		

A.5.2.2 5.7" devices

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

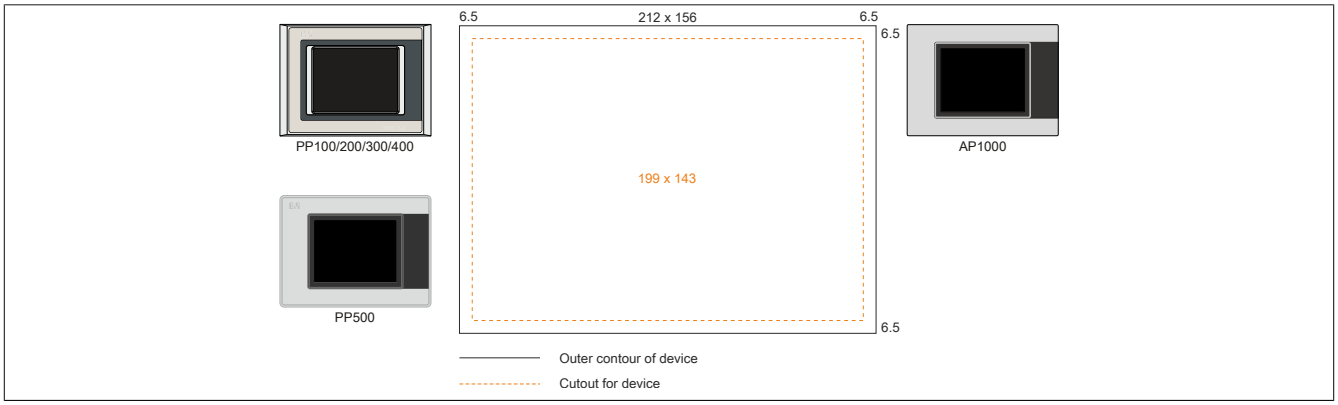


Figure 103: Installation compatibility - 5.7" devices - Landscape1

The 5.7" Automation Panel 1000, Power Panel 500, Power Panel 300/400 and Power Panel 100/200 devices in Landscape1 format are 100% compatible.

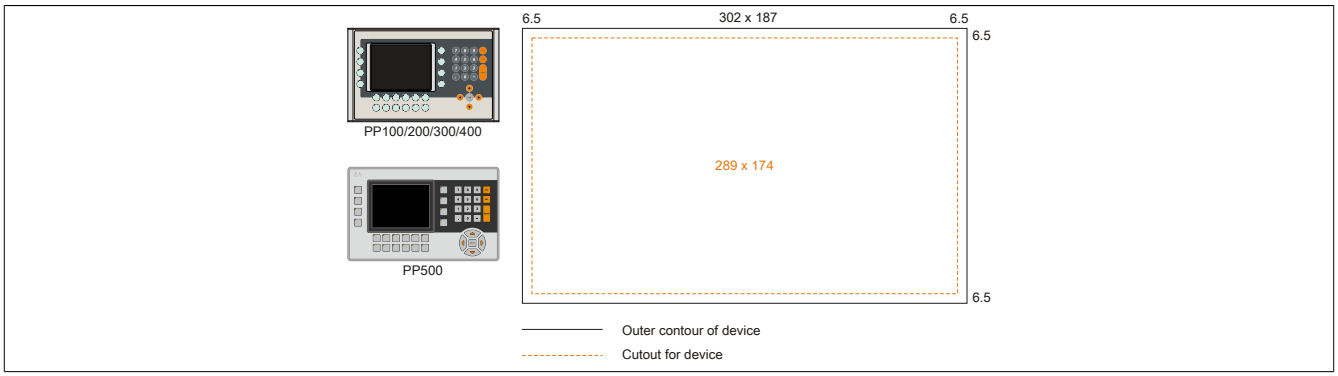


Figure 104: Installation compatibility - 5.7" devices - Landscape2

The 5.7" Power Panel 500, Power Panel 300/400 and Power Panel 100/200 devices in Landscape2 format are 100% compatible.

