Automation Panel 1000

User's manual
2.35 (November 2025)
MAAP1000-ENG

Translation of the original documentation

Publishing information

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Disclaimer

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1 Introduction

Information:

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

1.1 Manual history

Version	Date	Comment[1)]
2.35	November 2025	• New content: ° Windows 11 IoT Enterprise 2024 LTSC "Touch screen calibration" on page 134 and "Multi-touch drivers" on page 138 ° "China Classification Society (CCS)" on page 165 ° "Korean Register of Shipping (KR)" on page 165 • Content updates ° "Automation Panel firmware upgrade" on page 138 ° "5AP1120.1505-000" on page 97, degree of protection per UL 50, Type 12 certification
2.30	February 2025	• New content: ° General limitations in operation with link module 5DLDPO.1001-00, see "General limitations/characteristics" on page 20 ° "UL certification" on page 162 • Content updates ° cULus certification for link module 5DLDPO.1001-00 see "Technical data" on page 113 ° Adjustment of the max. ambient temperature in operation with link module 5DLDPO.1001-00 see "Maximum ambient temperature during operation" on page 40 ° Link module 5DLDPO.1001-00 in B&R Hypervisor mode see "USB interfaces" on page 48 ° Touch screen calibration as part of commissioning see "Touch screen calibration" on page 134
2.20	June 2024	• Updated "Order number key" on page 16. • Revised "Cable lengths and resolutions for SDL transfer" on page 53. • Revised "Cable lengths and resolutions for DVI transfer" on page 53. • Added link module "5DLDPO.1001-00". • Added Windows 10 2021 LTSC. • Added Linux for B&R 12. • Updated section "Touch screen" in annex C.
2.12	February 2022	• Updated chapter "International and national certifications" on page 161.

1) Editorial changes are not listed.

1.2 Information about this document

Information:

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

1.2.1 Organization of notices

Safety notices

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

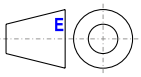
Signal word	Description
Danger!	Failure to observe these safety guidelines and notices will result in death, severe injury or substantial damage to property.
Warning!	Failure to observe these safety guidelines and notices can result in death, severe injury or substantial damage to property.
Caution!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

General notices

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

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

1.2.2 Guidelines



European dimension standards apply to all dimension diagrams.

Information:

All specifications in dimension diagrams and associated tables are in millimeters [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

2 General safety guidelines

2.1 Intended use

In all cases, applicable national and international standards, regulations and safety measures must be taken into account and observed!

The B&R products described in this manual are intended for use in industry and industrial applications. Intended use includes controlling, operating, monitoring, driving and visualizing as part of automation processes in machines and systems.

The use of B&R products is only permitted in their original condition. Modifications and extensions are only permitted if they are described in this manual.

B&R Industrial Automation GmbH assumes no any liability for damages of any kind arising from the use of B&R products outside of their intended use.

B&R products were not designed, developed and manufactured for any use involving serious risks or hazards that could result in death, injury, serious physical impairment or loss of any kind without the implementation of exceptionally stringent safety precautions.

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

- Monitoring and controlling thermonuclear processes
- Controlling weapon systems
- Flight and traffic management systems for passenger and freight transportation
- Health monitoring and life support 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) must be observed in accordance with applicable national and international regulations. This also applies to all other connected devices, such as drives.

All tasks such as the installation, commissioning and servicing of devices are only permitted to be performed 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, the information about the connection conditions (nameplate and documentation) and the limit values specified in the technical data must be read carefully before installation and commissioning and must be observed at all times.

2.4 Transport and storage

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

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 the EMC limit values.
- Installation must be performed according to this documentation using suitable equipment and tools.
- Devices are only permitted to be installed in a voltage-free state and by qualified personnel. The control cabinet must first be de-energized and secured against being switched on again.
- General safety guidelines and national accident prevention regulations must be observed.
- The electrical installation must be performed in accordance with applicable regulations (e.g. line cross section, fuse protection, protective ground connection).

2.6 Operation

2.6.1 Protection against contact with electrical parts

In order to operate programmable logic controllers, operating and monitoring devices and the uninterruptible power supply, 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. This could result in death, severe injury or damage to property.

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

Live components must be securely covered before switching on. All covers must be kept closed during operation.

2.6.2 Ambient conditions - Dust, moisture, aggressive gases

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

If aggressive gases occur in the environment, these 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 an indicator of aggressive gases.

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

2.6.3 Programs, viruses and malicious programs

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

2.7 Cybersecurity disclaimer for products

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

Information:

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

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

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

The aforementioned appropriate security measures include, for example:

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

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

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

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

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

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 screentechnologies as well as panels with touch screen and keys are available.

Panels are installed using retaining clips or clamping blocks.

The panels can only be operated as a complete system in combination with a link module or 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
	5AP1130.101D-000	10.1"	WUXGA	Multi-touch	No	Landscape
	5AP1130.101E-000	10.1"	WXGA	Multi-touch	No	Landscape
	5AP1130.121E-000	12.1"	WXGA	Multi-touch	No	Landscape
	5AP1130.121E-010	12.1"	WXGA	Multi-touch	No	Landscape
	5AP1130.156C-000	15.6"	FHD	Multi-touch	No	Landscape
	5AP1130.156C-001	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"	XGA	Single-touch	Yes	Landscape
	1181 panels					
	5AP1182.1043-000	10.4	VGA	Single-touch	Yes	Landscape
Link modules						Select 1
	5DLDPO.1001-00 DP receiver[1)] 5DLSDL.1001-00 SDL/DVI receiver 5DLSD3.1001-00 SDL3 receiver 5DLSD4.1001-00 SDL4 receiver					
Terminal blocks						Select 1
	Power supply connectors 0TB103.9 0TB103.91					

1) Only in conjunction with a multi-touch device.

3.3.1 Order number key

Information:

A current order number key is available on the B&R website for easy identification of the device configuration:

Home > Downloads > Industrial PCs and panels > Automation Panel 1000

3.4 Overview

Order number	Short description	Page
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm²	156
0TB103.91	Connector 24 VDC - 3-pin, female - Cage clamp terminal block 3.31 mm²	156
5AC804.MFLT-00	Line filter	158
5AC900.1201-00	USB interface cover M20 IP65 flat	160
5AC900.1201-01	USB interface cover M20 IP65 curved	160
5AC900.BLOC-00	Terminal block with brackets, 10 pcs.; replacement part	155
5AC900.BLOC-01	Clamping block without brackets, 10 pcs.; replacement part	155
5SWUTI.0001-000	HMI Service Center USB flash drive - Hardware diagnostic software - For APC910/PPC900 - For PPC1200 - For APC2100/PPC2100 - For APC2200/PPC2200 - For APC3100/PPC3100 - For APC mobile - For AP800/AP900 - For AP9x3/AP9xD - For AP1000/AP5000	150
	Hypervisor	
1TC4700.00	License for B&R Hypervisor (TC). One license per target system is required. This license is supported starting with version 4.9.	139
	Link modules	
5DLDPO.1001-00	Automation Panel link module - DisplayPort receiver - For Automation Panel 933/1130 - For Automation Panel 5130 - For Automation Panel 5230 (only with 5ACCKP00.xxxx-000)	113
5DLSD3.1001-00	Automation Panel link module - SDL3 receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	117
5DLSD4.1001-00	Automation Panel link module - SDL4 receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	119
5DLSDL.1001-00	Automation Panel link module - SDL/DVI receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	115
	Miscellaneous	
5ACCRHMI.0006-000	HMI installation tool for control cabinet - 1x torque wrench 0.4 - 2.0 Nm - 1x hex head bit 2.5, length 89 mm - 1x hex head bit 3.0, length 89 mm - 1x hex head bit 5.0, length 89 mm - 1x Torx 10 bit, length 90 mm - 1x Torx 20 bit, length 89 mm	154
	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	65
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	71
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 / PPC3x00 / PPC2200 / link modules	75
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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP520.1043-00	81
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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP520.1214-00	89
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 / PPC3x00 / PPC2200 / link modules	91
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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP520.1505-00, 5AP920.1505-01, 5PC720.1505-xx, 5PC820.1505-00	97
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/PPC3x00/PPC2200 - For link modules	103
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/PPC3x00/PPC2200 - For link modules - Compatible with 5AP920.1906-01, 5PC720.1906-00, 5PC820.1906-00	111
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	73
5AP1130.101D-000	Automation Panel 10.1" High Resolution - 1920 x 1200 pixels (16:10) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC2100/PPC3x00/PPC2200 - For link modules	77
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 / PPC3x00 / PPC2200 / link modules	79
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 / PPC3x00 / PPC2200 / link modules	93
5AP1130.121E-010	Automation Panel 12.1" sunlight readable - 1280 x 800 pixels (16:10) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC2100/PPC3x00/PPC2200 - For link modules	95
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/PPC3x00/PPC2200 - For link modules	105
5AP1130.156C-001	Automation Panel 15.6" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - Optical bonding - For PPC900/PPC2100/PPC3x00/PPC2200 - For link modules	107
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/PPC3x00/PPC2200 - For link modules	109
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	68
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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP580.1043-00, 5AP980.1043-01	83

Order number	Short description	Page
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 - 32 function keys - For PPC900/PPC2100/PPC3x00/PPC2200 - For link modules - Compatible with 5PP580.1505-00, 5AP980.1505-01	99
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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP581.1043-00, 5AP981.1043-01, 5PC781.1043-00	85
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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP581.1505-000	101
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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP582.1043-00, 5AP982.1043-01, 5PC782.1043-00	87
	Runtime	
1TC4601.06-5	License for Automation Runtime Embedded (TC). One license per target system is required. This license is supported starting with version 4.9.	139
	Technology Guard	
0TG1000.01	Technology Guard (MSD)	139
0TG1000.02	Technology Guard (HID)	139
0TGF016.01	Technology Guard (MSD) with integrated flash drive, 16 GB (MLC)	139
1TG4601.06-5	Automation Runtime Embedded TG license	139
1TG4601.06-T	Automation Runtime Embedded Terminal TG license	139
1TG4700.00	B&R Hypervisor	139

4 Technical data

4.1 Complete system

4.1.1 Connection options

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

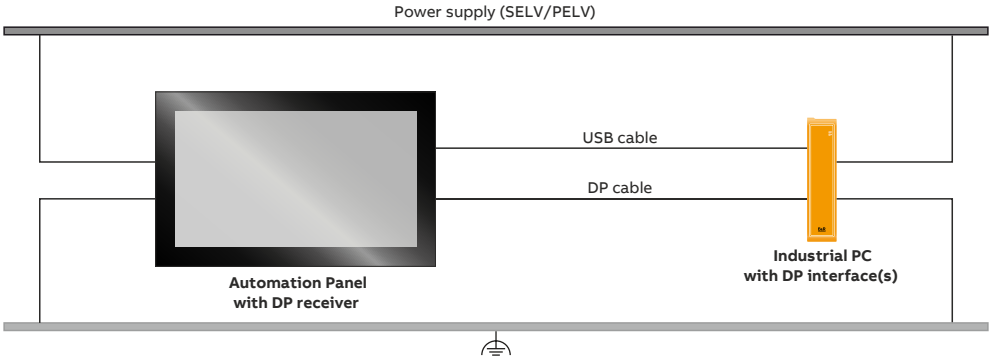
4.1.1.1 DP operation

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

4.1.1.1.1 DP operation with multi-touch Automation Panel

The display device can be installed up to 10 m away from the B&R industrial PC. USB 2.0 is also transferred over this distance. External adapter modules are not required. A monitor/panel with DP interface or an Automation Panel with DP receiver can be used as a display device.

The brightness of the display can be adjusted via the on-screen display (OSD).



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

DP interface (In)	✓	24 VDC power supply	✓
USB	✓ USB 2.0 (up to 2x)	Grounding	✓

Maximum cable length:

- 10 m

Requirements

- Automation Panel with DP receiver
- Industrial PC with DP interface (onboard or IF option)
- DP and USB type A/B cable

Information:

B&R cannot guarantee support for third-party products.

The permissibility and suitability of the monitor/panel must be checked individually by users in accordance with local technical and legal requirements.

4.1.1.1.2 General limitations/characteristics

- Key and LED data is not transferred.
- Data from operating elements is not transferred.
- Displaying device information (material number, serial number, revision) in the Automation Device Interface and HMI Service Center is not available.
- The maximum cable length is limited to 10 m.
- Single-touch (analog resistive) is not supported.

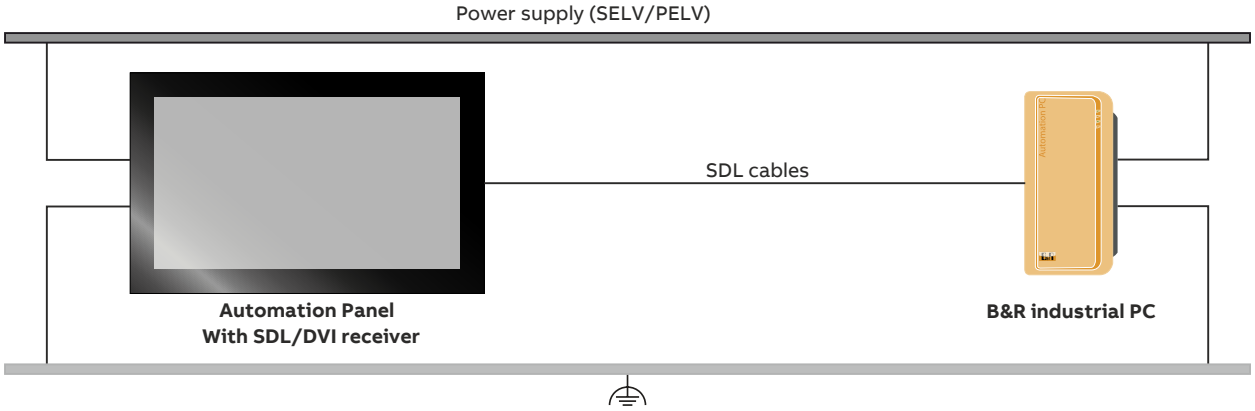
4.1.1.2 SDL operation

4.1.1.2.1 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 ADI 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

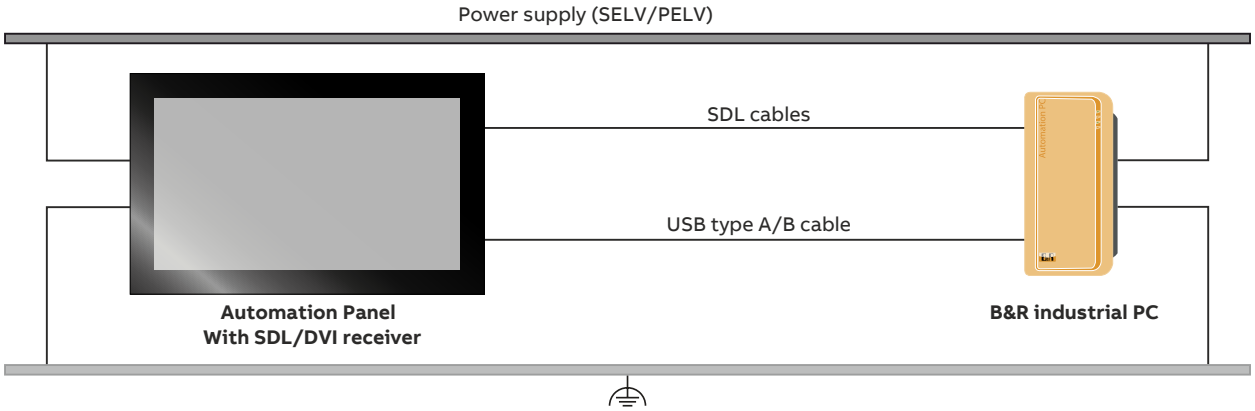
- Automation Panel with SDL/DVI receiver
- B&R industrial PC with SDL interface
- SDL cable

4.1.1.2.2 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 ADI 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

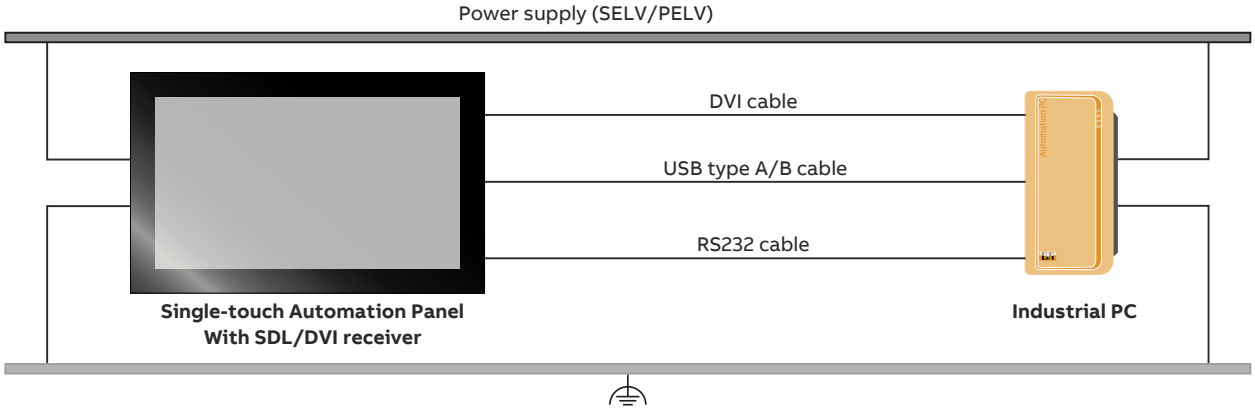
- Automation Panel with SDL/DVI receiver
- B&R industrial PC with SDL interface
- SDL cable, USB type A/B cable

4.1.1.3 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.

4.1.1.3.1 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	✓		

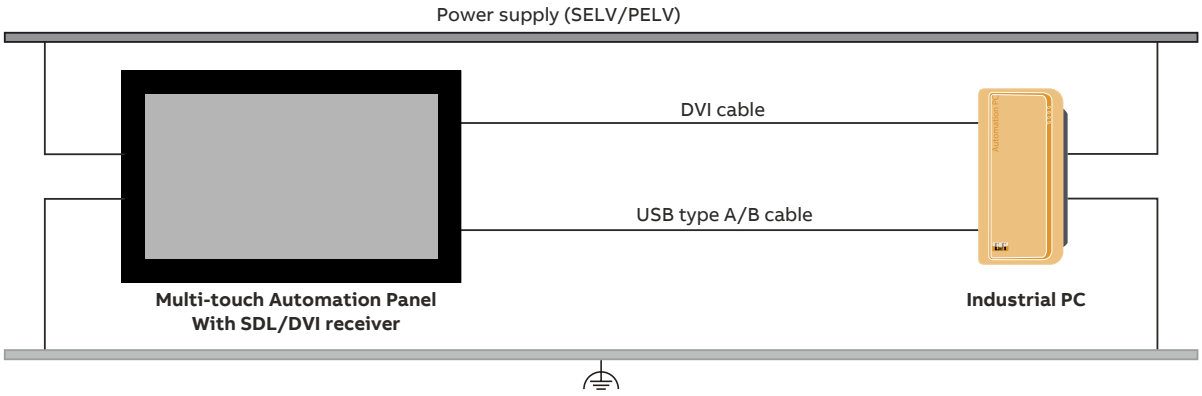
Maximum cable length: 5 m

Requirements

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

4.1.1.3.2 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
- Industrial PC with DVI interface
- DVI cable, USB type A/B cable

4.1.1.3.3 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.

4.1.1.4 SDL3 operation

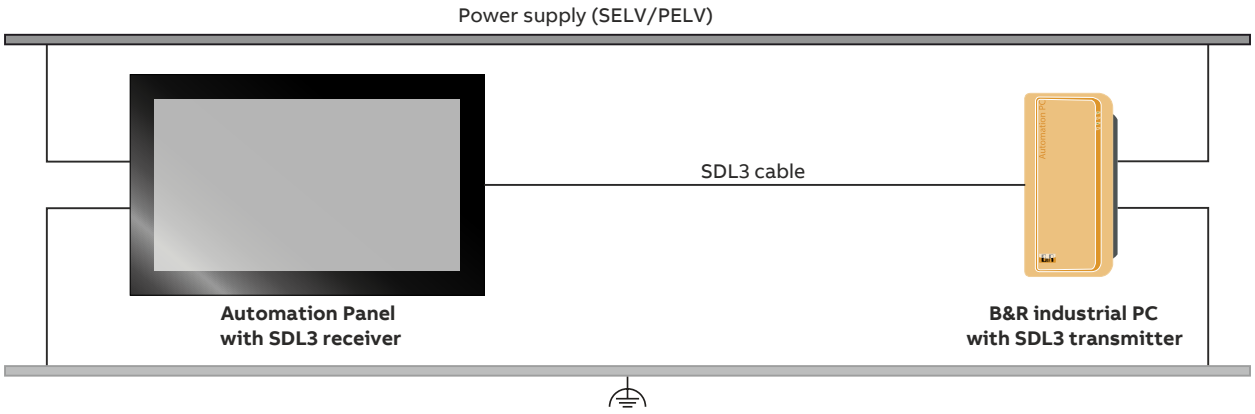
Smart Display Link 3 (SDL3) technology transfers all communication channels between a B&R industrial PC and panel up to 100 m over a standard Ethernet cable (min. Cat 6a). An RJ45 connector is used for the device connection, which is ideal for confined spaces in feed-throughs and swing arm systems.