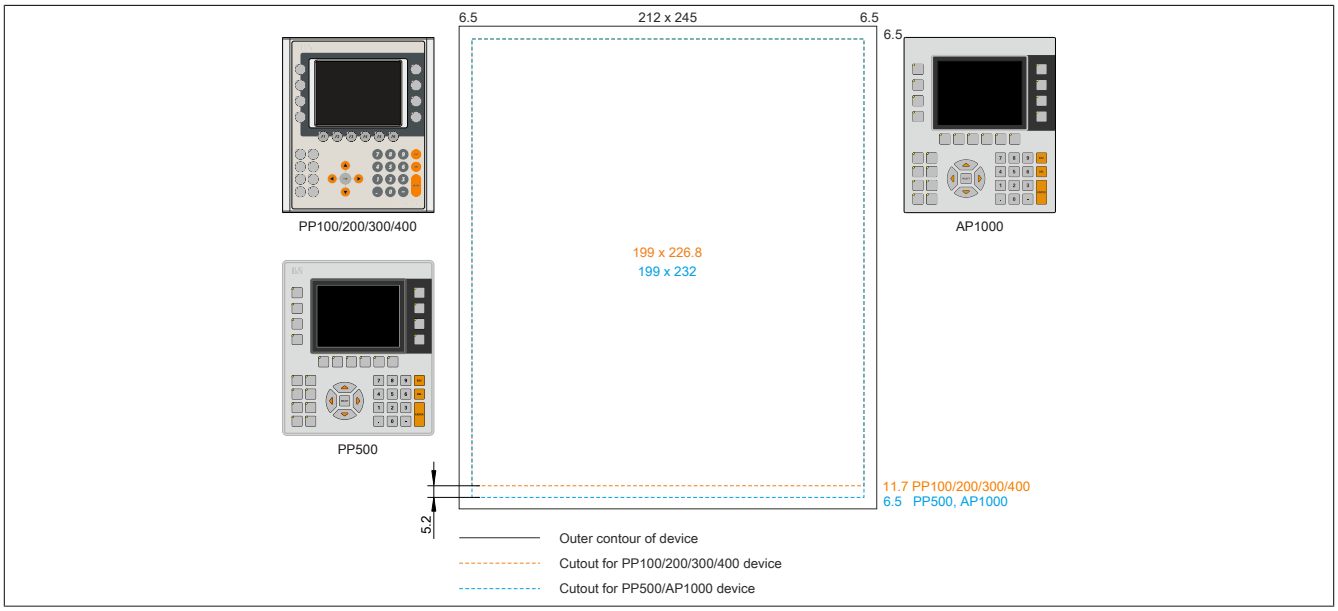


Figure 105: Installation compatibility - 5.7" devices - Portrait1

The 5.7" Automation Panel 1000 and Power Panel 500 are not 100% compatible with Power Panel 300/400 and Power Panel 100/200 devices in Portrait1 format. Automation Panel 1000 and Power Panel 500 devices need a cutout that is 5.2 mm larger (bottom edge).

The larger cutout can be used conditionally for all devices:

- During installation, it is important to ensure that the PP100/200 and PP300/400 devices are positioned and installed as centrally as possible in the cutout. If this is not the case, the retaining clips can no longer grip and impermeability is no longer ensured by the circumferential cord gasket (IP65).