4.1.1.4.1 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

4.1.1.4.2 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.

4.1.1.5 SDL4 operation

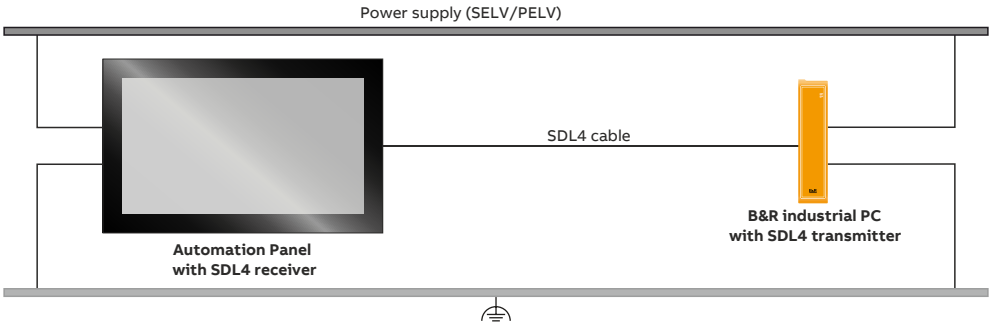
Smart Display Link 4 (SDL4) technology transfers all communication channels between a B&R industrial PC and panel up to 100 m over a standard Ethernet cable (min. Cat 6a). An RJ45 connector is used for the device connection, which is ideal for confined spaces in feed-throughs and swing arm systems.

4.1.1.5.1 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 ADI, 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

4.1.1.5.2 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.

4.1.1.5.2.1 General limitations

Determining the maximum available USB endpoints

Multi-touch panels

The following limitations apply to multi-touch panels:

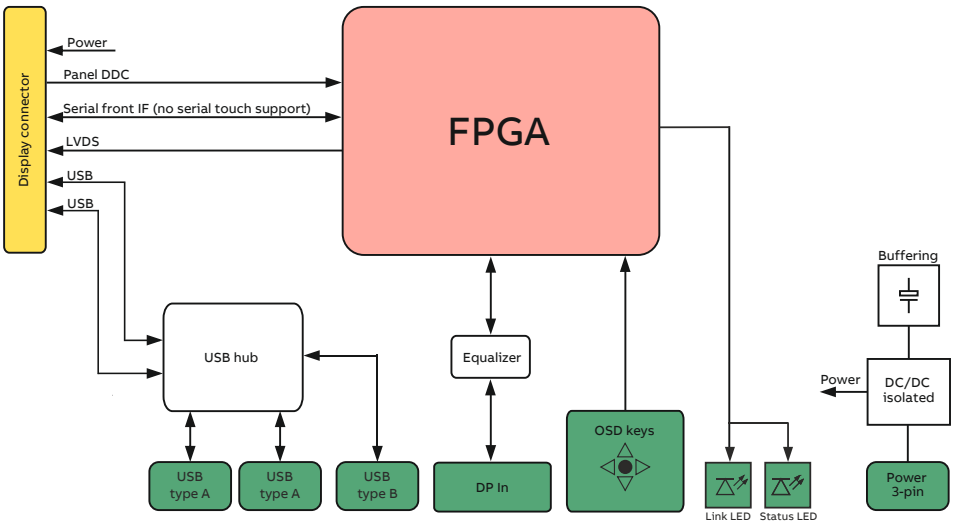
- A maximum of two USB hubs with up to eight ports per hub is supported.
- A maximum of six additional USB devices can be connected.
- Maximum permissible USB endpoints:

Transfer rate of the devices	Endpoints	
	IN	OUT
High speed	11	12
Full speed / Low speed	9	10

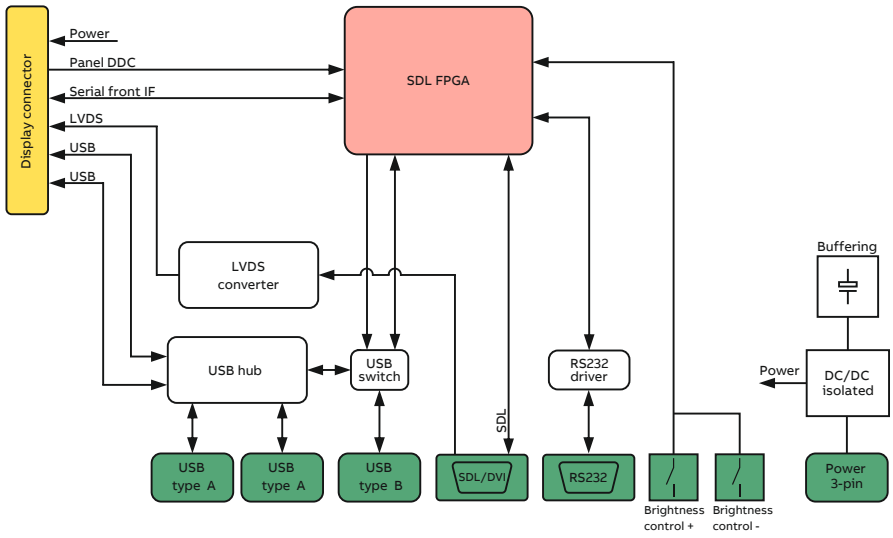
4.1.2 Electrical properties

4.1.2.1 Block diagrams

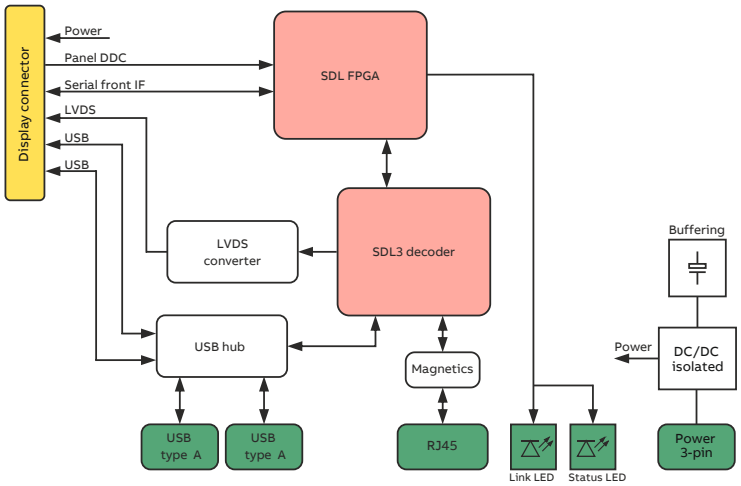
The following block diagram shows the simplified structure of DP receiver link module 5DLDPO.1001-00.



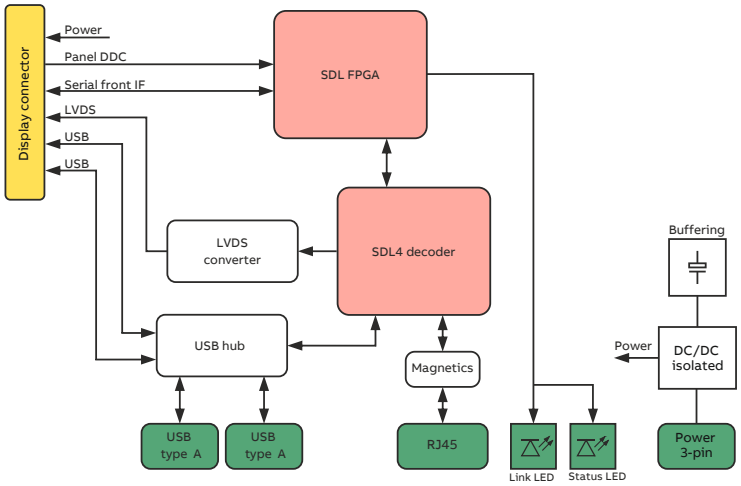
The following block diagram shows the simplified structure of the 5DLSDL.1001-00 SDL/DVI receiver link module.



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	Order number	Total power consumption of link module
DP receiver	5DLDPO.1001-00	Max. 3.1 W (without USB consumer) Max. 8.1 W (with USB consumer)
SDL/DVI receiver	5DLSDL.1001-00	Max. 3.6 W (without USB consumer) Max. 8.6 W (with USB consumer)
SDL3 receiver	5DLSD3.1001-00	Max. 8.1 W (without USB consumer) Max. 13.1 W (with USB consumer)
SDL4 receiver	5DLSD4.1001-00	Max. 8.1 W (without USB consumer) Max. 13.1 W (with USB consumer)

Panels

Type	Order 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	-	1.1 W	7.1 W	8.2 W
10.1" single-touch	5AP1120.101E-000 (hardware revision F0 and later)	-	1.0 W	5.8 W	6.8 W
10.1" multi-touch	5AP1130.101D-000	1.0 W	2.2 W	7.5 W	10.7 W
10.1" multi-touch	5AP1130.101E-000	1.0 W	1.1 W	7.1 W	9.2 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
12.1" multi-touch	5AP1130.121E-010	1.0 W	1.9 W	10.7 W	13.6 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
15.6" multi-touch	5AP1130.156C-001	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

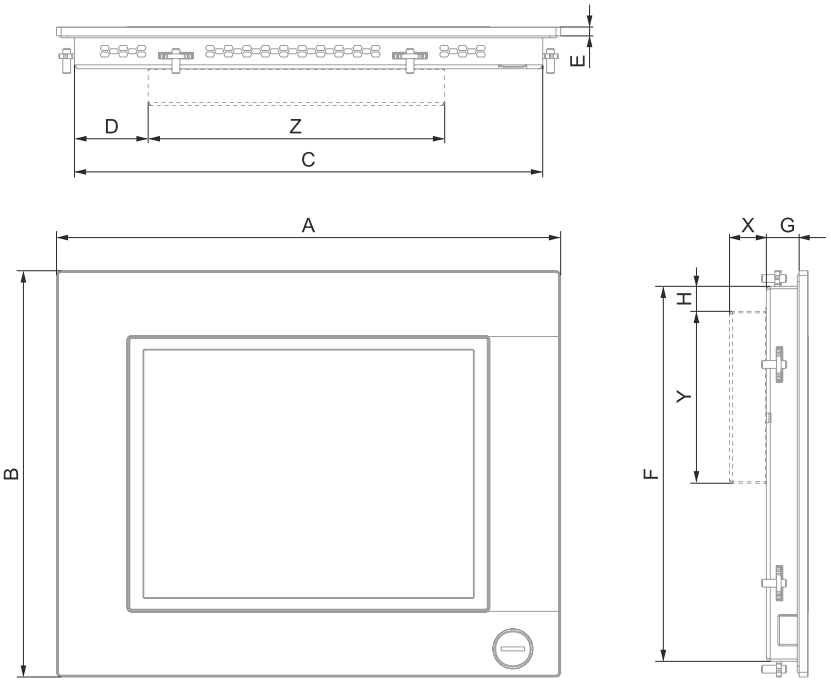
Information:

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).

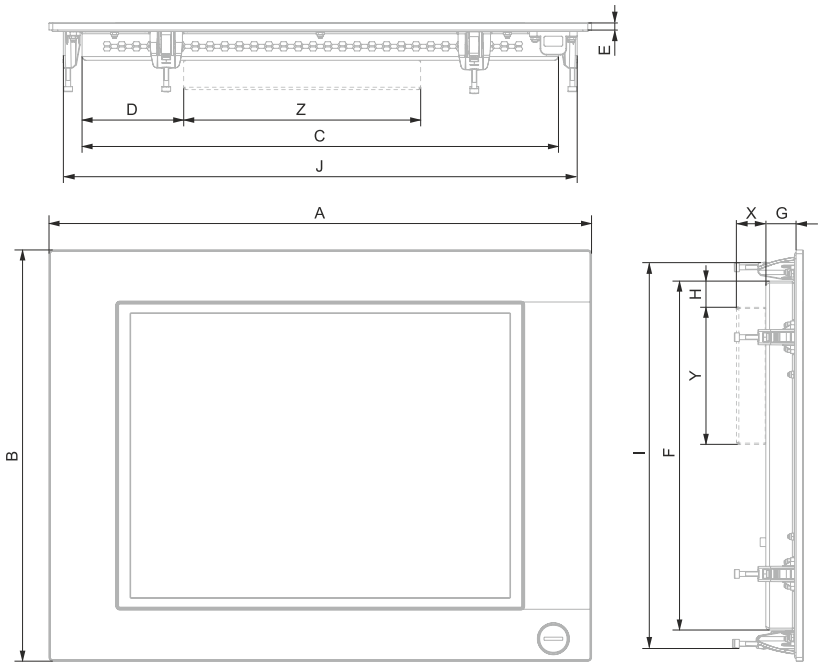
AP1000 panels with retaining clips - Dimensions



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" single-touch with 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	5AP1130.101D-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-010	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
15.6" multi-touch	5AP1130.156C-001	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	**Order number**	**X**	**Y**	**Z**
Link module	5DLxxx.1001-00	23.6	110	190

AP1000 panels 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	**Order number**	**X**	**Y**	**Z**
Link module	5DLxxx.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

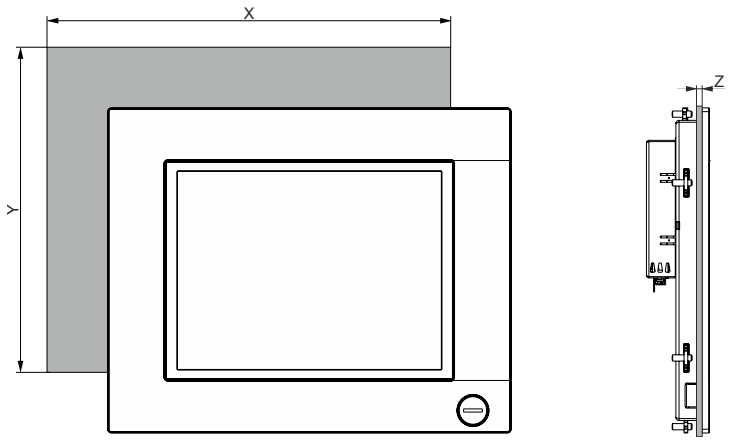


Figure 1: Automation Panel 1000 with retaining clips - Installation diagram

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" with buttons	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	5AP1130.101D-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
12.1" multi-touch	5AP1130.121E-010	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
15.6" multi-touch	5AP1130.156C-001	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

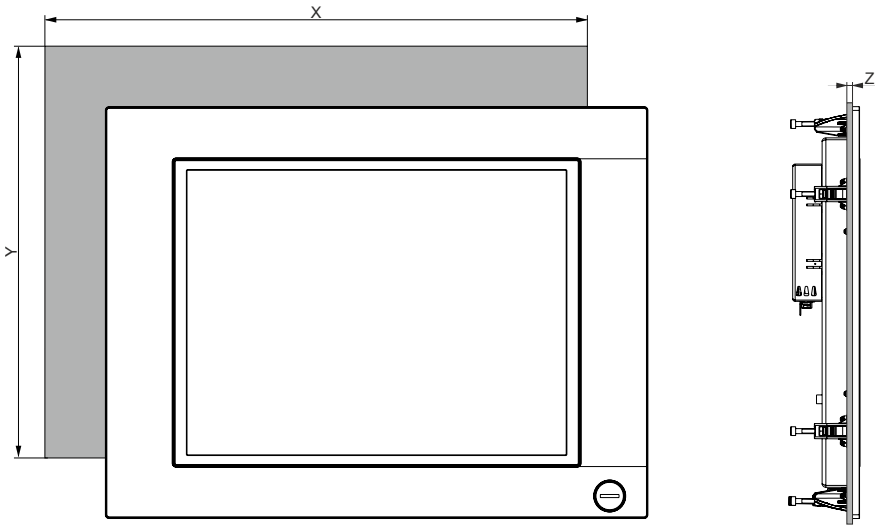


Figure 2: Automation Panel 1000 with clamping blocks - Installation diagram

Panels						
Type	**Order 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 panel.

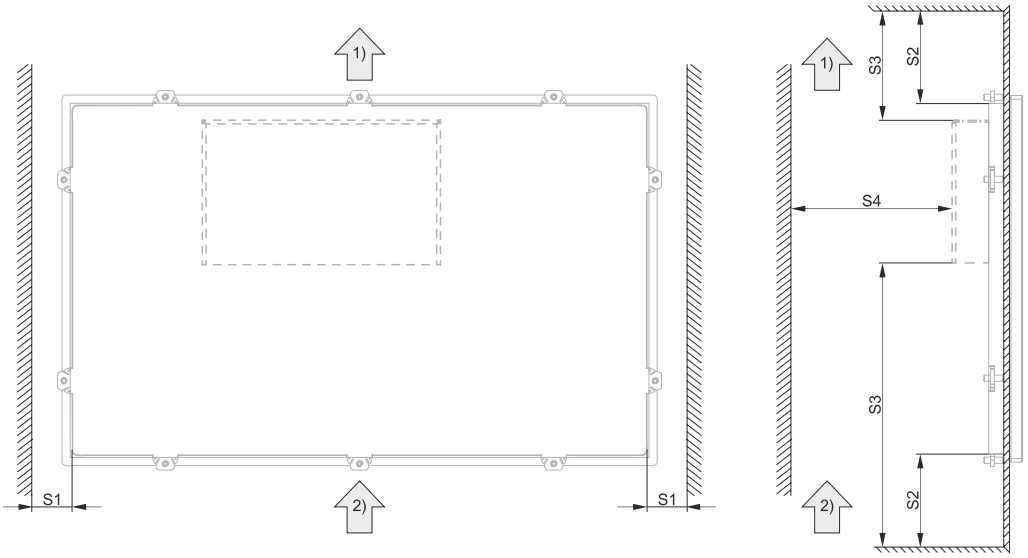
A 3 mm hex screwdriver is needed to tighten and loosen the screw on the clamping blocks. The maximum tightening torque of the clamping block is 0.5 Nm.

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.



Legend			
1)	Air outlet	2)	Air inlet

Name	Minimum spacing [mm]	Name	Minimum spacing [mm]
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.

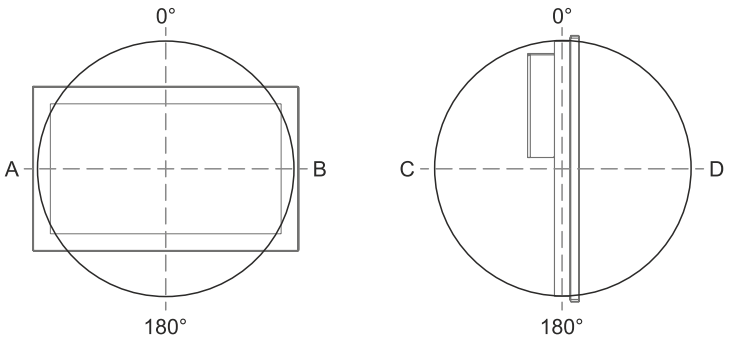
Caution!

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 43) must be monitored in the application 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.



This applies to the following tables:

- If the panel has a "✓" (check mark), the Automation Panel can be operated at the maximum ambient temperature (see "Maximum ambient temperature during operation" on page 40).
- If a temperature value (°C) is specified for the panel in a certain mounting orientation, e.g. "55", the ambient temperature of the Automation Panel is not permitted to exceed this.

Mounting orientations for the Automation Panel 1000 with DP receiver

All temperature specifications in degrees Celsius (°C) at 500 meters above sea level.[1)]	Mounting orientation - Angular degrees						
	0°	A[2)]	B[3)]	C[4)]	D[4)]	C	D[5)]
	0°	-1° to -90°	+1° to +90°	180°		-1° to -45°	+1° to +90°
5AP1130.0702-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.101D-000	✓	55	55	✓	✓	55	55
5AP1130.101E-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.121E-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.121E-010	✓	✓	✓	✓	✓	✓	✓
5AP1130.156C-000	✓	50	50	✓	✓	50	50
5AP1130.156C-001	✓	50	50	✓	✓	50	50
5AP1130.185C-000	✓	✓	50	✓	✓	✓	50

1) The maximum ambient temperature for the DisplayPort link module is limited to 50°C at a max. nominal current of 2.3 A.
At a continuous nominal current of max. 2.0 A, the specified max. ambient temperature applies, see "Maximum ambient temperature during operation" on page 40.
2) Counterclockwise
3) Clockwise
4) Interfaces on top
5) Display facing down

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 - Angular degrees						
	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	✓	✓	✓	✓	✓	✓	✓
5AP1130.101D-000	✓	55	55	55	55	55	55
5AP1130.101E-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.1043-000	✓	✓	✓	✓	✓	✓	✓
5AP1180.1043-000	✓	✓	✓	✓	✓	✓	✓
5AP1181.1043-000	✓	✓	✓	✓	✓	✓	✓
5AP1182.1043-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.1214-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.121E-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.121E-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.121E-010	✓	✓	✓	✓	✓	✓	✓
5AP1120.1505-000	✓	✓	✓	✓	✓	✓	✓
5AP1180.1505-000	✓	✓	✓	✓	✓	✓	✓
5AP1181.1505-000	✓	✓	✓	✓	✓	✓	✓
5AP1120.156B-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.156C-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.156C-001	✓	✓	✓	✓	✓	✓	✓
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 - Angular degrees						
	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	✓	✓	✓	✓	✓	✓	✓
5AP1130.101D-000	✓	55	55	55	55	55	55
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
5AP1130.121E-010	✓	50	50	50	50	50	50
5AP1120.1505-000	✓	✓	✓	✓	✓	✓	55
5AP1180.1505-000	✓	✓	✓	✓	✓	✓	55
5AP1181.1505-000	✓	✓	✓	✓	✓	✓	55
5AP1120.156B-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.156C-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.156C-001	✓	✓	✓	✓	✓	✓	✓
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 - Angular degrees						
	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	✓	✓	✓	✓	✓	✓	✓
5AP1130.101D-000	✓	55	55	55	55	55	55
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
5AP1130.121E-010	✓	50	50	50	50	50	50
5AP1120.1505-000	✓	✓	✓	✓	✓	✓	55
5AP1180.1505-000	✓	✓	✓	✓	✓	✓	55
5AP1181.1505-000	✓	✓	✓	✓	✓	✓	55
5AP1120.156B-000	✓	✓	✓	✓	✓	✓	✓
5AP1130.156C-000	✓	50	50	✓	✓	50	50
5AP1130.156C-001	✓	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" multi-touch	5AP1130.101D-000	2000
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
12.1" multi-touch	5AP1130.121E-010	2900
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	3800
15.6" multi-touch	5AP1130.156C-001	3900
18.5" multi-touch	5AP1130.185C-000	4700
19.0" single-touch	5AP1120.1906-000	7300

Link modules

Type	Model number	Weight [g]
DP receiver	5DLDPO.1001-00	490
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 ADI Control Center, for example).

Information about worst-case conditions

- BurnInTest 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 respective ambient temperature is derated approx. 1°C per 1000 meters starting at 500 m above sea level.	**5DLDPO.1001-00** DP[1]	**5DLSDL.1001-00** SDL/DVI	**5DLSD3.1001-00** SDL3[2]	**5DLSD4.1001-00** SDL4
Maximum ambient temperature	60	60	60	60
5AP1120.0573-000	-	✓	✓	✓
5AP1151.0573-000	-	✓	✓	✓
5AP1120.0702-000	-	✓	✓	✓
5AP1130.0702-000	✓	✓	✓	✓
5AP1120.101E-000	-	55	55	55
5AP1130.101D-000	✓	✓	✓	✓
5AP1130.101E-000	55	55	55	55
5AP1120.1043-000	-	✓	✓	✓
5AP1180.1043-000	-	✓	✓	✓
5AP1181.1043-000	-	✓	✓	✓
5AP1182.1043-000	-	✓	✓	✓
5AP1120.1214-000	-	✓	✓	✓
5AP1120.121E-000	-	✓	✓	✓
5AP1130.121E-000	✓	✓	✓	✓
5AP1130.121E-010	55	55	55	55
5AP1120.1505-000	-	✓	✓	✓
5AP1180.1505-000	-	✓	✓	✓
5AP1181.1505-000	-	✓	✓	✓
5AP1120.156B-000	-	✓	55	55
5AP1130.156C-000	55	55	50	55
5AP1130.156C-001	55	55	50	55
5AP1130.185C-000	55	55	55	55
5AP1120.1906-000	-	✓	✓	✓

1) The maximum ambient temperature for the DisplayPort link module is limited to 50°C at a max. nominal current of 2.3 A. At a continuous nominal current of max. 2.0 A, the specified max. ambient temperature applies.

2) The max. ambient temperature for SDL3 link module 5DLSD3.1001-00 < Rev. A5 with the corresponding panel is 5°C lower.

4.1.4.1.2 Minimum ambient temperature during operation

All temperature specifications in degrees Celsius [°C] at 500 m above sea level, **non-condensing**.	**Link module**			
The respective ambient temperature is derated approx. 1°C per 1000 meters starting at 500 m above sea level.	**5DLDPO.1001-00** DP	**5DLSDL.1001-00** SDL/DVI	**5DLSD3.1001-00** SDL3	**5DLSD4.1001-00** SDL4
Minimum ambient temperature	-10	0	0	0
5AP1120.0573-000	-	✓	✓	✓
5AP1151.0573-000	-	✓	✓	✓
5AP1120.0702-000	-	✓	✓	✓
5AP1130.0702-000	✓	✓	✓	✓
5AP1120.101E-000	-	✓	✓	✓
5AP1130.101D-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	✓	✓	✓	✓
5AP1130.121E-010	✓	✓	✓	✓
5AP1120.1505-000	-	✓	✓	✓
5AP1180.1505-000	-	✓	✓	✓
5AP1181.1505-000	-	✓	✓	✓
5AP1120.156B-000	-	✓	✓	✓
5AP1130.156C-000	✓	✓	✓	✓
5AP1130.156C-001	✓	✓	✓	✓
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 additional information, see section "Mounting orientations" on page 36.

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" multi-touch	5AP1130.101D-000	-30 to 70	-30 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
12.1" multi-touch	5AP1130.121E-010	-30 to 70	-30 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
15.6" multi-touch	5AP1130.156C-001	-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]
DP receiver	5DLDPO.1001-00	-20 to 60	-20 to 60
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 section "Temperature sensor positions" on page 43. The values specified there represent the defined maximum temperature at this measuring point. If the temperature is exceeded, no alarm is triggered.

Temperatures[2)] can be read out in different ways in approved operating systems:

- BIOS
- ADI Control Center[3)]
- ADI Development Kit[2)]
- ADI .NET SDK[2)]
- HMI Service Center[2)]
- HMI diagnostics[2)]
- PVI ADI line[2)]
- 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

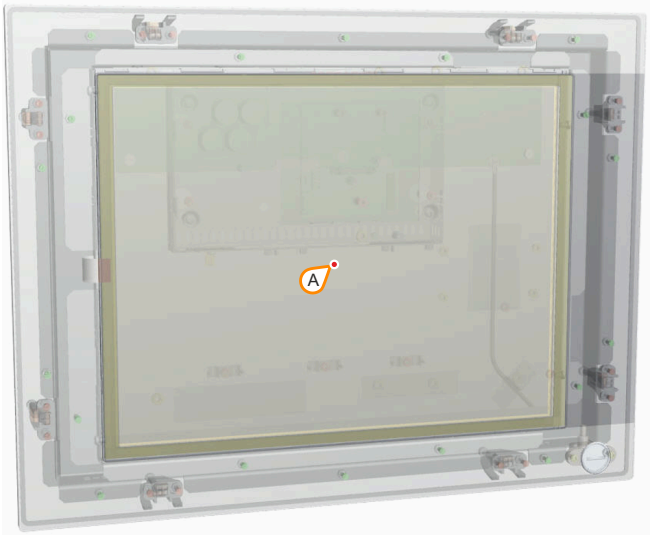


Figure 3: Automation Panel 1000 - Temperature sensor position

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 5AP1130.101D-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 5AP1130.121E-010: 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 5AP1130.156C-001: 80°C 5AP1130.185C-000: 80°C 5AP1120.1906-000: 80°C

2) The measured temperature is a guide value for the immediate ambient temperature, but it may have been influenced by neighboring components.
3) 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" single-touch with keys	5AP1151.0573-000 ≤ Rev. D0	5 to 90	5 to 90	5 to 90
5.7" single-touch with 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	5AP1130.101D-000	5 to 85	5 to 85	5 to 85
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
12.1" multi-touch	5AP1130.121E-010	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
15.6" multi-touch	5AP1130.156C-001	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	Order number	Operation [%]	Storage [%]	Transport [%]
DP receiver	5DLDPO.1001-00	5 to 90	5 to 95	5 to 95
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 121)
- 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

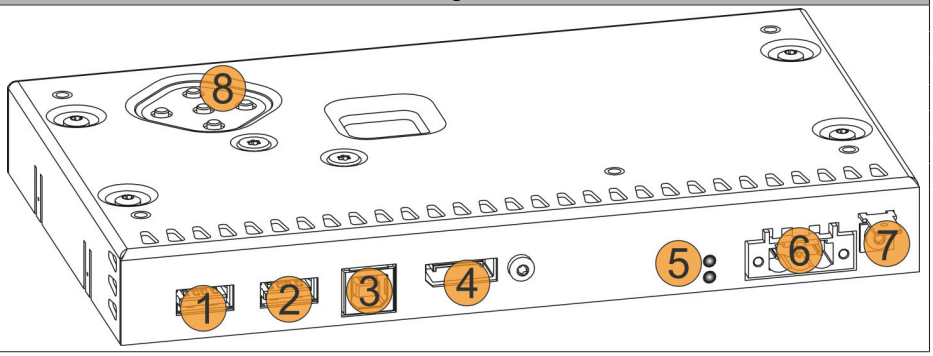
4.1.5.1 Overview

Information:

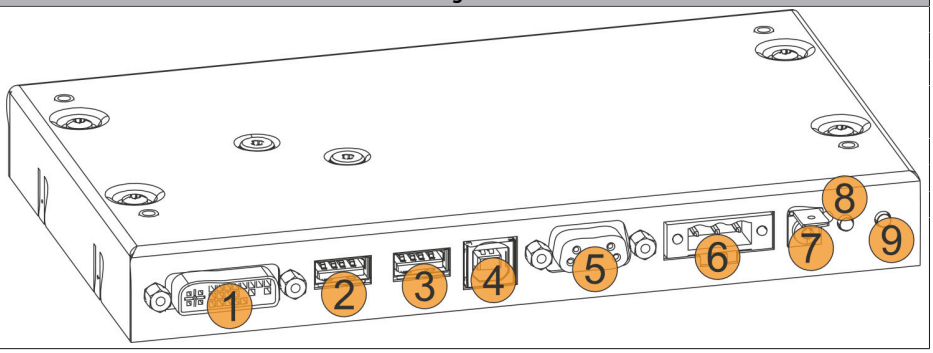
The interfaces available on the device or module are numbered for the purpose of clear differentiation. The numbering used by the operating system may deviate, however.

The receiver interfaces are located on the back of the complete system.

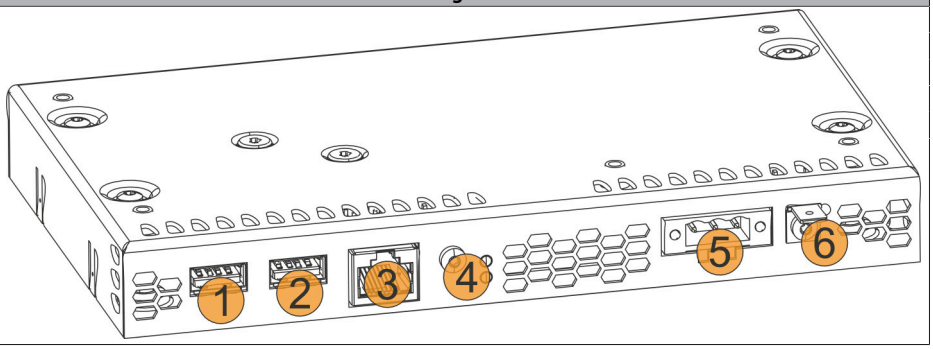
DP receiver 5DLDPO.1001-00

Legend		Figure
1	"USB1 interface"	
2	"USB2 interface"	
3	"USB In interface"	
4	"DP interface"	
5	"LED status indicators"	
6	"+24 VDC power supply"	
7	"Grounding"	
8	"OSD control panel"	

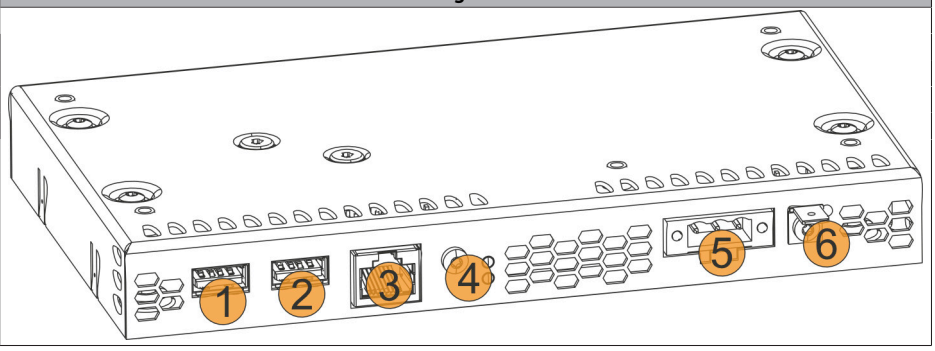
5DLSDL.1001-00 SDL/DVI receiver

Legend		Figure
1	"Panel In (SDL/DVI)"	
2	"USB1 interface"	
3	"USB2 interface"	
4	"USB In interface"	
5	"Serial interface"	
6	"+24 VDC power supply"	
7	"Grounding"	
8	"Brightness control + (DVI)"	
9	"Brightness control - (DVI)"	

SDL3 receiver 5DLSD3.1001-00

Legend		Figure
1	"USB1 interface"	
2	"USB2 interface"	
3	"SDL3 In interfaces"	
4	"SDL3 In LEDs"	
5	"+24 VDC power supply"	
6	"Grounding"	

SDL4 receiver 5DLSD4.1001-00

Legend		Figure
1	"USB1 interface"	
2	"USB2 interface"	
3	"SDL4 In interface"	
4	"SDL4 In LEDs"	
5	"+24 VDC power supply"	
6	"Grounding"	

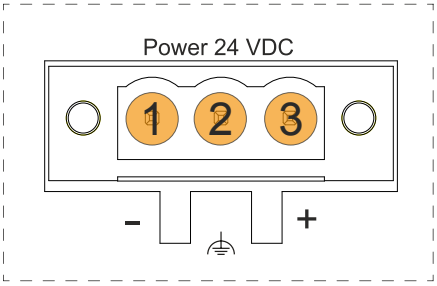
4.1.5.1.1 +24 VDC power supply

Danger!

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

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

The device is protected against overload and reverse polarity by a soldered fuse. 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, SELV[1]
Nominal current	5DLSDx.1001-00: Max. 3 A
	5DLDPO.1001-00: Max. 2.3 A[2]
Operating voltage	24 VDC ±25%
Fuse	5DLSDx.1001-00: 10 A, fast-acting
	5DLDPO.1001-00: 6.3 A, fast-acting
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes
Uninterruptible power supply	No

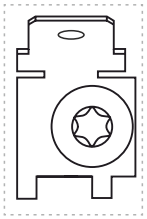
1) IEC 61010-2-201 requirements must be observed.
2) The maximum ambient temperature for the DisplayPort link module is limited to 50°C at a maximum nominal current of 2.3 A.

At a continuous nominal current of max. 2.0 A, the specified max. ambient temperature applies.see "Maximum ambient temperature during operation" on page 40

4.1.5.1.2 Grounding

Caution!

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

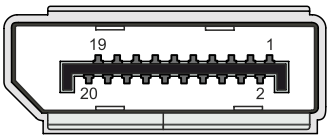


For example, a copper strip must be attached to the ground connection at a central grounding point of the control cabinet or system in which the device is installed. The wire cross section should be as large as possible (at least 2.5 mm²).

4.1.5.1.3 DP receiver (5DLDPO.1001-00)

4.1.5.1.3.1 DisplayPort interface

The DisplayPort interface is 20-pin (female) and can be operated with DisplayPort, DVI or HDMI transmission technologies.



Pin	Pinout	Description	Pin	Pinout	Description
1	DP_LANE3-	DisplayPort lane 3 (negative)	11	GND	Ground
2	GND	Ground	12	DP_LANE0+	DisplayPort lane 0 (positive)
3	DP_LANE3+	DisplayPort lane 3 (positive)	13	CONFIG1	Configuration pin 1 (connected to ground)
4	DP_LANE2-	DisplayPort lane 2 (negative)	14	CONFIG2	Configuration pin 2 (connected to ground)
5	GND	Ground	15	DP_AUX+	Auxiliary channel (positive)
6	DP_LANE2+	DisplayPort lane 2 (positive)	16	GND	Ground
7	DP_LANE1-	DisplayPort lane 1 (negative)	17	DP_AUX-	Auxiliary channel (negative)
8	GND	Ground	18	DP_HPD#	Hot plug detection
9	DP_LANE1+	DisplayPort lane 1 (positive)	19	RETURN	Return for power
10	DP_LANE0-	DisplayPort lane 0 (negative)	20	DP_PWR	Power for connector

Information:

Hot plugging output devices on the interface for service purposes is supported by the hardware and graphic drivers of approved operating systems.

A maximum of 10,000 mating cycles are specified for this interface.

Information:

Cable lengths and resolutions for DP transfer:

The maximum cable length for DP transfer is 10 m with a B&R DP cable (regardless of the panel resolution).

4.1.5.1.3.2 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!

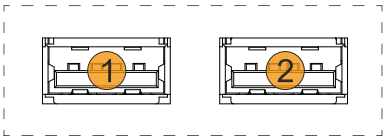
USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is ensured.

Caution!

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

Information:

For using B&R Hypervisor operating mode, see the chapter in B&R Hypervisor.

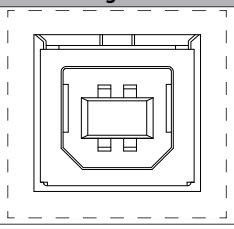
USB1 - 2		
Standard	USB 2.0	
Variant	Type A, female	
Transfer rate	Low speed (1.5 Mbit/s) Full speed (12 Mbit/s) High speed (480 Mbit/s)	
Current-carrying capacity[1)] USB1 (1) USB2 (2)	Total max. 1 A	
Cable length USB 2.0	Max. 5 m (without hub)	

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

4.1.5.1.3.3 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). For possible transfer methods, see section "Connection options" on page 19.

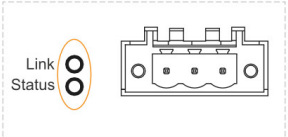
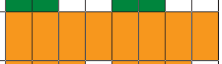
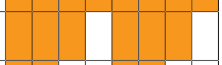
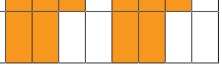
If the interface is connected to an output device (e.g. B&R industrial PC), then USB 2.0 transfer rates are possible on the USB1 and USB2 interfaces.

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. 10 m (without hub)	
-		

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

4.1.5.1.3.4 LED status indicators

The LEDs are located on the connection side of the DP receiver.

Assignment	LED	Color	Status	Explanation	LED status indicators[1)]
	**Link**	Reserved			
	Status	Green	On	Power LED, image transfer taking place	
			Blinking	Device working but no signal from the PC	
				Hot plugging	
		Yellow	On	Power LED, image transfer taking place, a firmware image is corrupt.	
			Blinking	Device working, no signal from the PC, a firmware image is corrupt.	
				Hot plugging, a firmware image is corrupt.	

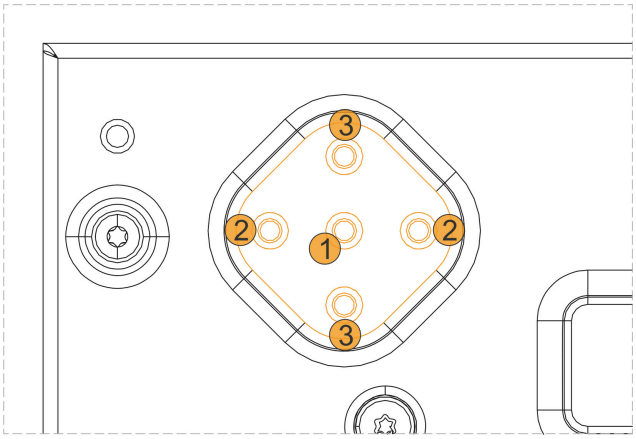
1) Two columns form 1 interval of 500 ms each.

4.1.5.1.3.5 On-screen display (OSD)

The OSD menu is available to display information for service purposes. It is possible to adjust the display brightness at room temperature during commissioning or maintenance tasks.

OSD control panel

The OSD control panel for menu navigation is located on the back of the DP receiver of the Automation Panel.

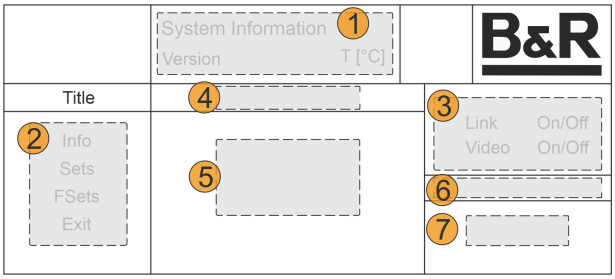


	Key	Option
1	Center menu button	Opens and closes the OSD menu
2	Horizontal cursor keys	Navigates left and right
3	Vertical cursor keys	Navigates up and down

OSD main menu

The OSD menu is not shown as an original screen-shot in this documentation, but systematically as a graphic.

The OSD menu is opened using the menu button on the DP receiver.



	Menu	Contents
1	System information	**DisplayPort receiver 5DLDPO.1001-00** • Device revision • Serial number • Installed firmware Temperature measured on the panel in degrees Celsius.
2	Submenu	• Info • Sets • FSets • Exit
3	Status and activity indicator	For information, see LED status indicators.
4	Currently selected submenu	
5	Displays the properties and settings of the submenu	
6	Selected parameter	
7	Change parameters	• Brightness of the display in percent • Backup of modified data • Reset to factory setting

The OSD menu can be navigated using the cursor keys.