A.5.2.3 10.4" devices

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

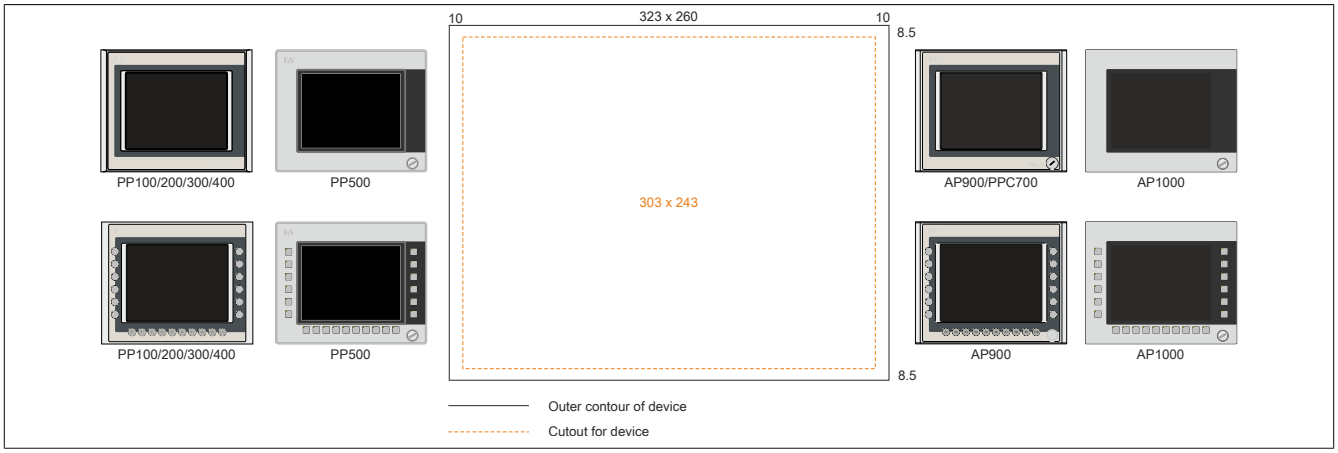


Figure 106: Installation compatibility - 10.4" devices - Landscape1

10.4" Automation Panel 1000, Automation Panel 900, Panel PC 700, Power Panel 500, Power Panel 300/400 and Power Panel 100/200 devices in Landscape1 format are 100% compatible.