Submenu	Contents	Options
Info	CRC (cyclic redundancy check - error detection)	Okay/Fail
	Image	High/Low
	PME	Reserved
	ICT	Reserved
	RecE	Reserved
Sets	Brightness setting of the display	Setting in percent

Submenu	Contents	Options
FSets	Information only	• DP receiver used • Panel used • Reserved
Exit	Closes the OSD menu	Via the menu button
	Saves any changed values	Sets WR to "open", default "locked"
	Reset to factory setting	Sets default to "set", standard "back"

Sets - Brightness setting

In submenu Sets, it is possible to read out the set brightness in % and adjust it to the ambient conditions of the Automation Panel.

1. Open the OSD menu.
2. Select submenu **Sets** using the vertical cursor keys.
3. Press the horizontal cursor key on the control panel until the % value in the parameter field is highlighted in yellow.
4. Use the vertical cursor keys to adjust the brightness.
5. Navigate back to the submenu.
6. Set WR (write protect) to "open" in menu **Exit**.
7. Exit the OSD menu.

Information:

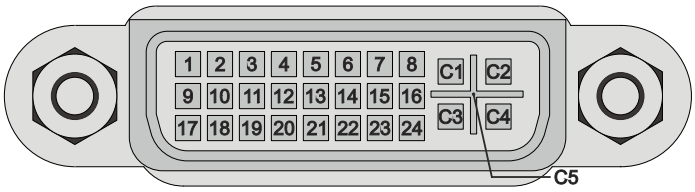
The brightness value is only saved by leaving menu Exit with WR "open" so that the setting is retained even after a power interruption.

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

4.1.5.1.4.1 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 additional information, see sections "SDL operation" on page 21 and "DVI operation" on page 23.

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.

It is important to note the following information about the transfer rate:

- 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.

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	WVGA 800 x 480	SVGA 800 x 600	XGA 1024 x 768	HD 1366 x 768	WXGA 1200 x 800	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	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	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	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	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	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.0150-00 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.0200-00 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	5CASDL.0250-00 5CASDL.0250-03	- -	- -	- -	- -
30	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-00 5CASDL.0300-03	- 5CASDL.0300-13	- 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	5CASDL.0400-13	-	5CASDL.0400-13

Cable lengths and resolutions for DVI transfer

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

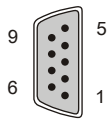
DVI cable	Resolution									
Segment length [m]	VGA 640 x 480	WVGA 800 x 480	SVGA 800 x 600	XGA 1024 x 768	HD 1366 x 768	WXGA 1280 x 800	SXGA 1280 x 1024	UXGA 1600 x 1200	FHD 1920 x 1080	WUXGA 1920 x 1200
1.8	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00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

4.1.5.1.4.2 Serial interface

The serial interface is only available for use with a single-touch display 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	NC
2	RXD
3	TXD
4	NC
5	GND
6	NC
7	RTS
8	CTS
9	NC



4.1.5.1.4.3 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 ensured.

Caution!

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

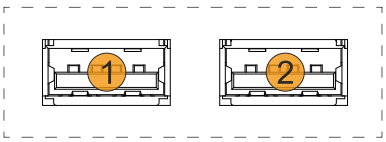
USB1, USB2

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 19.

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).

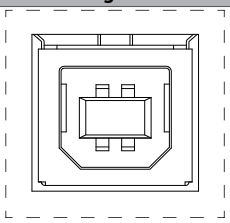
Front USB

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 64.

4.1.5.1.4.4 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 19.

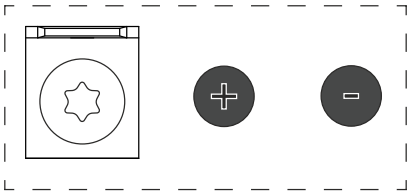
If the interface is connected to an output device (e.g. B&R industrial PC), then USB 2.0 transfer rates are possible on the USB1 and USB2 interfaces.

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 interface is protected by a maintenance-free "USB current-limiting switch" (max. 500 mA).

4.1.5.1.4.5 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.



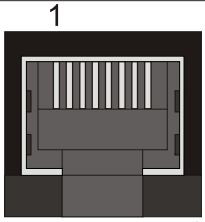
4.1.5.1.5 SDL3 receiver (5DLSD3.1001-00)

4.1.5.1.5.1 SDL3 In interfaces

Information:

For additional information, see section "SDL3 operation" on page 25.

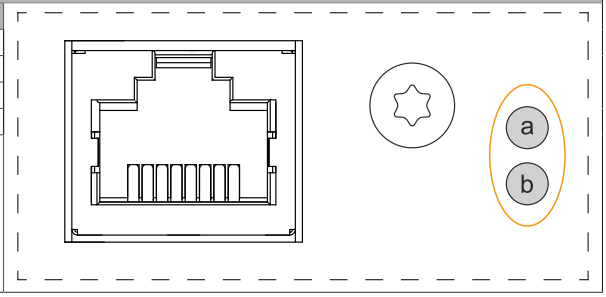
The "SDL3 In" interface is a female RJ45 connector and operated with SDL3 transmission technology.

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.		1 
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 (a)	Yellow	On	Indicates an active SDL3 connection.	
		Off	No active SDL3 connection.	
Status (b)	Yellow	On	The SDL3 connection is established and OK.	
		Off	No active SDL3 connection.	
		Blinking	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.

4.1.5.1.5.2 USB interfaces

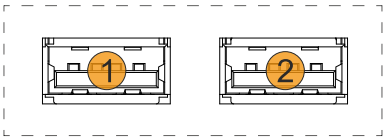
The link module is equipped with a USB 2.0 (Universal Serial Bus) host controller with several USB ports, of which 2 USB interfaces are routed externally and freely available to the user.

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 ensured.

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 46.

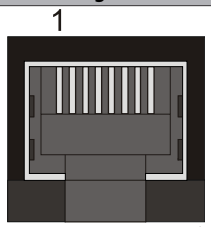
4.1.5.1.6 SDL4 receiver (5DLSD4.1001-00)

4.1.5.1.6.1 SDL4 In interface

Information:

For additional information, see section "SDL4 operation" on page 26.

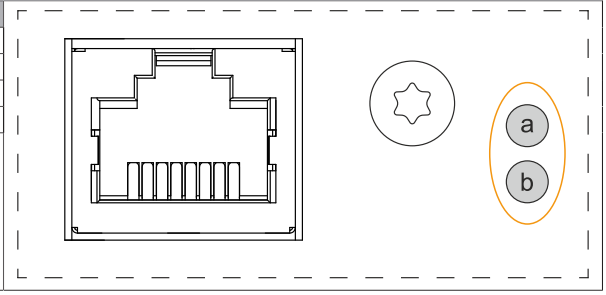
The SDL4 In interface is a female RJ45 connector and operated with SDL4 transmission technology.

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 (a)	Yellow	On	Indicates an active SDL4 connection.	
		Off	No active SDL4 connection.	
Status (b)	Yellow	On	The SDL4 connection is established and OK.	
		Off	No active SDL4 connection.	
		Blinking	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 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 SDL4 In interface and then disconnected again during operation (hot plugging), it may be necessary to recalibrate the touch screen.

4.1.5.1.6.2 USB interfaces

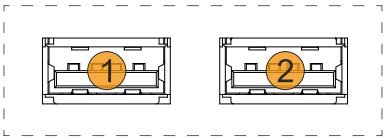
The link module is equipped with a USB 2.0 (Universal Serial Bus) host controller with several USB ports, of which 2 USB interfaces are routed externally and freely available to the user.

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 ensured.

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).

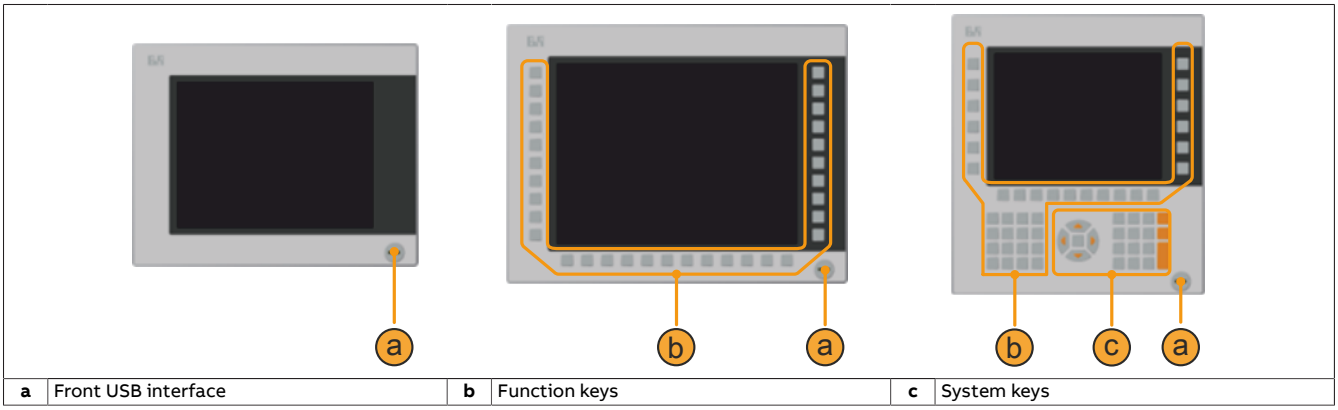
Front USB

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 46.

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	Order 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	5AP1130.101D-000	WUXGA	Multi-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
12.1" multi-touch	5AP1130.121E-010	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
15.6" multi-touch	5AP1130.156C-001	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



a	Front USB interface	**b**	Function keys	**c**	System keys

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 template for slide-in labels with individual captions 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.

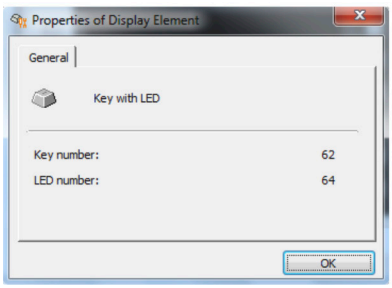
4.1.6.2 Key and LED configuration

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

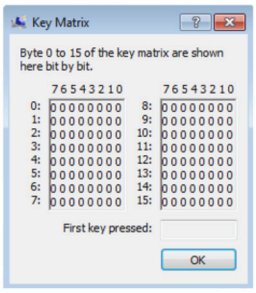
- B&R Key Editor for Windows operating systems
- B&R KCF Editor for Windows operating systems
- Visual Components

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 displayed as hardware numbers and can be read directly on the target system using B&R tools and the ADI Control Center.



B&R Key Editor

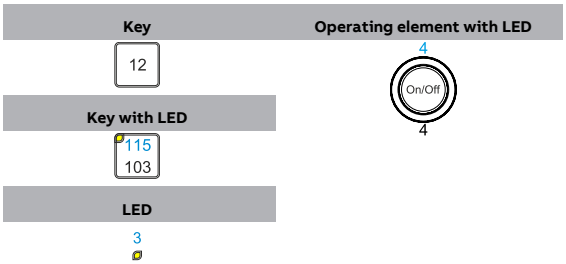


ADI Control Center

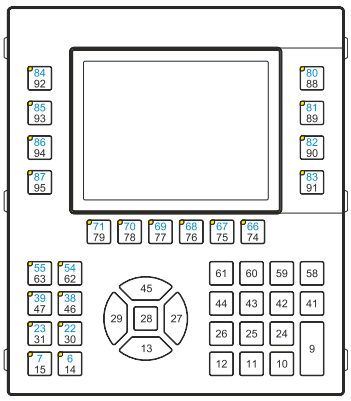
Keys and LEDs in the matrix:

- Hardware numbers of keys are specified in the following with black indexes.
- Hardware numbers of LEDs are specified in the following with blue indexes.

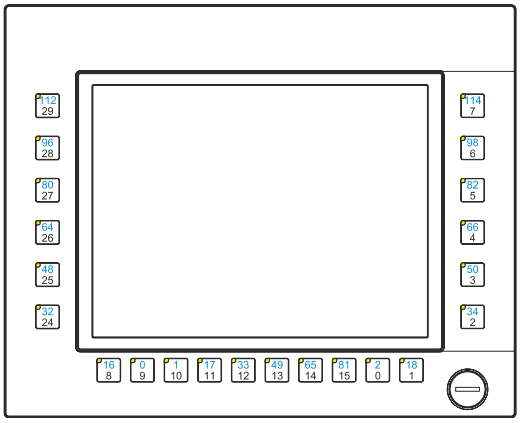
Illustration examples:



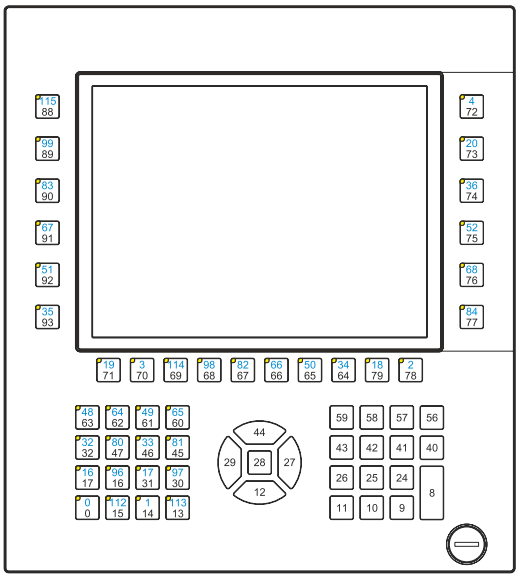
5AP1151.0573-000



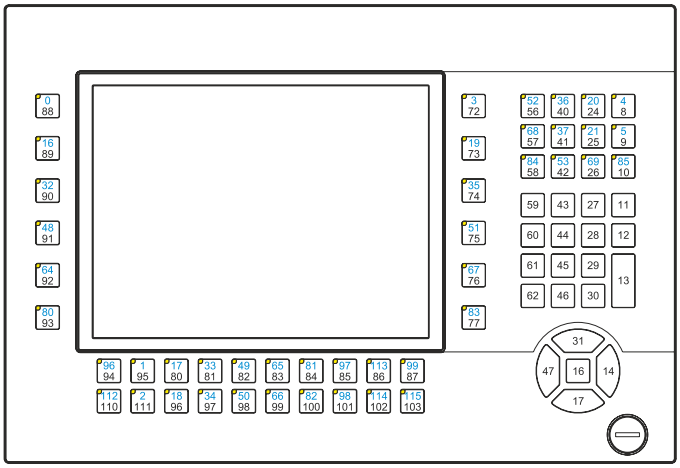
5AP1180.1043-000



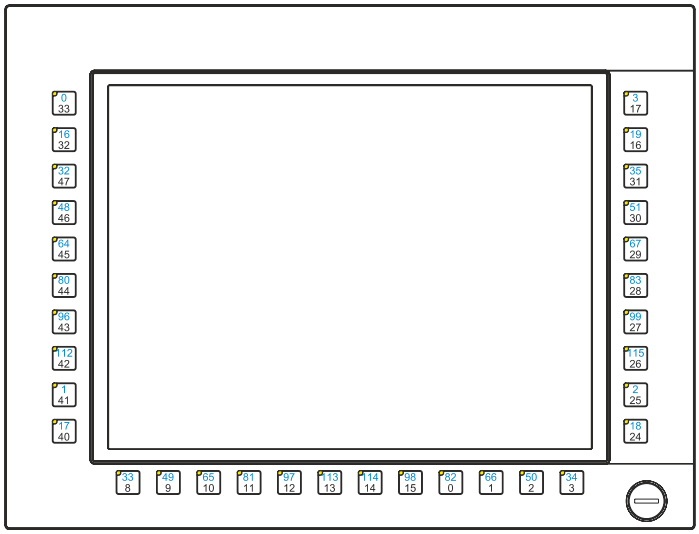
5AP1181.1043-000



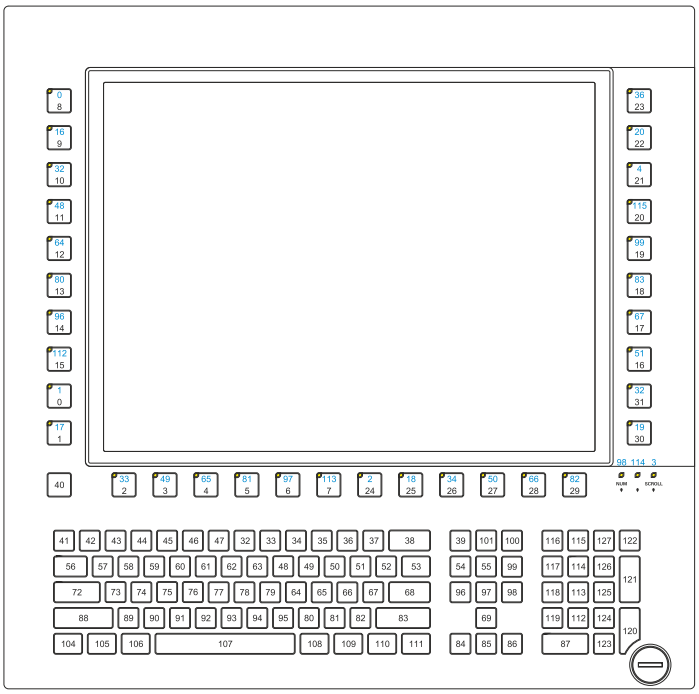
5AP1182.1043-000



5AP1180.1505-000



5AP1181.1505-000



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.

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 ensured.

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

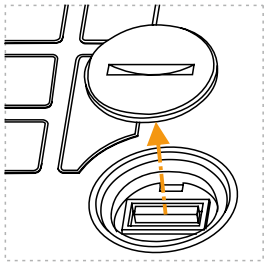
The front USB interface is available to the user for service purposes.

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 19.

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 exact specifications, see the table in section Cable lengths and resolutions for SDL transfer.

Front USB	
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	Max. 500 mA
Cable length	Max. 5 m (without hub)
-	



1) 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)
2) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 500 mA).

4.2 Individual components

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 specific data specified for the complete system applies to the complete system in which an individual component is used.

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

Order 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	

4.2.1.1.3 Technical data

Order number	5AP1120.0573-000	
Revision	**D0**	**E0**
General information		
B&R ID code	0xE7AA	
Certifications		
CE	Yes	
UKCA	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]		
Technology	Analog, resistive	
Controller	B&R, serial, 12-bit	
Transmittance	81% ±3%	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	

Order number	5AP1120.0573-000	
Revision	**D0**	**E0**
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	

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 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

4.2.1.1.5 Temperature/Humidity diagram

5AP1120.0573-000 ≥ Rev. E0

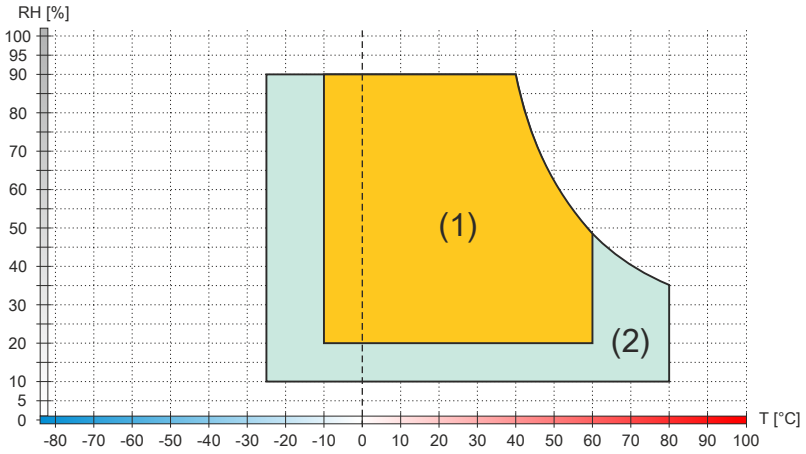


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

5AP1120.0573-000 ≤ Rev. D0

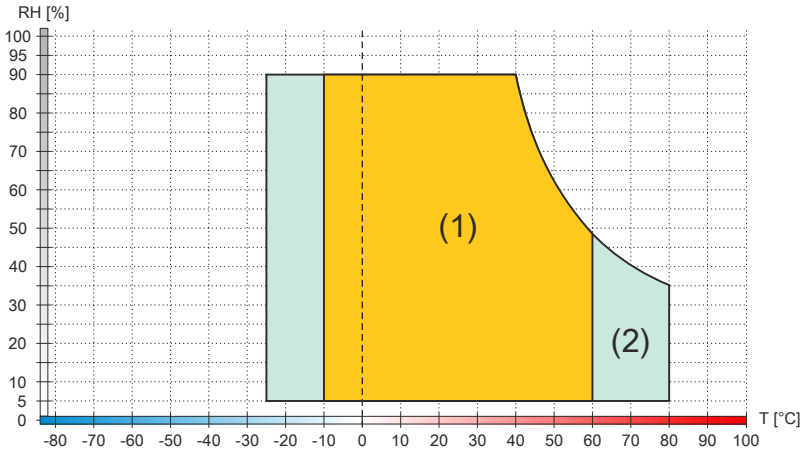


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

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

Order 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	

4.2.1.2.3 Technical data

Order number	5AP1151.0573-000	
Revision	**D0**	**E0**
General information		
B&R ID code	0xE7AB	
Certifications		
CE	Yes	
UKCA	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 luminous 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	

Order number	5AP1151.0573-000	
Revision	**D0**	**E0**
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	

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 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

4.2.1.2.5 Temperature/Humidity diagram

5AP1151.0573-000 ≥ Rev. E0

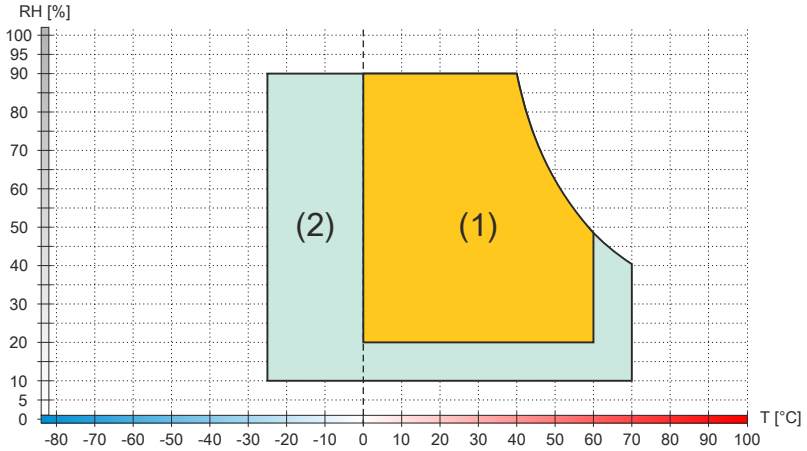


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

5AP1151.0573-000 ≤ Rev. D0

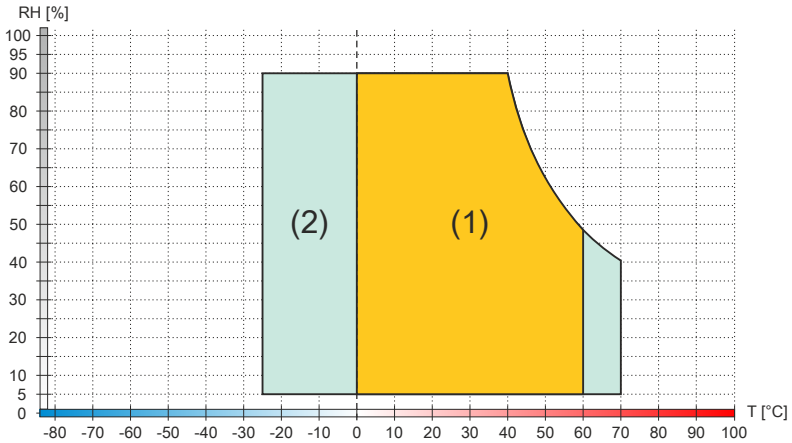


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

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

Order 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	

4.2.1.3.3 Technical data

Order number	5AP1120.0702-000	
Revision	**C0**	**D0**
General information		
B&R ID code	0xE7AC	
Certifications		
CE	Yes	
UKCA	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	550:1
Viewing angles		
Horizontal	Direction R = 70° / Direction L = 70°	
Vertical	Direction U = 60° / Direction D = 60°	Direction U = 50° / Direction D = 60°
Backlight		
Type	LED	
Brightness (dimmable)	Typ. 80 to 500 cd/m²	
Half-brightness time [2]	50,000 h	
Touch screen [3]		
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	
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	

Technical data

Order number	5AP1120.0702-000	
Revision	**C0**	**D0**
Dimensions		
Width	212 mm	
Height	156 mm	
Weight	900 g	

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 Temperature/Humidity diagram

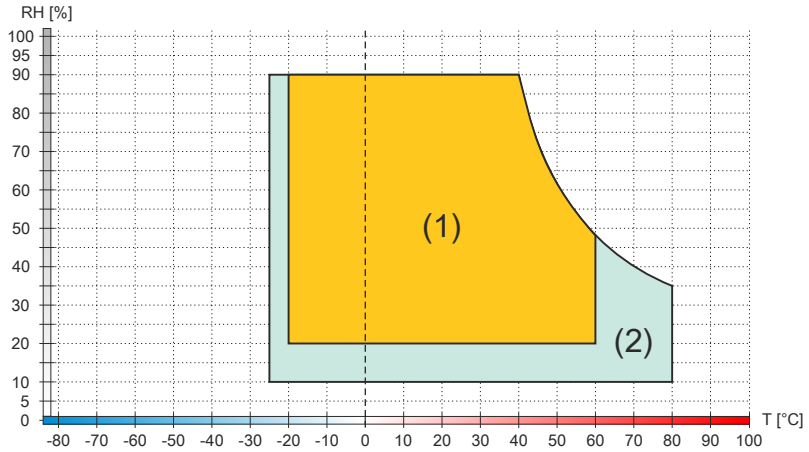


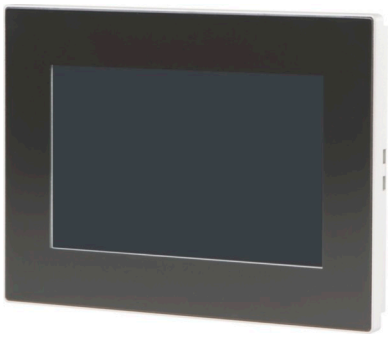
Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

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

Order 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	

4.2.1.4.3 Technical data

Order number	5AP1130.0702-000	
Revision	**G0**	**H0**
General information		
B&R ID code	0xEB61	
Certifications		
CE	Yes	
UKCA	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	700:1	
Viewing angles		
Horizontal	Direction R = 70° / Direction L = 70°	Direction R = 89° / Direction L = 89°
Vertical	Direction U = 60° / Direction D = 60°	Direction U = 89° / Direction D = 89°
Backlight		
Type	LED	
Brightness (dimmable)	Typ. 50 to 500 cd/m²	
Half-brightness time [2)]	50,000 h	
Touch screen [3)]		
Technology	Projected capacitive touch (PCT)	
Transmittance	Approx. 88%	
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, coated	
Design	Black	
Gasket	3 mm fixed gasket	

Technical data

Order number	5AP1130.0702-000	
Revision	**G0**	**H0**
Dimensions		
Width	209 mm	
Height	153 mm	
Weight	1200 g	

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 Temperature/Humidity diagram

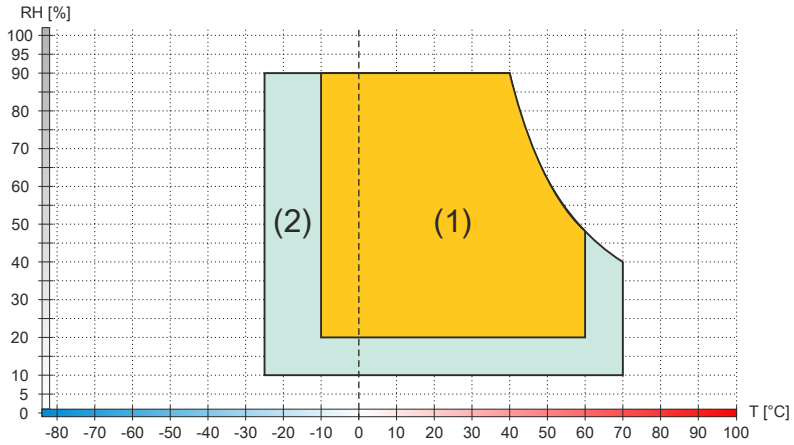


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.5 5AP1120.101E-000

4.2.1.5.1 General information

- Panel for AP1000, PPC2100, PPC2200 or PPC3x00
- 10.1" TFT WXGA color display
- Single-touch (analog resistive)
- Control cabinet installation

4.2.1.5.2 Order data

Order 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 / PPC3x00 / PPC2200 / link modules	

4.2.1.5.3 Technical data

Order number	5AP1120.101E-000			
Revision	**D0**	**E0**	**F0**	**G0**
General information				
B&R ID code	0xE93D			
Certifications				
CE	Yes			
UKCA	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	800:1			
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	Typ. 100 to 1000 cd/m²	Typ. 25 to 500 cd/m²	Typ. 100 to 1000 cd/m²
Half-brightness time [2)]	50,000 h			
Touch screen [3)]				
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			
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			

Order number	5AP1120.101E-000			
Revision	**D0**	**E0**	**F0**	**G0**
Dimensions				
Width	279 mm			
Height	191 mm			
Weight	1900 g			

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 Temperature/Humidity diagram

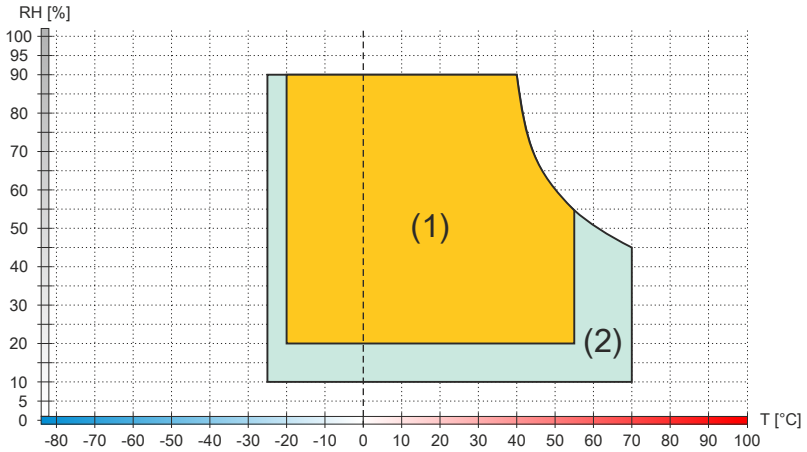


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.6 5AP1130.101D-000

4.2.1.6.1 General information

- Panel for AP1000, PPC2100, PPC2200 or PPC3x00
- 10.1" TFT WUXGA color display
- Multi-touch (projected capacitive)
- Brighter display
- Control cabinet installation

4.2.1.6.2 Order data

Order number	Short description	Figure
	Panels	
5AP1130.101D-000	Automation Panel 10.1" High Resolution - 1920 x 1200 pixels (16:10) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC2100/PPC3x00/ PPC2200 - For link modules	

4.2.1.6.3 Technical data

Order number	5AP1130.101D-000
General information	
B&R ID code	0x27AD
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Display	
Type	TFT color
Diagonal	10.1"
Colors	16.7 million
Resolution	WUXGA, 1920 x 1200 pixels
Contrast	800:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°
Backlight	
Type	LED
Brightness (dimmable)	Typ. 80 to 800 cd/m²
Half-brightness time [1]	40,000 h
Touch screen [2]	
Technology	Projected capacitive touch (PCT)
Transmittance	Approx. 88%
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, coated
Design	Black
Gasket	3 mm fixed gasket
Dimensions	
Width	279 mm
Height	191 mm
Weight	Approx. 2000 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.
2) The specifications for the touch screen driver must be taken into account. See section "Multi-touch drivers" in chapter 4 "Software".
3) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.6.4 Temperature/Humidity diagram

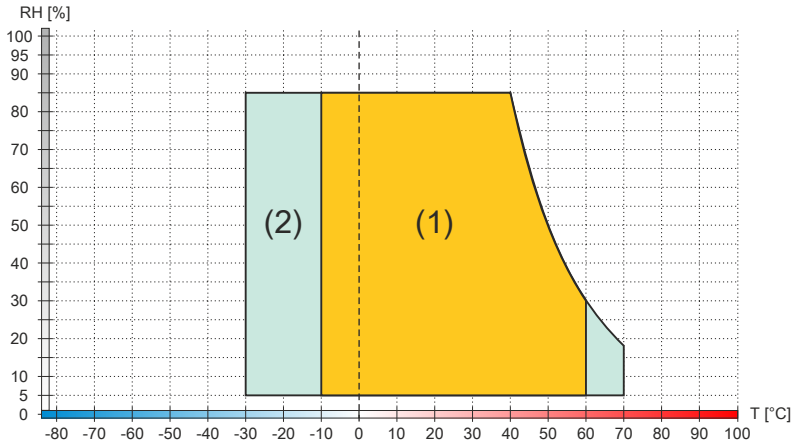


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.7 5AP1130.101E-000

4.2.1.7.1 General information

- Panel for AP1000, PPC2100, PPC2200 or PPC3x00
- 10.1" TFT WXGA color display
- Multi-touch (projected capacitive)
- Control cabinet installation

4.2.1.7.2 Order data

Order 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 / PPC3x00 / PPC2200 / link modules	

4.2.1.7.3 Technical data

Order number	5AP1130.101E-000		
Revision	**J0**	**K0**	**L0**
General information			
B&R ID code	0xEB62		
Certifications			
CE	Yes		
UKCA	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	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck) [2)]		
CCS	Yes		
LR	ENV3		
KR	Yes		
ABS	Yes		
BV	**EC31B** Temperature: 5 - 55°C Vibration: 0.7 g EMC: Bridge and open deck		
Display			
Type	TFT color		
Diagonal	10.1"		
Colors	16.7 million		
Resolution	WXGA, 1280 x 800 pixels		
Contrast	800:1		
Viewing angles			
Horizontal	Direction R = 85° / Direction L = 85°		
Vertical	Direction U = 85° / Direction D = 85°		
Backlight			
Type	LED		
Brightness (dimmable)	100 to 1000 cd/m²	25 to 500 cd/m²	100 to 1000 cd/m²
Half-brightness time [3)]	50,000 h		
Touch screen [4)]			
Technology	Projected capacitive touch (PCT)		
Transmittance	Approx. 88%		
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		

Order number	5AP1130.101E-000		
Revision	**J0**	**K0**	**L0**
Mechanical properties			
Front [5]			
Frame		Aluminum, coated	
Design		Black	
Gasket		3 mm fixed gasket	
Dimensions			
Width		279 mm	
Height		191 mm	
Weight		2000 g	

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 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 section "Multi-touch drivers" in chapter 4 "Software".
5) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.7.4 Temperature/Humidity diagram

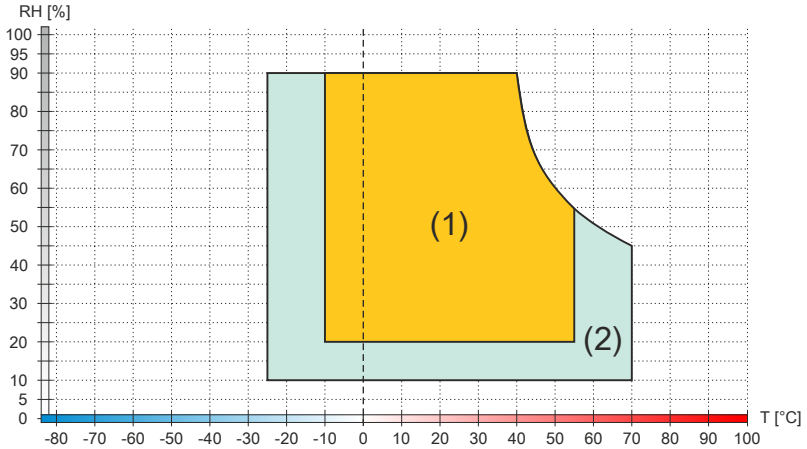


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.8 5AP1120.1043-000

4.2.1.8.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3x00
- 10.4" TFT VGA color display
- Single-touch (analog resistive)
- Front USB interface
- Control cabinet installation

4.2.1.8.2 Order data

Order 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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP520.1043-00	

4.2.1.8.3 Technical data

Order number	5AP1120.1043-000
General information	
B&R ID code	0xE7AD
Certifications	
CE	Yes
UKCA	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]	
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
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

Order number	5AP1120.1043-000
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	323 mm
Height	260 mm
Weight	2800 g

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 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

4.2.1.8.5 Temperature/Humidity diagram

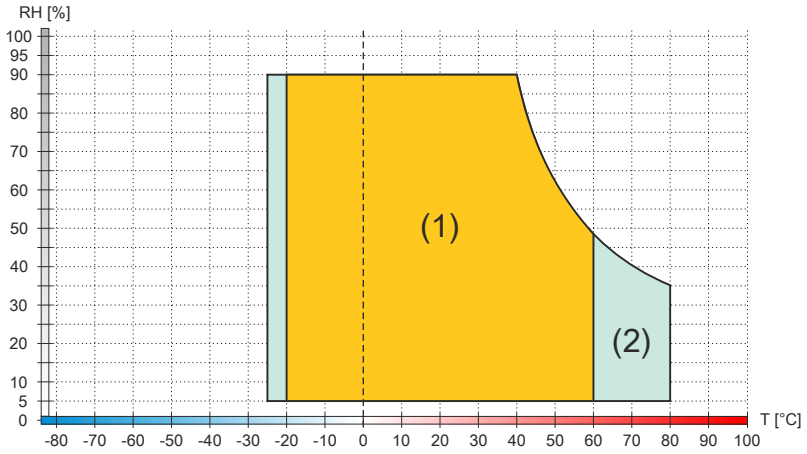


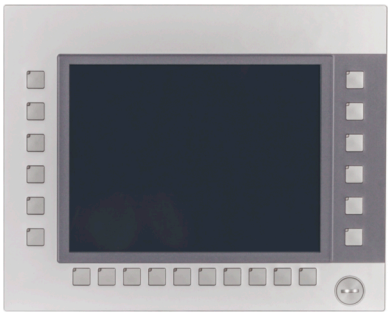
Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.9 5AP1180.1043-000

4.2.1.9.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3x00
- 10.4" TFT VGA color display
- Single-touch (analog resistive)
- 22 function keys
- Front USB interface
- Control cabinet installation

4.2.1.9.2 Order data

Order 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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP580.1043-00, 5AP980.1043-01	

4.2.1.9.3 Technical data

Order number	5AP1180.1043-000
General information	
B&R ID code	0xE7AE
Certifications	
CE	Yes
UKCA	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]	
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	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 luminous intensity	
yellow	Typ. 38 mcd

Order number	5AP1180.1043-000
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 [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

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 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

4.2.1.9.5 Temperature/Humidity diagram

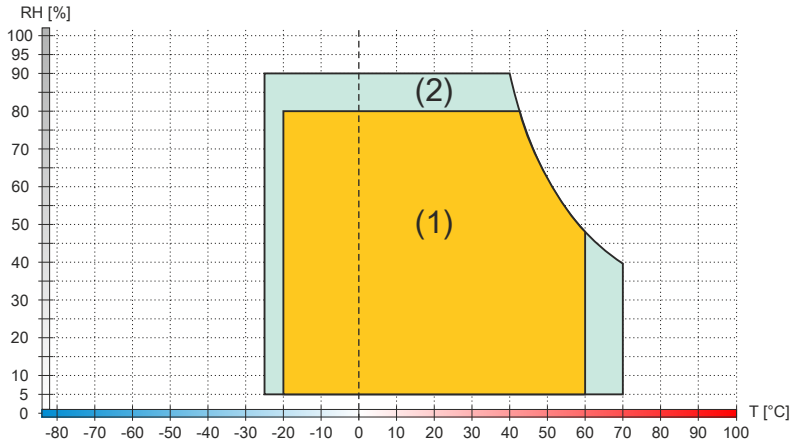


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.10 5AP1181.1043-000

4.2.1.10.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3x00
- Single-touch (analog resistive)
- 38 function keys and 20 system keys
- Front USB interface
- Control cabinet installation

4.2.1.10.2 Order data

Order 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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP581.1043-00, 5AP981.1043-01, 5PC781.1043-00	

4.2.1.10.3 Technical data

Order number	5AP1181.1043-000
General information	
B&R ID code	0xE7AF
Certifications	
CE	Yes
UKCA	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)]	
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

Order number	5AP1181.1043-000
LED luminous 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

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 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

4.2.1.10.5 Temperature/Humidity diagram

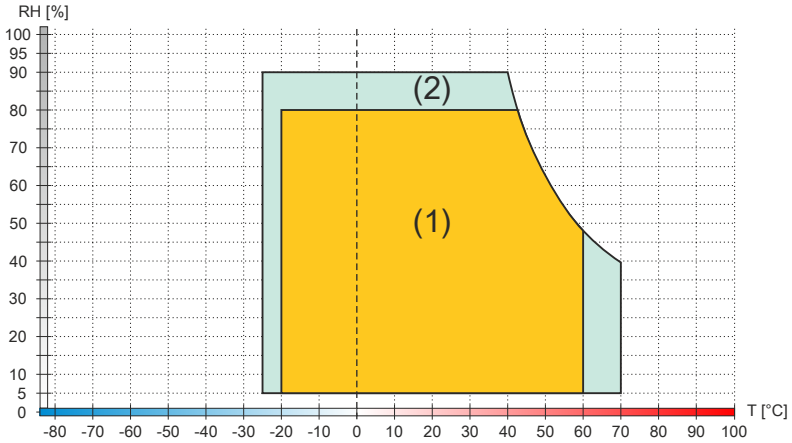


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.11 5AP1182.1043-000

4.2.1.11.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3x00
- 10.4" TFT VGA color display
- Single-touch (analog resistive)
- 44 function keys and 20 system keys
- Front USB interface
- Control cabinet installation

4.2.1.11.2 Order data

Order 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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP582.1043-00, 5AP982.1043-01, 5PC782.1043-00	

4.2.1.11.3 Technical data

Order number	5AP1182.1043-000
General information	
B&R ID code	0xE7B0
Certifications	
CE	Yes
UKCA	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)]	
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	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 luminous intensity	
yellow	Typ. 38 mcd
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2

Order number	5AP1182.1043-000
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

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 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