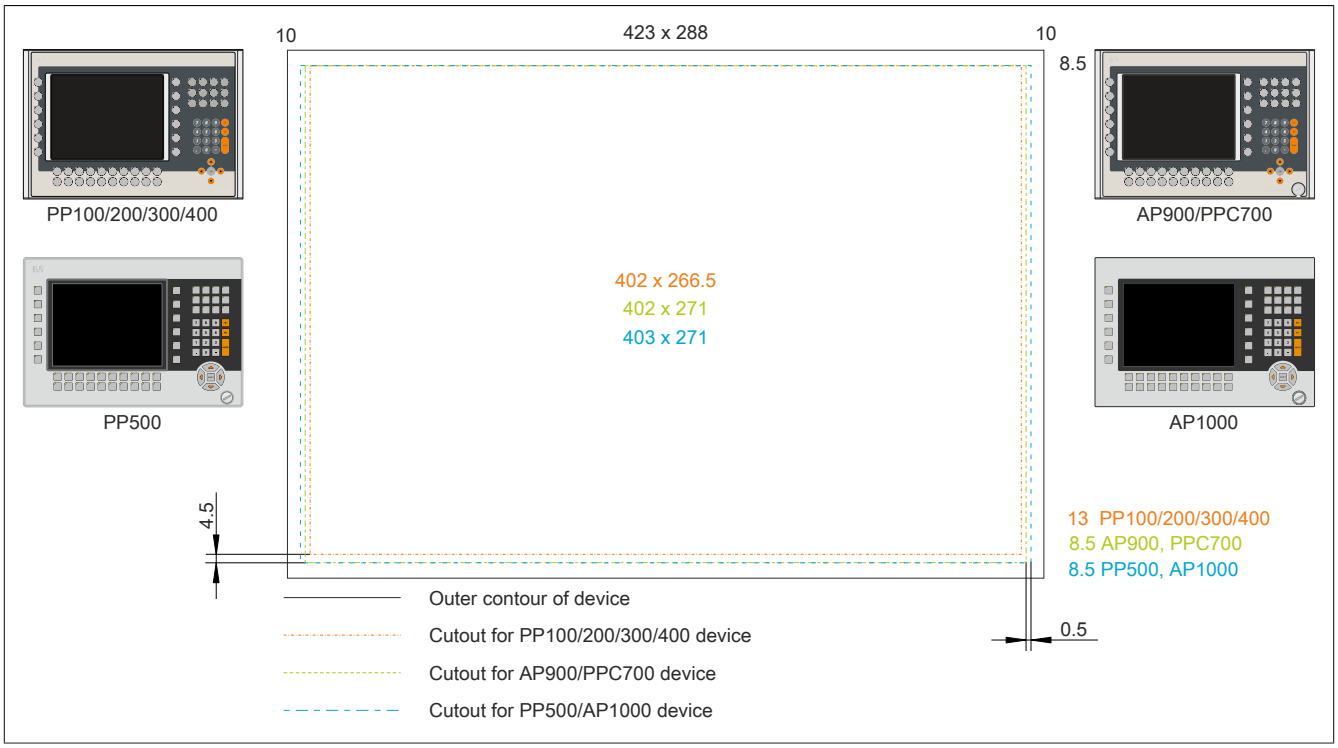


Figure 107: Installation compatibility - 10.4" devices - Landscape2

10.4" Automation Panel 1000, Automation Panel 900, Panel PC 700 and Power Panel 500 devices are not 100% compatible with Power Panel 300/400 or Power Panel 100/200 devices in Landscape2 format. Automation Panel 1000, Automation Panel 900, Panel PC 700 and Power Panel 500 devices need a cutout that is 4.5 mm larger (bottom edge) and 0.5 mm wider (left and right).

The larger cutout can be used conditionally for all devices:

- During installation, it is important to ensure that the PP100/200 and PP300/400 devices are positioned and installed as centrally as possible in the cutout. If this is not the case, the retaining clips can no longer grip and impermeability is no longer ensured by the circumferential cord gasket (IP65).

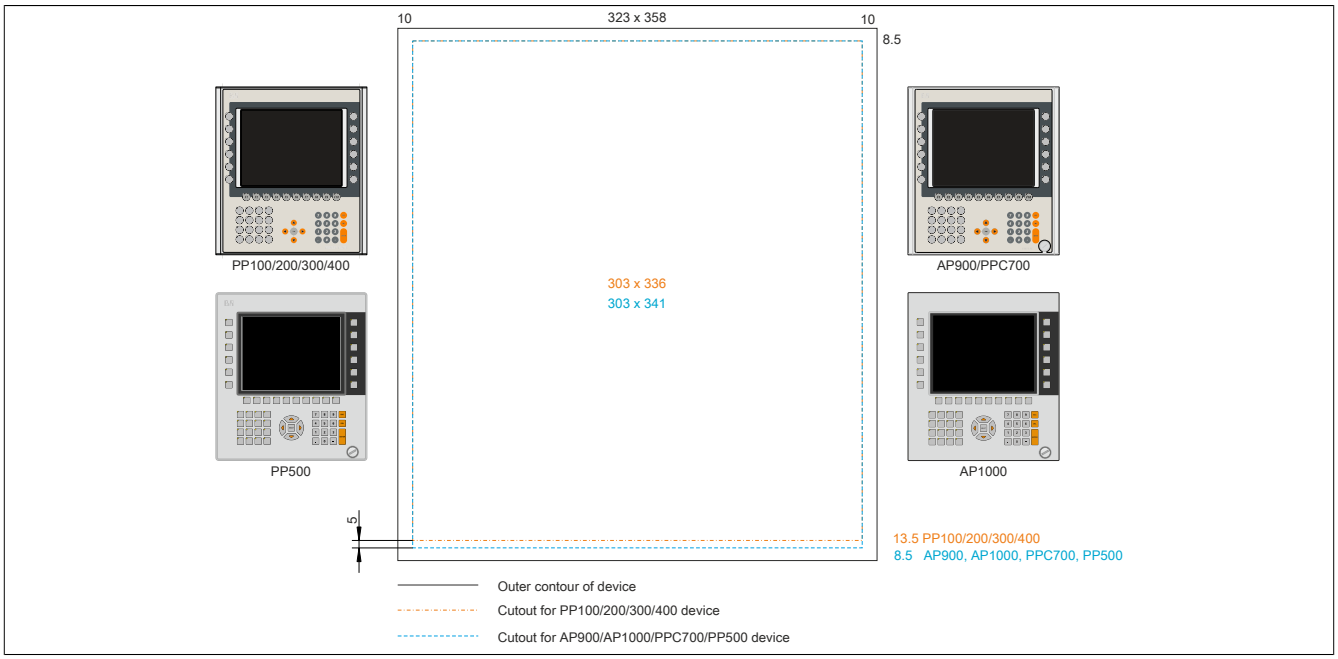


Figure 108: Installation compatibility - 10.4" devices - Portrait1

10.4" Automation Panel 1000, Automation Panel 900, Panel PC 700 and Power Panel 500 devices are not 100% compatible with Power Panel 300/400 or Power Panel 100/200 devices in Portrait1 format. Automation Panel 1000, Automation Panel 900, Panel PC 700 and Power Panel 500 devices need a cutout that is 5 mm larger (bottom edge).