4.2.1.11.5 Temperature/Humidity diagram

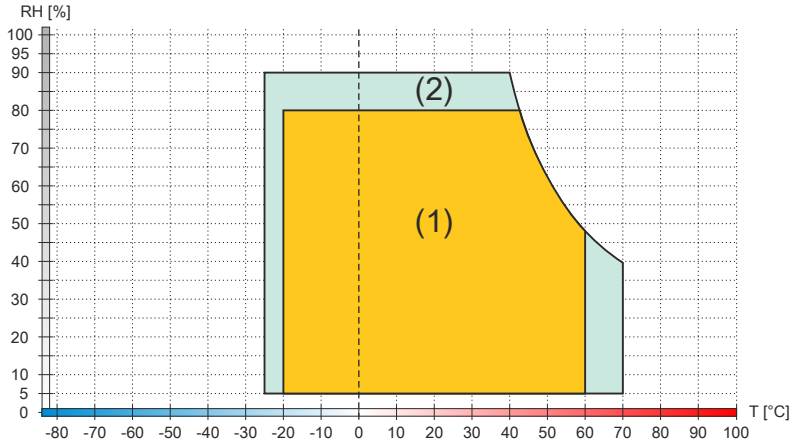


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.12 5AP1120.1214-000

4.2.1.12.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3x00
- 12.1" TFT SVGA color display
- Single-touch (analog resistive)
- Front USB interface
- Control cabinet installation

4.2.1.12.2 Order data

Order 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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP520.1214-00	

4.2.1.12.3 Technical data

Order number	5AP1120.1214-000
General information	
B&R ID code	0xE7BB
Certifications	
CE	Yes
UKCA	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]	
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
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

Technical data

Order number	5AP1120.1214-000
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	362 mm
Height	284 mm
Weight	3200 g

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 Temperature/Humidity diagram

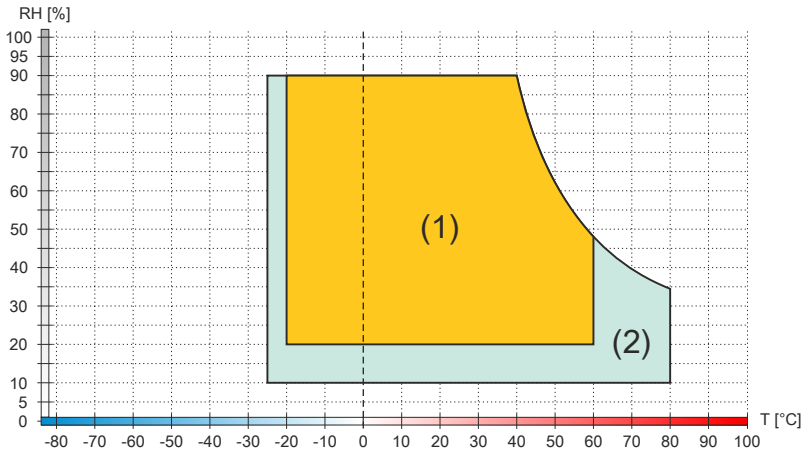


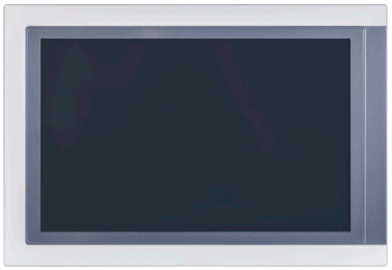
Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.13 5AP1120.121E-000

4.2.1.13.1 General information

- Panel for AP1000, PPC2100, PPC2200 or PPC3x00
- 12.1" TFT WXGA color display
- Single-touch (analog resistive)
- Control cabinet installation

4.2.1.13.2 Order data

Order 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 / PPC3x00 / PPC2200 / link modules	

4.2.1.13.3 Technical data

Order number	5AP1120.121E-000
General information	
B&R ID code	0xE8E4
Certifications	
CE	Yes
UKCA	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]	
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
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

Technical data

Order number	5AP1120.121E-000
Dimensions	
Width	324 mm
Height	221.5 mm
Weight	2300 g

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.

4.2.1.13.4 Temperature/Humidity diagram

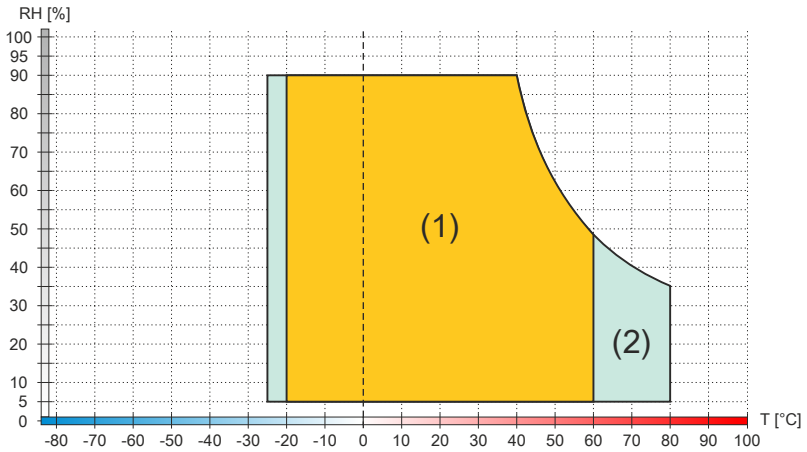


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.14 5AP1130.121E-000

4.2.1.14.1 General information

- Panel for AP1000, PPC2100, PPC2200 or PPC3x00
- 12.1" TFT WXGA color display
- Multi-touch (projected capacitive)
- Control cabinet installation

4.2.1.14.2 Order data

Order 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 / PPC3x00 / PPC2200 / link modules	

4.2.1.14.3 Technical data

Order number	5AP1130.121E-000
General information	
B&R ID code	0xEB63
Certifications	
CE	Yes
UKCA	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]	
Technology	Projected capacitive touch (PCT)
Transmittance	Approx. 88%
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, coated
Design	Black
Gasket	3 mm fixed gasket
Dimensions	
Width	324 mm
Height	221.5 mm
Weight	2400 g

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 section "Multi-touch drivers" in chapter 4 "Software".
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.14.4 Temperature/Humidity diagram

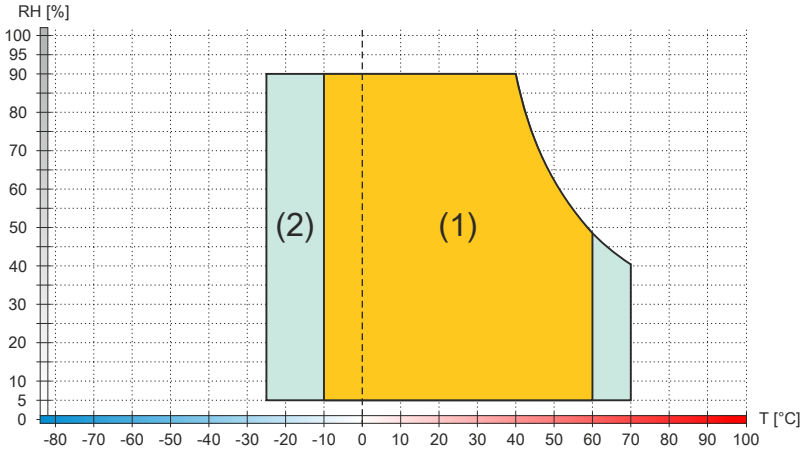


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.15 5AP1130.121E-010

4.2.1.15.1 General information

- Panel for AP1000, PPC2100, PPC2200 or PPC3x00
- 12.1" TFT WXGA color display
- Multi-touch (projected capacitive)
- Sunlight-readable display

4.2.1.15.2 Order data

Order number	Short description	Figure
	Panels	
5AP1130.121E-010	Automation Panel 12.1" sunlight readable - 1280 x 800 pixels (16:10) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - For PPC2100/PPC3x00/ PPC2200 - For link modules	

4.2.1.15.3 Technical data

Order number	5AP1130.121E-010
General information	
B&R ID code	0x27D9
Certifications	
CE	Yes
UKCA	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	1000:1
Sunlight readable	Yes
Viewing angles	
Horizontal	Direction R = 89° / Direction L = 89°
Vertical	Direction U = 89° / Direction D = 89°
Backlight	
Type	LED
Brightness (dimmable)	Typ. 150 to 1500 cd/m²
Half-brightness time [2]	70,000 h
Touch screen [3]	
Technology	Projected capacitive touch (PCT)
Transmittance	Approx. 88%
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, coated
Design	Black
Gasket	3 mm fixed gasket

Order number	5AP1130.121E-010
Dimensions	
Width	324 mm
Height	221.5 mm
Weight	Approx. 2900 g

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 section "Multi-touch drivers" in chapter 4 "Software".
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.15.4 Temperature/Humidity diagram

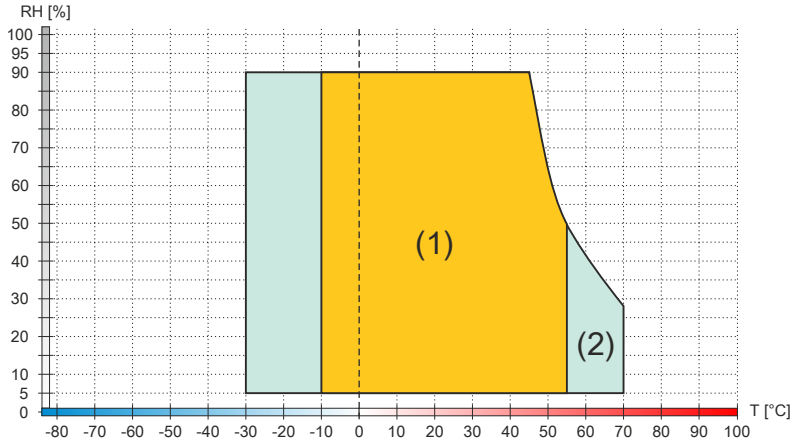


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.16 5AP1120.1505-000

4.2.1.16.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3x00
- 15.0" TFT XGA color display
- Single-touch (analog resistive)
- Front USB interface
- Control cabinet installation

4.2.1.16.2 Order data

Order 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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP520.1505-00, 5AP920.1505-01, 5PC720.1505-xx, 5PC820.1505-00	

4.2.1.16.3 Technical data

Order number	5AP1120.1505-000
General information	
B&R ID code	0xE7BC
Certifications	
CE	Yes
UKCA	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]	
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
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	Type 4X indoor use only and Type 12 on the front

Technical data

Order number	5AP1120.1505-000
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	435 mm
Height	330 mm
Weight	5000 g

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 Temperature/Humidity diagram

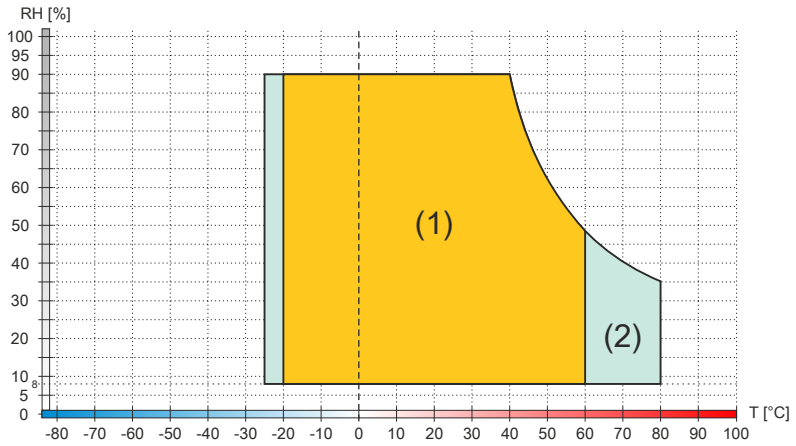


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.17 5AP1180.1505-000

4.2.1.17.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3x00
- 15.0" TFT XGA color display
- Single-touch (analog resistive)
- 32 function keys
- Front USB interface
- Control cabinet installation

4.2.1.17.2 Order data

Order 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 - 32 function keys - For PPC900/PPC2100/PPC3x00/PPC2200 - For link modules - Compatible with 5PP580.1505-00, 5AP980.1505-01	

4.2.1.17.3 Technical data

Order number	5AP1180.1505-000
General information	
B&R ID code	0xE7BD
Certifications	
CE	Yes
UKCA	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)]	
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	No
Service life	>1,000,000 actuations at 1 ±0.3 N to 3 ±0.3 N actuating force
LED luminous intensity	
yellow	Typ. 38 mcd

Order number	5AP1180.1505-000
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 [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

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 Temperature/Humidity diagram

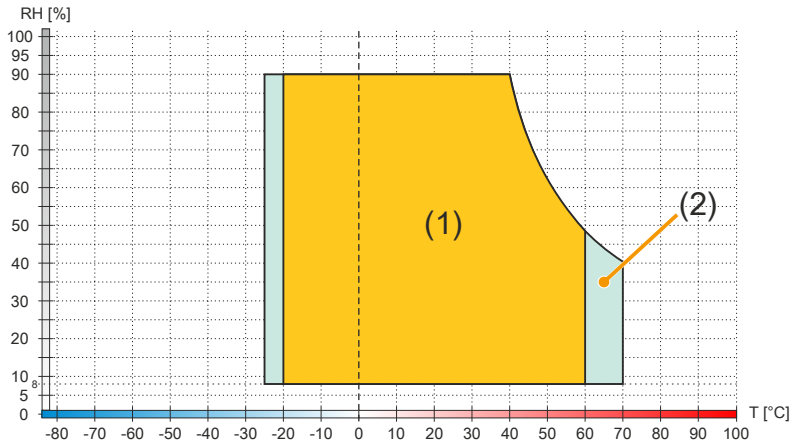


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.18 5AP1181.1505-000

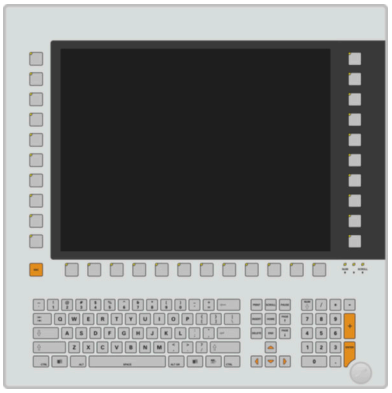
4.2.1.18.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3x00
- 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.

4.2.1.18.2 Order data

Order 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/PPC3x00/PPC2200 - For link modules - Compatible with 5PP581.1505-000	

4.2.1.18.3 Technical data

Order number	5AP1181.1505-000
General information	
B&R ID code	0xEF61
Certifications	
CE	Yes
UKCA	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]	
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%

Order number	5AP1181.1505-000
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	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 luminous 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

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.

4.2.1.18.4 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

4.2.1.18.5 Temperature/Humidity diagram

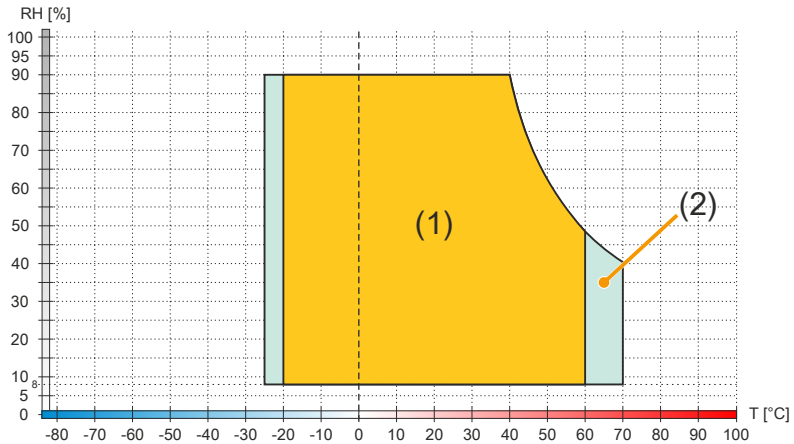


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.19 5AP1120.156B-000

4.2.1.19.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3x00
- 15.6" TFT HD color display
- Single-touch (analog resistive)
- Control cabinet installation

4.2.1.19.2 Order data

Order 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/PPC3x00/PPC2200 - For link modules	

4.2.1.19.3 Technical data

Order number	5AP1120.156B-000
General information	
B&R ID code	0xE8E5
Certifications	
CE	Yes
UKCA	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]	
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%
Service life	10,000,000 touch operations at the same position (release pressure: 250 g, interval: 0.25 s)
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, coated
Panel overlay	
Material	Polyester
Light background color	RAL 9006
Dark border color around display	RAL 7024
Gasket	3 mm fixed gasket

Technical data

Order number	5AP1120.156B-000
Dimensions	
Width	414 mm
Height	258.5 mm
Weight	4200 g

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.

4.2.1.19.4 Temperature/Humidity diagram

Hardware revision H0 and later

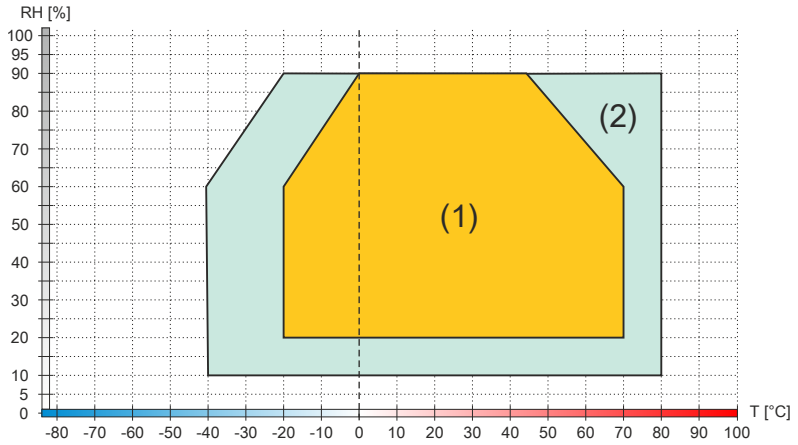


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

Up to hardware revision G0

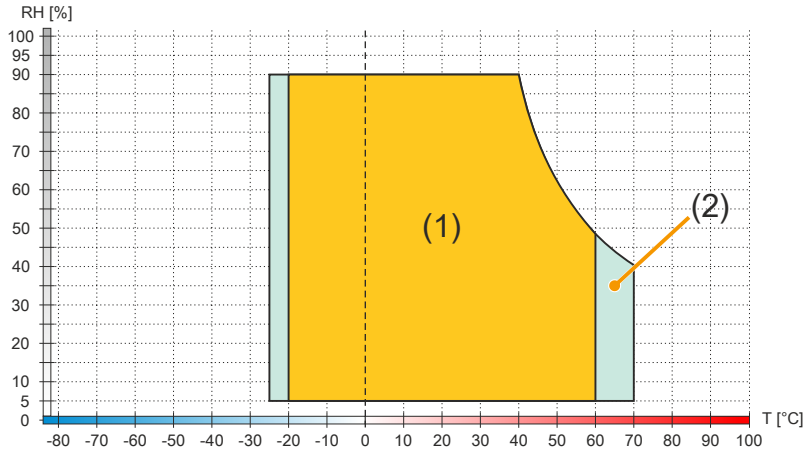


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.20 5AP1130.156C-000

4.2.1.20.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3x00
- 15.6" FHD color display
- Multi-touch (projected capacitive)
- Control cabinet installation

4.2.1.20.2 Order data

Order 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/PPC3x00/PPC2200 - For link modules	

4.2.1.20.3 Technical data

Order number	5AP1130.156C-000	
Revision	**I5**	**J0**
General information		
B&R ID code	0xEC5D	
Certifications		
CE	Yes	
UKCA	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	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck) [2)]	
CCS	Yes	
LR	ENV3	
KR	Yes	
ABS	Yes	
BV	**EC31B** Temperature: 5 - 55°C Vibration: 0.7 g EMC: Bridge and open deck	
Display		
Type	TFT color	
Diagonal	15.6"	
Colors	16.7 million	
Resolution	FHD, 1920 x 1080 pixels	
Contrast	1500:1	800:1
Viewing angles		
Horizontal	Direction R = 85° / Direction L = 85°	
Vertical	Direction U = 85° / Direction D = 85°	
Backlight		
Type	LED	
Brightness (dimmable)	Typ. 40 to 450 cd/m²	
Half-brightness time [3)]	≥50,000 h	
Touch screen [4)]		
Technology	Projected capacitive touch (PCT)	
Transmittance	Approx. 88%	
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	

Order number	5AP1130.156C-000	
Revision	**I5**	**J0**
Mechanical properties		
Front [5]		
Frame	Aluminum, coated	
Design	Black	
Gasket	3 mm fixed gasket	
Dimensions		
Width	414 mm	
Height	258.5 mm	
Weight	3800 g	

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 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 section "Multi-touch drivers" in chapter 4 "Software".
5) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.20.4 Temperature/Humidity diagram