The larger cutout can be used conditionally for all devices:

- During installation, it is important to ensure that the PP100/200/300/400 devices are positioned and installed as centrally as possible in the cutout. If this is not the case, the retaining clips can no longer grip and impermeability is no longer ensured by the circumferential cord gasket (IP65).

A.5.2.4 12.1" devices

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

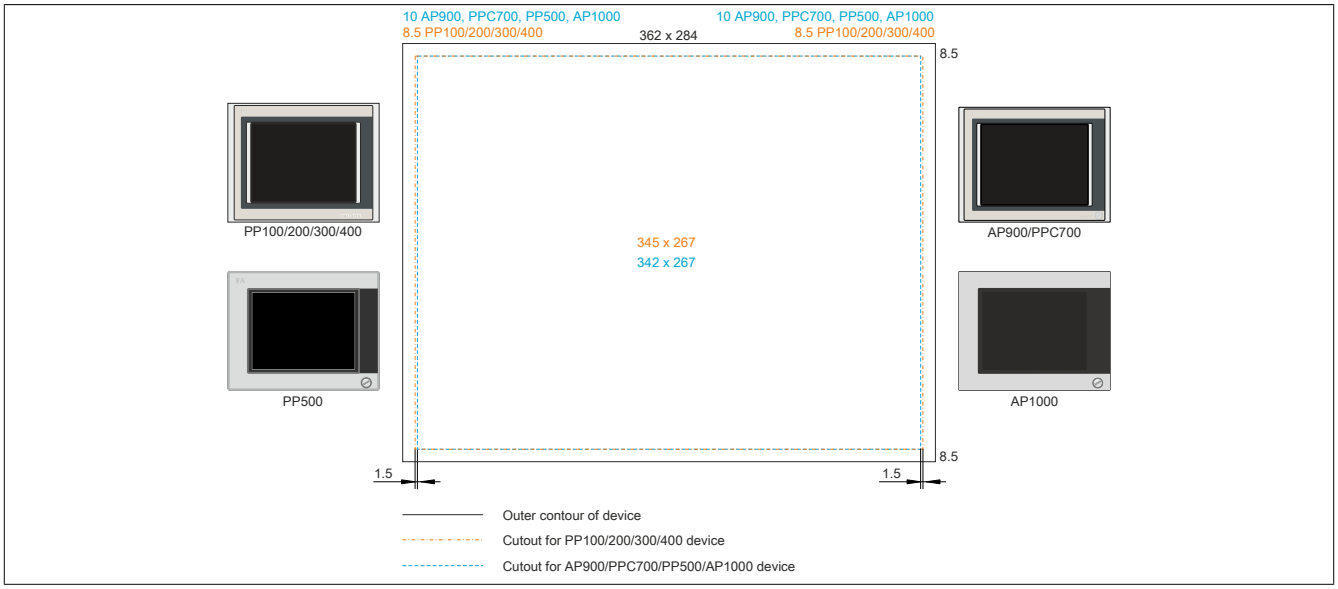


Figure 109: Installation compatibility - 12.1" devices - Landscape1

12.1" Automation Panel 1000, Automation Panel 900, Panel PC 700 and Power Panel 500 devices are not 100% compatible with Power Panel 300/400 or Power Panel 100/200 devices in Landscape1 format. Power Panel 300/400 and Power Panel 100/200 devices need a cutout that is 1.5 mm wider (left and right).

The larger cutout can be used conditionally for all devices:

- During installation, it is important to ensure that the AP1000, AP900, PPC700 and PP500 devices are positioned and installed as centrally as possible in the cutout.