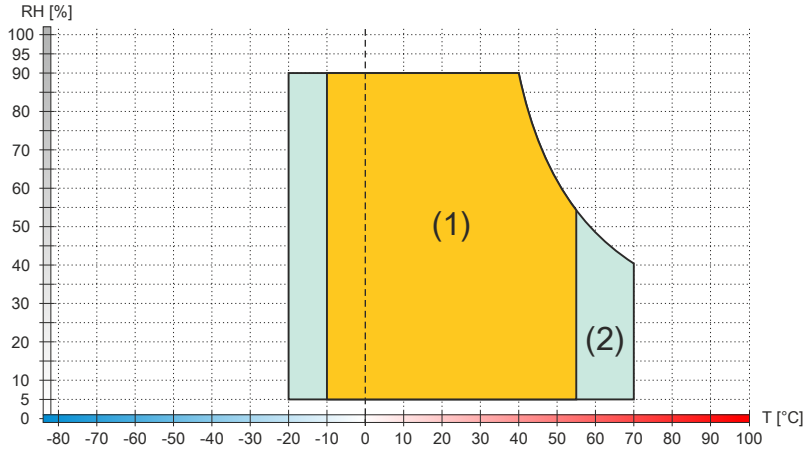


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.21 5AP1130.156C-001

4.2.1.21.1 General information

- Panel for AP1000, PPC2100, PPC2200 or PPC3x00
- 15.6" TFT FHD color display
- Multi-touch (projected capacitive)
- Manufactured with optical bonding technology
- Control cabinet installation

4.2.1.21.2 Order data

Order number	Short description	Figure
	Panels	
5AP1130.156C-001	Automation Panel 15.6" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Control cabinet installation - Landscape format - Optical bonding - For PPC900/PPC2100/PPC3x00/PPC2200 - For link modules	

4.2.1.21.3 Technical data

Order number	5AP1130.156C-001	
Revision	**C0**	**D0**
General information		
B&R ID code	0x28B5	
Certifications		
CE	Yes	
UKCA	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	FHD, 1920 x 1080 pixels	
Contrast	1500:1	800:1
Viewing angles		
Horizontal	Direction R = 85° / Direction L = 85°	
Vertical	Direction U = 85° / Direction D = 85°	
Backlight		
Type	LED	
Brightness (dimmable)	40 to 450 cd/m²	
Half-brightness time [2)]	50,000 h	
Touch screen [3)]		
Technology	Projected capacitive touch (PCT)	
Transmittance	Approx. 88%	
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, coated	
Design	Black	
Gasket	3 mm fixed gasket	

Order number	5AP1130.156C-001	
Revision	**C0**	**D0**
Dimensions		
Width	414 mm	
Height	258.5 mm	
Weight	3900 g	

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 section "Multi-touch drivers" in chapter 4 "Software".
4) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.21.4 Temperature/Humidity diagram

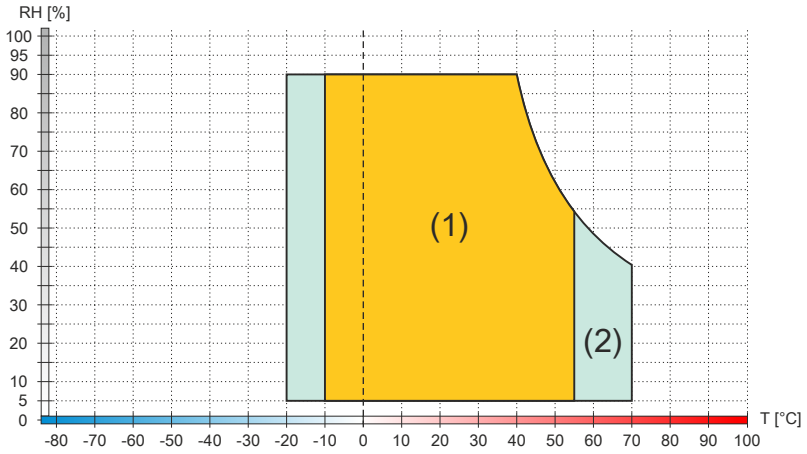


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.22 5AP1130.185C-000

4.2.1.22.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3x00
- 18.5" FHD color display
- Multi-touch (projected capacitive)
- Control cabinet installation

4.2.1.22.2 Order data

Order 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/PPC3x00/PPC2200 - For link modules	

4.2.1.22.3 Technical data

Order number	5AP1130.185C-000	
Revision	**G0**	**H0**
General information		
B&R ID code	0xEC5E	
Certifications		
CE	Yes	
UKCA	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	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck) [2]	
CCS	Yes	
LR	ENV3	
KR	Yes	
ABS	Yes	
BV	**EC31B** Temperature: 5 - 55°C Vibration: 0.7 g EMC: Bridge and open deck	
Display		
Type	TFT color	
Diagonal	18.5"	
Colors	16.7 million	
Resolution	FHD, 1920 x 1080 pixels	
Contrast	1500:1	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 [3]	50,000 h	
Touch screen [4]		
Technology	Projected capacitive touch (PCT)	
Transmittance	Approx. 88%	
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	

Technical data

Order number	5AP1130.185C-000	
Revision	**G0**	**H0**
Mechanical properties		
Front [5]		
Frame	Aluminum, coated	
Design	Black	
Gasket	3 mm fixed gasket	
Dimensions		
Width	475 mm	
Height	295 mm	
Weight	4700 g	

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 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 section "Multi-touch drivers" in chapter 4 "Software".
5) Visual deviations in color and surface quality are possible due to process or batch conditions.

4.2.1.22.4 Temperature/Humidity diagram

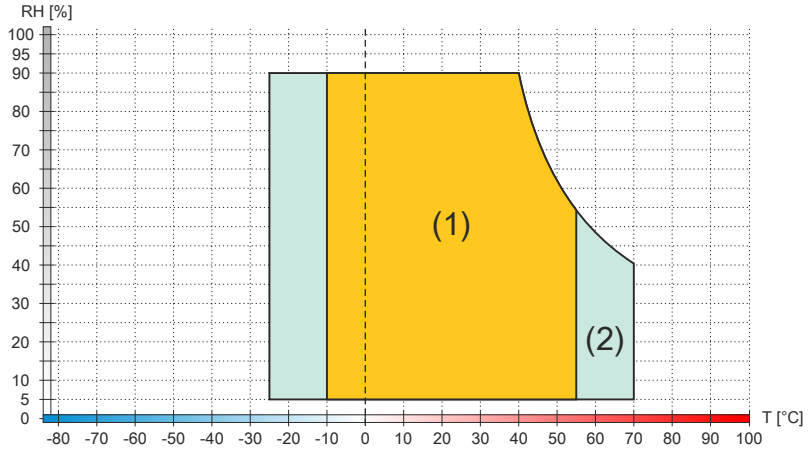


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.23 5AP1120.1906-000

4.2.1.23.1 General information

- Panel for AP1000, PPC900, PPC2100, PPC2200 or PPC3x00
- 19.0" TFT SXGA color display
- Single-touch (analog resistive)
- Front USB interface
- Control cabinet installation

4.2.1.23.2 Order data

Order 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/PPC3x00/PPC2200 - For link modules - Compatible with 5AP920.1906-01, 5PC720.1906-00, 5PC820.1906-00	

4.2.1.23.3 Technical data

Order number	5AP1120.1906-000
General information	
B&R ID code	0xE7BE
Certifications	
CE	Yes
UKCA	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	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck) [2]
CCS	Yes
LR	ENV3
KR	Yes
ABS	Yes
BV	**EC31B** Temperature: 5 - 55°C Vibration: 0.7 g EMC: Bridge and open deck
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]	
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%

Technical data

Order 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

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 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.

4.2.1.23.4 Temperature/Humidity diagram

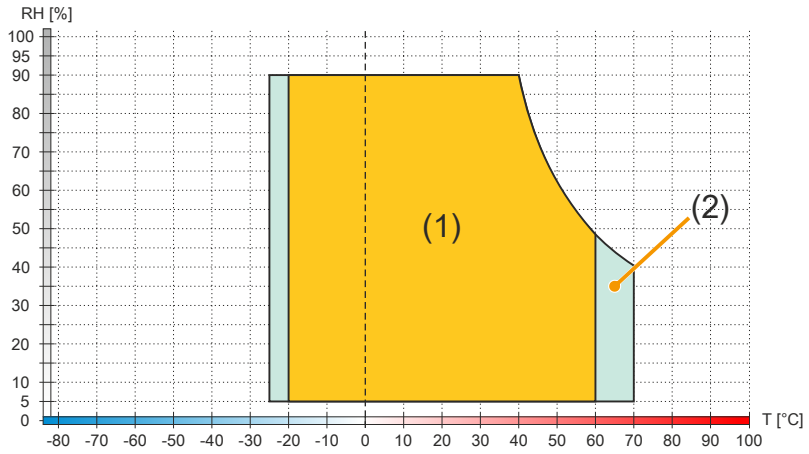


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.2 Link modules

4.2.2.1 5DLDPO.1001-00

4.2.2.1.1 General information

- Link module for Automation Panel 933/1130/5130 and 5230 (only with 5ACCKP00.xxxx-000)
- 1x DisplayPort interface
- 1x USB In (USB 2.0 type B)
- 2x USB 2.0 type A
- 1x OSD control panel
- Compatible with APC910, APC3100, APC3200 and APC4100

4.2.2.1.2 Order data

Order number	Short description	Figure
	Link modules	
5DLDPO.1001-00	Automation Panel link module - DisplayPort receiver - For Automation Panel 933/1130 - For Automation Panel 5130 - For Automation Panel 5230 (only with 5ACCKP00.xxxx-000)	
	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	
	DisplayPort cables	
5CADPO.0018-00	DisplayPort cable 1.8 m	
5CADPO.0050-00	DisplayPort cable 5 m	
5CADPO.0075-00	DisplayPort cable 7.5 m	
5CADPO.0100-00	DisplayPort cable 10 m	
	USB cables	
5CAUSB.0018-00	USB 2.0 connection cable - Type A - type B connector - 1.8 m	
5CAUSB.0050-00	USB 2.0 connection cable - Type A - type B connector - 5 m	
5CAUSB.0075-00	USB 2.0 connection cable - Type A - type B connector - 7.5 m	
5CAUSB.0100-00	USB 2.0 connection cable - Type A - type B connector - 10 m	

4.2.2.1.3 Technical data

Order number	5DLDPO.1001-00
General information	
LEDs	Status, Link
B&R ID code	0x2F1A
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Interfaces	
USB	
Quantity	3
Type	USB 2.0
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 [1)]
Panel In	
Quantity	1
Variant	DisplayPort
Electrical properties	
Nominal voltage	24 VDC, SELV [2)]
Nominal current	Max. 2.3 A [3)]
Operating voltage	24 VDC ±25%
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2

Technical data

Order number	5DLDPO.1001-00
Mechanical properties	
Dimensions	
Width	190 mm
Height	110 mm
Depth	23.6 mm
Weight	490 g

1) For the 2 USB type A female connectors.
2) IEC 61010-2-201 requirements must be observed.
3) The maximum ambient temperature for the DisplayPort link module is limited to 50°C at a maximum nominal current of 2.3 A. At a continuous nominal current of max. 2.0 A, the specified max. ambient temperature applies.

4.2.2.2 5DLSDL.1001-00

4.2.2.2.1 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

4.2.2.2.2 Order data

Order 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	

4.2.2.2.3 Technical data

Order number	5DLSDL.1001-00
General information	
B&R ID code	0xE1A4
Brightness buttons	Yes [1]
Certifications	
CE	Yes
UKCA	Yes
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 [3]	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck) [4]
CCS	Yes
LR	ENV3
KR	Yes
ABS	Yes
BV	**EC31B** Temperature: 5 - 55°C Vibration: 0.7 g EMC: Bridge and open deck
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 [5]
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 [6]
Panel In	
Variant	DVI-D
Type	SDL/DVI
Electrical properties	
Nominal voltage	24 VDC, SELV [7]
Nominal current	Max. 3 A
Operating voltage	24 VDC ±25%
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes

Technical data

Order number	5DLSDL.1001-00
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

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) The following Automation Panel link module interfaces are not approved for use in DNV ambient conditions: COM, USB.
4) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV certificate for the product family.
5) Max. USB 1.1 is possible in "SDL operation without USB cable".
6) For the 2 USB type A female connectors.
7) IEC 61010-2-201 requirements must be observed.

4.2.2.3 5DLSD3.1001-00

4.2.2.3.1 General information

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

4.2.2.3.2 Order data

Order 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	
5CASD3.0010-00	SDL3/SDL4/FT5x cable - 1 m - FT5x including Power over Ethernet	
5CASD3.0030-00	SDL3/SDL4/FT5x cable - 3 m - FT5x including Power over Ethernet	
5CASD3.0050-00	SDL3/SDL4/FT5x cable - 5 m - FT5x including Power over Ethernet	
5CASD3.0070-00	SDL3/SDL4/FT5x cable - 7 m - FT5x including Power over Ethernet	
5CASD3.0100-00	SDL3/SDL4/FT5x cable - 10 m - FT5x including Power over Ethernet	
5CASD3.0150-00	SDL3/SDL4/FT5x cable - 15 m - FT5x including Power over Ethernet	
5CASD3.0200-00	SDL3/SDL4/FT5x cable - 20 m - FT5x including Power over Ethernet	
5CASD3.0300-00	SDL3/SDL4/FT5x cable - 30 m - FT5x including Power over Ethernet	
5CASD3.0500-00	SDL3/SDL4/FT5x cable - 50 m - FT5x including Power over Ethernet	
5CASD3.0750-00	SDL3/SDL4/FT5x cable - 75 m - FT5x including Power over Ethernet	
5CASD3.1000-00	SDL3/SDL4/FT5x cable - 100 m - FT5x including Power over Ethernet	

4.2.2.3.3 Technical data

Order number	5DLSD3.1001-00
General information	
LEDs	Status, Link
B&R ID code	0xE3FC
Certifications	
CE	Yes
UKCA	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]
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, SELV [2]
Nominal current	Max. 3 A
Operating voltage	24 VDC ±25%
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes

Technical data

Order number	5DLSD3.1001-00
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	527 g

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

4.2.2.4 5DLSD4.1001-00

4.2.2.4.1 General information

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

4.2.2.4.2 Order data

Order 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	
5CASD3.0010-00	SDL3/SDL4/FT5x cable - 1 m - FT5x including Power over Ethernet	
5CASD3.0030-00	SDL3/SDL4/FT5x cable - 3 m - FT5x including Power over Ethernet	
5CASD3.0050-00	SDL3/SDL4/FT5x cable - 5 m - FT5x including Power over Ethernet	
5CASD3.0070-00	SDL3/SDL4/FT5x cable - 7 m - FT5x including Power over Ethernet	
5CASD3.0100-00	SDL3/SDL4/FT5x cable - 10 m - FT5x including Power over Ethernet	
5CASD3.0150-00	SDL3/SDL4/FT5x cable - 15 m - FT5x including Power over Ethernet	
5CASD3.0200-00	SDL3/SDL4/FT5x cable - 20 m - FT5x including Power over Ethernet	
5CASD3.0300-00	SDL3/SDL4/FT5x cable - 30 m - FT5x including Power over Ethernet	
5CASD3.0500-00	SDL3/SDL4/FT5x cable - 50 m - FT5x including Power over Ethernet	
5CASD3.0750-00	SDL3/SDL4/FT5x cable - 75 m - FT5x including Power over Ethernet	
5CASD3.1000-00	SDL3/SDL4/FT5x cable - 100 m - FT5x including Power over Ethernet	

4.2.2.4.3 Technical data

Order number	5DLSD4.1001-00
General information	
LEDs	Status, Link
B&R ID code	0xECE3
Certifications	
CE	Yes
UKCA	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)]
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, SELV [2)]
Nominal current	Max. 3 A
Operating voltage	24 VDC ±25%
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes

Technical data

Order number	5DLSD4.1001-00
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	525 g

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

5 Installation and wiring

5.1 Basic information

Information:

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

Unpacking

The following activities must be performed before unpacking the device:

- Check the packaging for visible transport damage.
- If transport damage is noticeable, document this immediately and submit a complaint. If possible, have the damage confirmed by the carrier/delivery service.
- Check the contents of the shipment for completeness and damage.
- If the contents of the packaging are incomplete, damaged or do not correspond to the order, the responsible sales office or B&R Headquarters must be informed immediately.
- The information in section "Protection against electrostatic discharge" on page 10 must be observed for unpacked devices and components.
- Keep the original packaging for further transport.

Power supply

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

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

Caution!

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

Installation

Information:

Optional sets are available that contain all necessary tools for installation. For additional information about tool sets, see section "Installation accessories" on page 154.

Before installation

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

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

Caution!

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

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

Information about the device's environment

- Observe the notes and regulations regarding the power supply and functional ground.
- Observer the specified bend radius when connecting cables.
- Ventilation openings are not permitted to be covered or blocked.
- The device is only permitted to be operated in closed rooms and not permitted to be exposed to direct sunlight.
- The climatic ambient conditions and environmental conditions must be taken into account – see "Environmental properties" on page 40.

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 device and void the certifications and warranty for the device.
- When installing the device, the permissible mounting orientations must be observed - see "Mounting orientations" on page 36.
- 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 leak tightness

Warning!

Failure to follow instructions can result in damage to property.

- The gasket must be inspected before installation or reinstallation and at regular intervals according to the requirements of the operating environment.
- Replace the entire device if inspection reveals visible scratches, cracks, dirt deposits or excessive wear.
- Do not stretch the gasket unnecessarily.
- It is important to ensure that the gasket is correctly seated all around.
- The housing components must be secured using the specified tightening torque.

Transport and storage

Information:

Condensation may form under certain environmental conditions or rapid climatic changes. For improved acclimatization and to avoid damage, the device must be slowly adapted to the room temperature.

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

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

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

Use of third-party products

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

5.2 Installing the 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 used.

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
- 5AP1130.101D-000
- 5AP1130.101E-000
- 5AP1120.1043-000
- 5AP1180.1043-000
- 5AP1120.121E-000
- 5AP1130.121E-000
- 5AP1130.121E-010
- 5AP1120.156B-000
- 5AP1130.156C-000
- 5AP1130.156C-001
- 5AP1130.185C-000

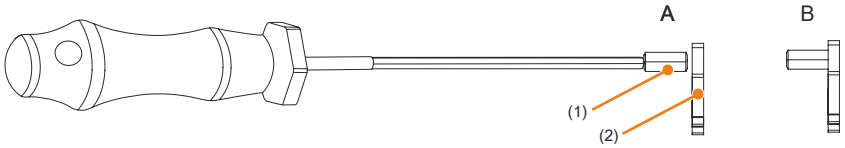
The thickness of the wall or control cabinet plate must be at least 1 mm and is not permitted to exceed 6 to10 mm (depending on the Panel used).

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).



2. Insert the device into the front of the prepared, burr-free and flat installation cutout. For the dimensions of the installation cutout, see section "Installation diagrams" on page 33.
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 section "Installation diagrams" on page 33.

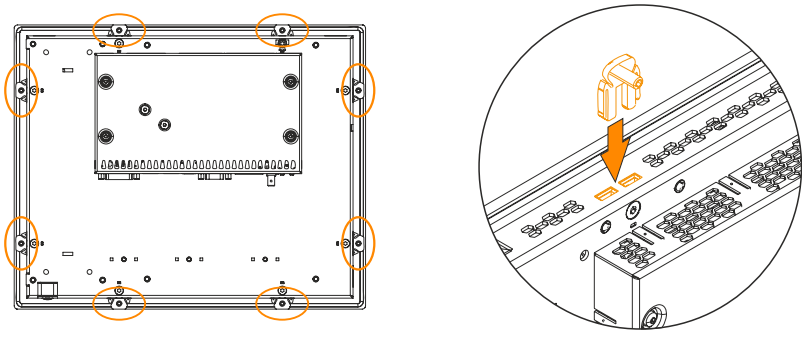


Figure 4: Inserting the retaining clips

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.

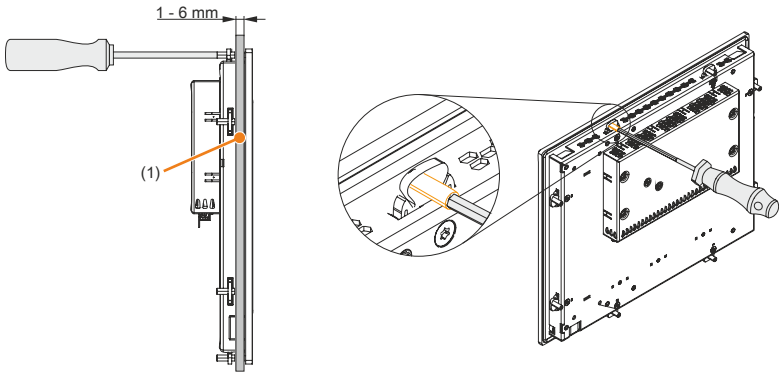


Figure 5: Fastening the retaining clips

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 33.

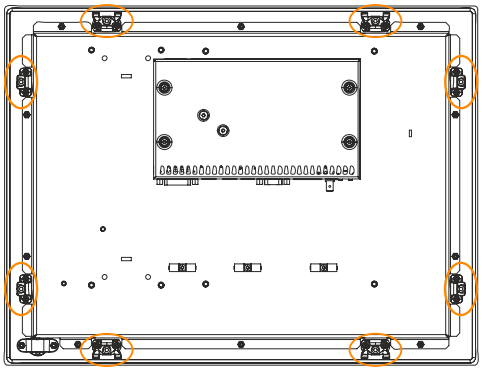


Figure 6: Position of the clamping blocks

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.