A.5.2.5 15" devices

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

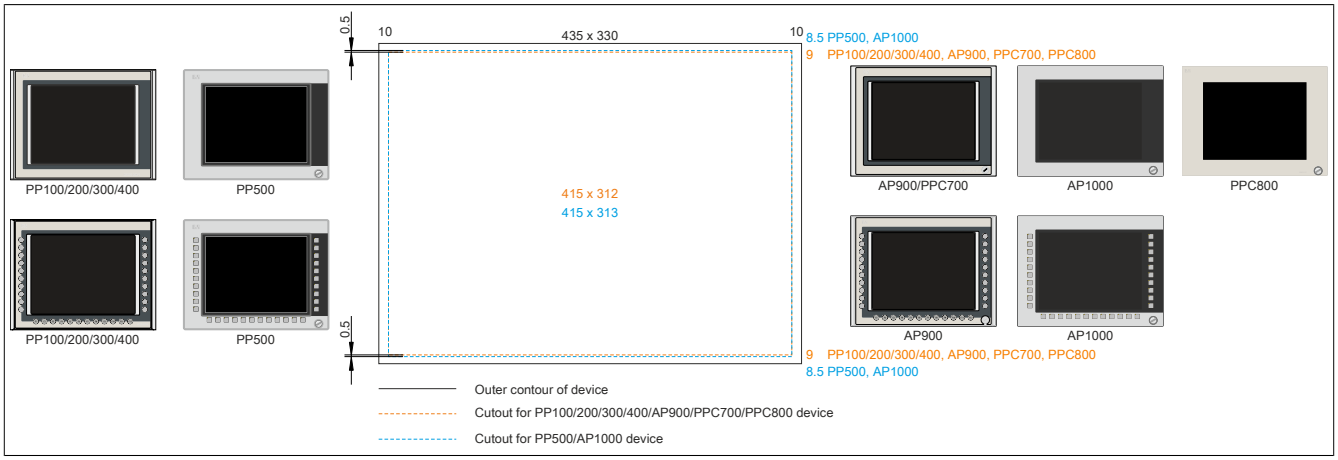


Figure 110: Installation compatibility - 15" devices - Landscape1

15" Automation Panel 1000 and Power Panel 500 devices are not 100% compatible with Power Panel 100/200, Power Panel 300/400, Automation Panel 900, Panel PC 700 and Panel PC 800 devices in Landscape1 format. Automation Panel 1000 and Power Panel 500 devices need a cutout that is 0.5 mm larger (top and bottom edge).

The larger cutout can be used conditionally for all devices:

- During installation, it is important to ensure that the PP100/200, PP300/400, AP900, PPC700 and PPC800 devices are positioned and installed as centrally as possible in the cutout. If this is not the case, the retaining clips can no longer grip and impermeability is no longer ensured by the circumferential cord gasket (IP65).

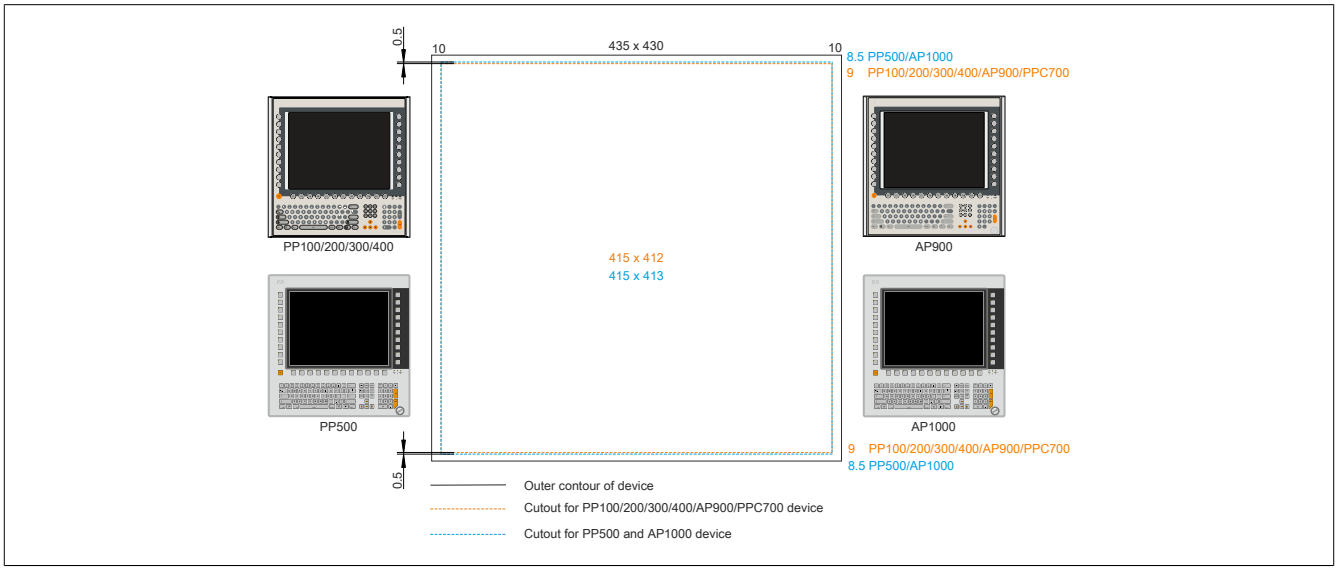


Figure 111: Installation compatibility - 15" devices - Portrait1

15" Automation Panel 1000 and Power Panel 500 devices are not 100% compatible with Power Panel 100/200, Power Panel 300/400, Automation Panel 900 and Panel PC 700 devices in Portrait1 format. Automation Panel 1000 and Power Panel 500 devices need a cutout that is 0.5 mm larger (top and bottom edge).

The larger cutout can be used conditionally for all devices:

- During installation, it is important to ensure that the PP100/200, PP300/400, AP900 and PPC700 devices are positioned and installed as centrally as possible in the cutout. If this is not the case, the retaining clips can no longer grip and impermeability is no longer ensured by the circumferential cord gasket (IP65).

A.5.2.6 17" devices

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

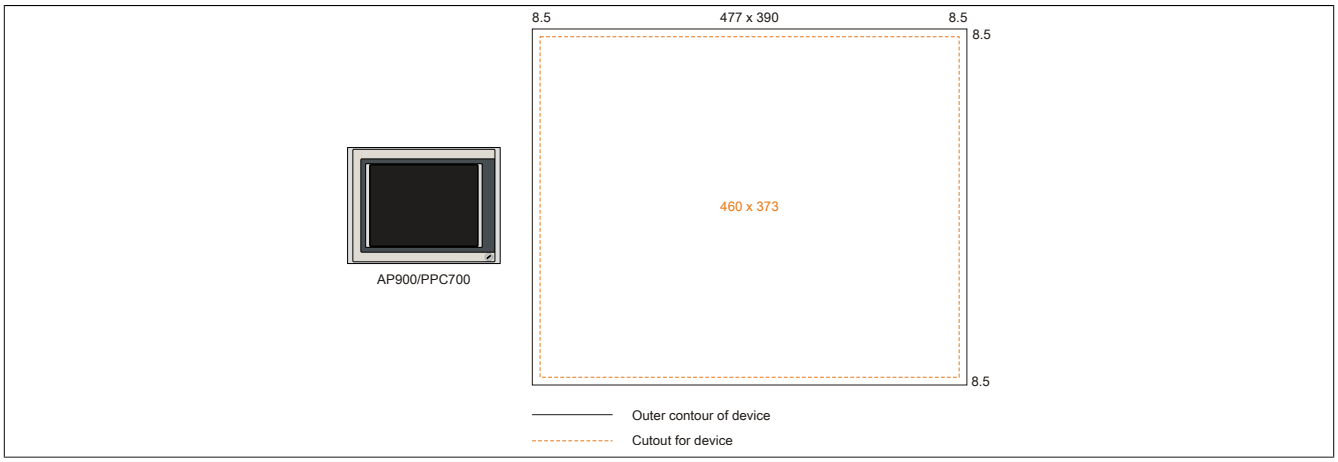


Figure 112: Installation compatibility - 17" devices - Landscape1

The 17" Automation Panel 900 and Panel PC 700 in Landscape1 format are 100% compatible.

A.5.2.7 19" devices

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

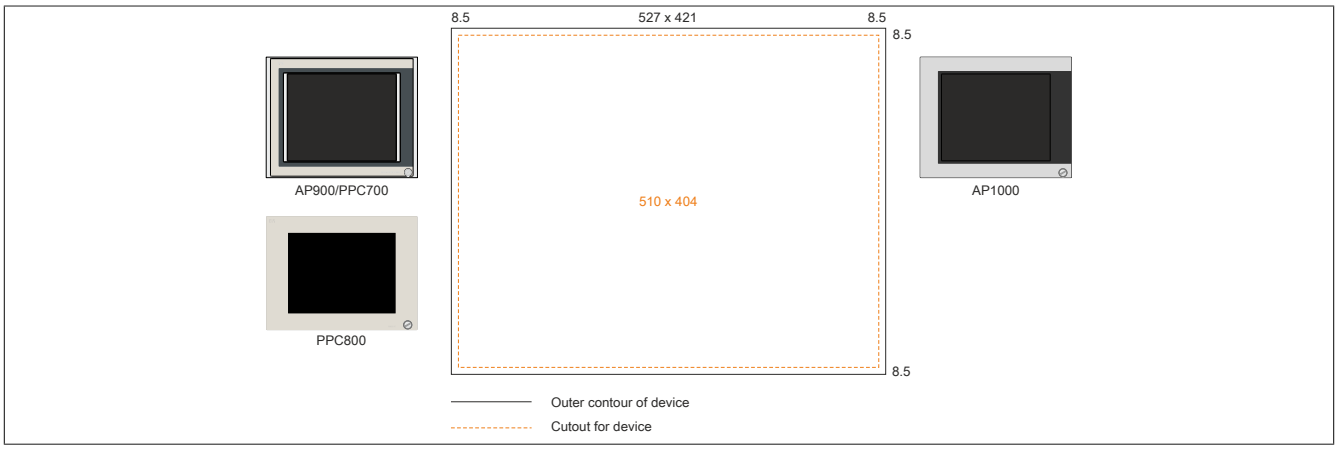


Figure 113: Installation compatibility - 19" devices - Landscape1

The 19" Automation Panel 1000, Automation Panel 900, Panel PC 700 and Panel PC 800 in Landscape1 format are 100% compatible.

A.5.2.8 21.3" devices

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

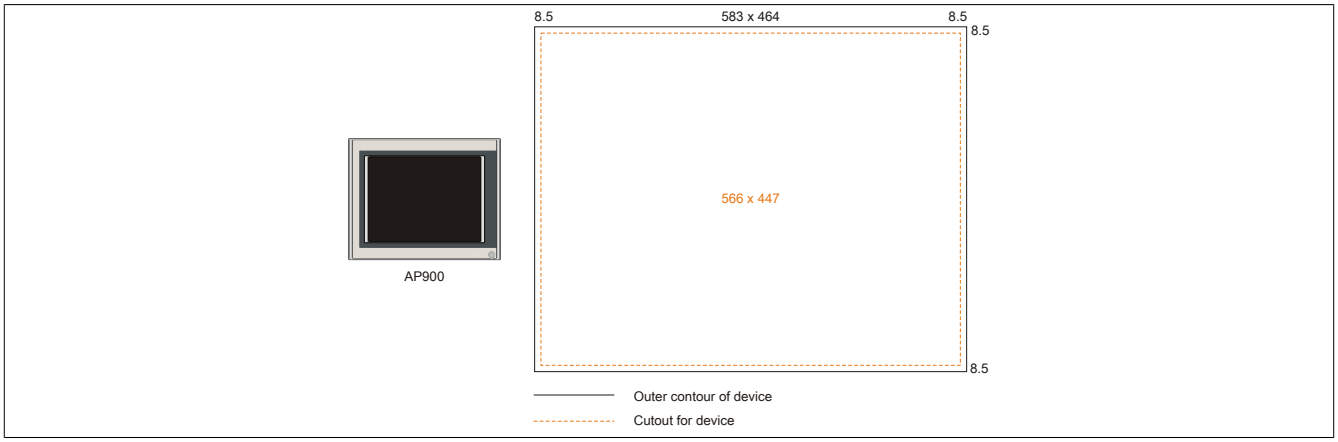


Figure 114: Installation compatibility - 21.3" devices - Landscape1

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