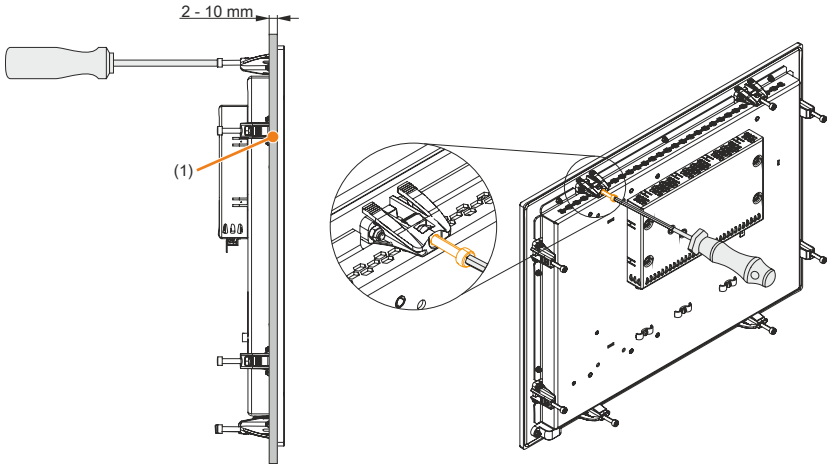
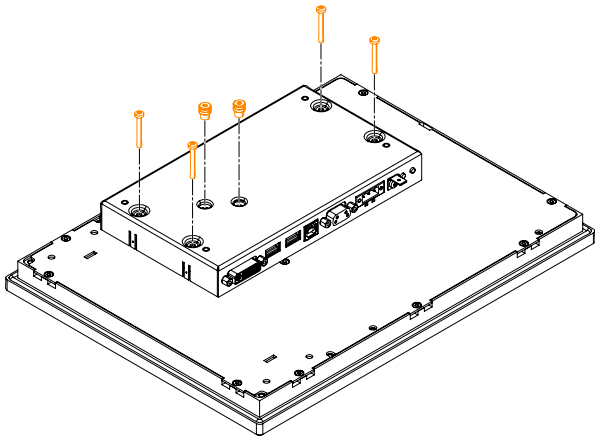


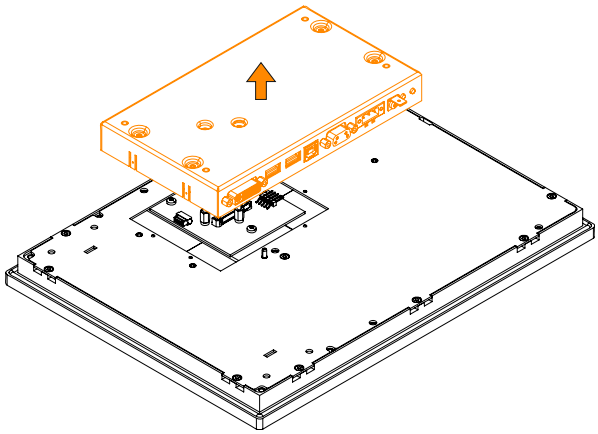
Figure 7: Fastening the clamping blocks

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.



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



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 unit).

5.5.1.1 wiring

Caution!

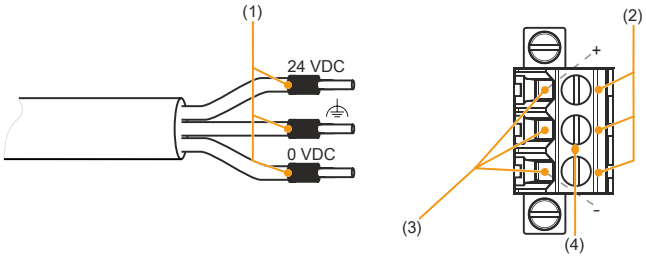
The pinout of the power supply interface must be observed!

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

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

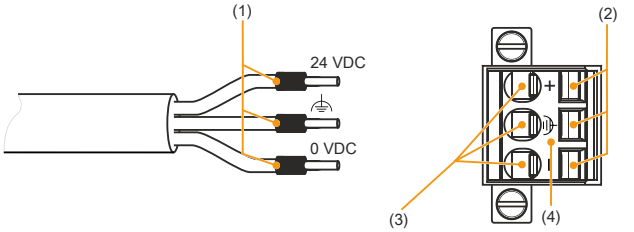
Installing screw clamp terminal block 0TB103.9

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



Installing cage clamp terminal block 0TB103.91

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

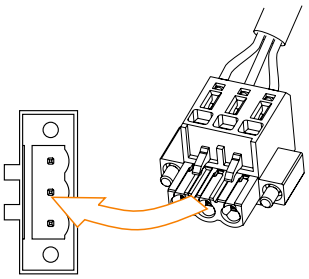


5.5.2 Connecting the power supply to a B&R device

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 unit).

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



5.5.3 Grounding concept - Functional ground

Functional ground is a low impedance current path between circuits and ground. It is used for equipotential bonding and thus for improving immunity to interference.

Notice!

Functional grounding does not meet the requirements of protective ground!
Suitable measures for electrical safety in the event of operation and faults must be provided separately.

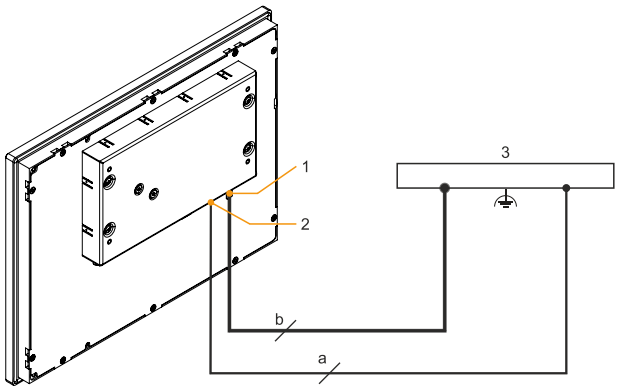
The device is equipped with the following functional ground connections:

- Functional ground connection of the power supply
- Ground connection

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

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 with 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 implemented using shielded lines.



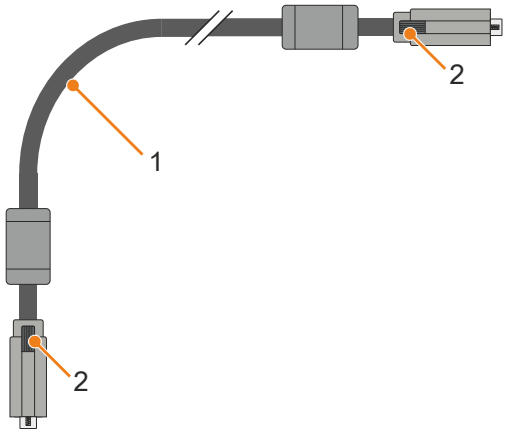
Legend					
1	Ground connection	2	Power supply connection +24 VDC pin 2	3	Central grounding point
a	At least 1.5 mm²	b	At least 2.5 mm²	-	

5.6 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.

Bend radii and tightening torques (locating screws) must be observed for all cables used in accordance with the manufacturer's instructions.



1) Bend radius
2) Locating screws

6 Commissioning

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.

6.1 Switching on the device for the first time

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 121?
- 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.

Requirements

- 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).

Procedure

1. Connect the power supply and switch it on (e.g. power supply unit).
2. The device is operating.

6.2 Touch screen calibration

B&R devices with touch screens are hardware-calibrated at the factory. This means that recalibration is not usually necessary.

6.2.1 Single-touch (analog resistive)

Recalibration is generally not necessary. Nevertheless, B&R recommends recalibration in order to best adapt the touch screen to the user's needs.

6.2.1.1 Windows 11 IoT Enterprise 2024 LTSC

After starting Windows 11 IoT Enterprise 2024 LTSC 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).

6.2.1.2 Windows 10 IoT Enterprise 2021 LTSC

After starting Windows 10 IoT Enterprise 2021 LTSC 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).

6.2.1.3 Windows 10 IoT Enterprise 2019 LTSC

After starting Windows 10 IoT Enterprise 2019 LTSC 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).

6.2.1.4 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).

6.2.1.5 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).

6.2.1.6 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).

6.2.1.7 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).

6.2.1.8 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 screen 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).

6.2.1.9 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).

6.2.1.10 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).

6.2.2 Multi-touch (projected capacitive - PCT)

6.2.2.1 Windows 11 IoT Enterprise 2024 LTSC

Microsoft multi-touch drivers are installed on the device during installation of Windows 11 IoT Enterprise 2024 LTSC. After successful installation, the device is immediately ready for operation.

6.2.2.2 Windows 10 IoT Enterprise 2021 LTSC

Microsoft multi-touch drivers are installed on the device during installation of Windows 10 IoT Enterprise 2021 LTSC. After successful installation, the device is immediately ready for operation.

6.2.2.3 Windows 10 IoT Enterprise 2019 LTSC

Microsoft multi-touch drivers are installed on the device during installation of Windows 10 IoT Enterprise 2019 LTSC. After successful installation, the device is immediately ready for operation.

6.2.2.4 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, the device is immediately ready for operation.

6.2.2.5 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, the device is immediately ready for operation.

6.2.2.6 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, the device is immediately ready for operation.

6.2.2.7 Windows 7 Professional / Ultimate

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

6.2.2.8 Windows Embedded Standard 7 Premium

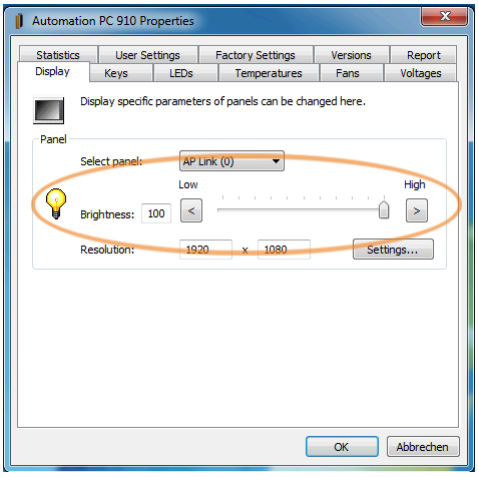
Microsoft multi-touch drivers are installed on the device during installation of Windows Embedded Standard 7 Premium. After successful installation, the device is immediately ready for operation.

6.3 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. In the DP receiver use case, the display brightness can be adjusted via the OSD menu.

6.3.1 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.



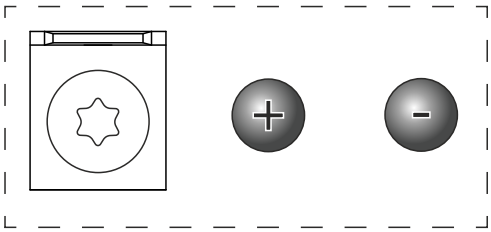
Information:

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.

6.3.2 Adjusting in DVI operation

1. Use the two brightness controls on the SDL/DVI receiver to set the brightness (for additional information, see "SDL/DVI receiver (5DLSDL.1001-00)" on page 52).



6.3.3 Adjusting in DP operation

Adjusting the display brightness is described in "Sets - Brightness setting" on page 51.

7 Software

7.1 Upgrade information

Warning!

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

7.1.1 Automation Panel firmware upgrade

With Firmware Upgrade (Automation Panel, SDL3 Converter, SLD4 converter), it is possible to update the firmware of several controllers (SDLR, SDL3R, SDL4R, SDL3 Converter, SDL4 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).

Automation Panels with a DisplayPort receiver can be updated with the Live Utils. For details, see the Live Utils user's manual.
The Live Utils user's manual can be downloaded from 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 11 IoT Enterprise 2024 LTSC
- Windows 10 IoT Enterprise 2021 LTSC
- Windows 10 IoT Enterprise 2019 LTSC
- 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
- Linux for B&R 12
- Linux for B&R 10
- Linux for B&R 9
- Linux for B&R 8

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 software

7.3.1 Licensing

B&R Automation Runtime software components (e.g. Automation Runtime, B&R Hypervisor, mapp Technology) require a license.

It is possible to choose between the following licensing types:

Technology Guarding (TG)

Technology Guarding is license protection used for individual software components. The Technology Guard (hardware dongle) serves as the license container; this is connected to an available USB interface on the target system.

Information:

Licensing via TG is required for Automation Studio V4.1 or later and Automation Runtime V4.08 or later. No TG is necessary in earlier versions.

Terms and conditions (TC)

No Technology Guard is necessary; licensing takes place via a license agreement. Licenses are supplied with the sales receipt. The user is responsible for complying with the license conditions. B&R is protected by the terms of the EULA.

Information:

Licensing via TC is possible for Automation Studio V4.9 or later as well as Automation Runtime V4.90 or later.

For detailed information about licensing, see Automation Help (**Automation software / Licensing**).

7.3.2 Order data

Hardware-based licensing (Technology Guard)

Order number	Short description	Figure
	Technology Guard	
0TG1000.01	Technology Guard (MSD)	
0TG1000.02	Technology Guard (HID)	
0TGF016.01	Technology Guard (MSD) with integrated flash drive, 16 GB (MLC)	
1TG4601.06-5	Automation Runtime Embedded TG license	
1TG4601.06-T	Automation Runtime Embedded Terminal TG license	
1TG4700.00	B&R Hypervisor	

Contract-based licensing (terms and conditions)

Order number	Short description	Figure
	Runtime	
1TC4601.06-5	License for Automation Runtime Embedded (TC). One license per target system is required. This license is supported starting with version 4.9.	
	Hypervisor	
1TC4700.00	License for B&R Hypervisor (TC). One license per target system is required. This license is supported starting with version 4.9.	

7.3.3 Automation Runtime

7.3.3.1 General information

The real-time operating system Automation Runtime is an integral part of Automation Studio. This real-time operating system forms the software core for running applications on a target system.

- Guarantees the highest possible performance of the hardware being 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 as well as 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.

7.3.3.2 Minimum versions

The following software versions (or higher) are required to operate Automation Runtime (ARemb and ARwin) 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:

Automation Runtime Embedded supports serial touch screens on Automation Panels only via SDL, SDL3 or SDL4 connection. External DVI connections are not supported.

Information:

For detailed information, see Automation Help or the B&R website (www.br-automation.com).

7.3.4 B&R Hypervisor

B&R Hypervisor allows multiple operating systems to operate simultaneously on a single device. The operating systems can communicate with each other via a virtual network.

Intelligent distribution of CPU resources

B&R Hypervisor allows Windows or Linux to run simultaneously with Automation Runtime. This makes it possible to combine a controller and HMI PC in one device. With B&R Hypervisor, an industrial PC can also be used as an edge controller. This serves as a controller and simultaneously transmits preprocessed data to higher-level systems in the cloud via OPC UA.

Virtual network

The hypervisor provides a virtual network connection that allows applications to exchange data between operating systems. Similar to an ordinary Ethernet interface, standard network protocols are used. In place of a cable, there is a reserved memory area that is not allocated to either operating system.

Maximum flexibility

The user configures the hypervisor and allocates hardware resources in the B&R Automation Studio software development environment. The system configurations are determined individually. This makes the assignment of resources to the respective operating system flexible. Whereas previous simultaneous solutions were tailored to a specific Windows version, B&R Hypervisor is completely independent of the version of the operating systems used.

Information:

For detailed information, see Automation Help or the B&R website (www.br-automation.com).

7.3.4.1 DP receiver in operation with B&R Hypervisor

When using the DP receiver in a B&R Hypervisor configuration, it is important to note that the assignment to an operating system is made via the USB interface of the connected B&R industrial PC in Automation Studio.[4)] All USB interfaces of the DisplayPort receiver, multi-touch panel and other additional devices are then assigned to the selected operating system.

7.3.5 mapp Technology

mapp Technology is revolutionizing the creation of machine and plant software. "mapps" are as easy to use as smartphone apps. Instead of programming user/role systems, alarm systems or the control of axes line by line, the machine software developer simply configures the finished mapps. Complex algorithms are easy to master. The programmer can concentrate fully on the machine process.

4) Automation Runtime / Method of operation / B&R Hypervisor / Installation and configuration / Configuration in Automation Studio / Adjusting the interface assignment

Information:

For detailed information, see Automation Help or the B&R website (www.br-automation.com).

7.4 Automation Device Interface (ADI)

The Automation Device Interface (ADI) allows access to specific functions of B&R devices in Windows and Linux.

7.4.1 ADI driver (Windows)

Information:

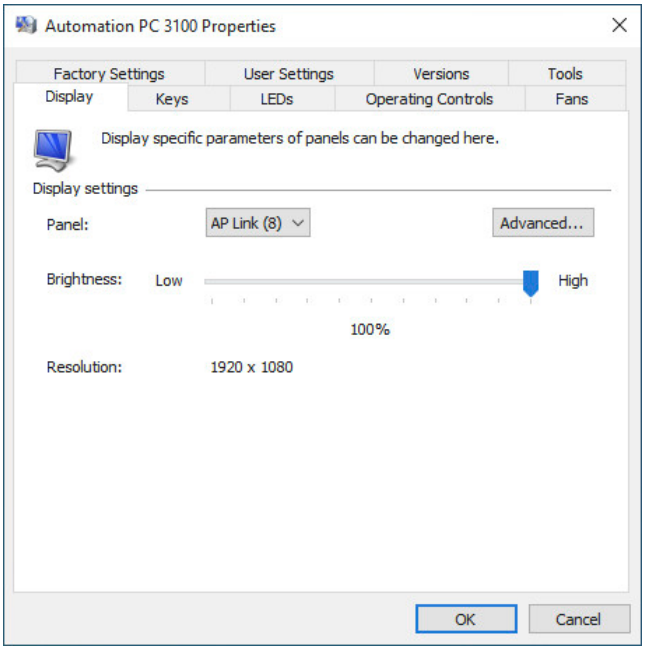
Basic functionalities and components of the ADI driver are explained below. For more detailed information, the ADI driver user's manual can be downloaded from the B&R website (www.br-automation.com).

7.4.1.1 Control Center

The Control Center is used to change and display settings for a B&R industrial PC and Automation Panels. It can be opened from the Control Panel or Start menu.

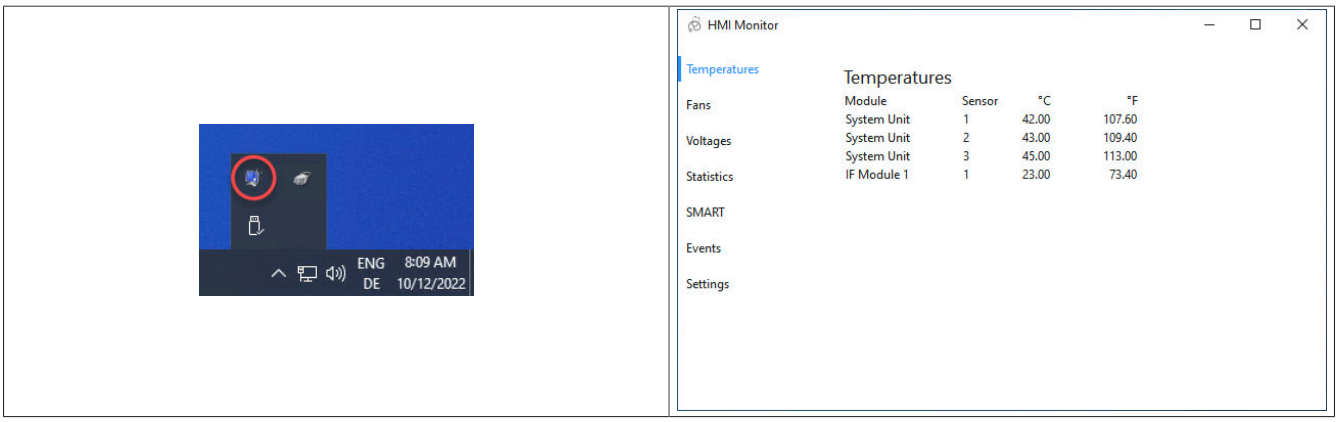
The following chapters describe the setting options in the Control Center tabs. Tabs:

- Display
- Keys
- LEDs
- Operating elements
- Fans
- Factory settings
- User settings
- Versions
- Tools



7.4.1.2 HMI Monitor

Allows display of fan, SMART, voltage, statistical and temperature values. HMI Monitor can be opened via a symbol in the taskbar or from the Start menu.



HMI Monitor displays alarms (e.g. temperature or SMART alarm), errors and warnings from the ADI System Service in the symbol in the notification area. The icon will be hidden after reinstallation, but it can be displayed using drag-and-drop or via the Windows settings.

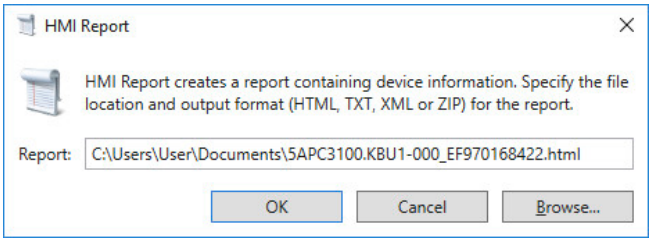
The icon can be disabled in the Windows Task Manager under tab Autostart.

The following menu options are available in HMI Monitor and described in more detail below:

- Temperatures
- Fans
- Voltages
- Statistics
- SMART
- Events
- Settings

7.4.1.3 HMI Report

HMI Report can be used to create a report with device-specific information. This report can then be used for support purposes or system documentation. The program is opened via the Start menu.



The following output formats are available:

- HTML Report (HTML) - Report in HTML format for display in the browser.
- Text Report (TXT) - Report in text format for display in the text editor.
- XML Report (XML) - Report in XML format for display in the browser.
- Diagnostic package (ZIP) - The diagnostic package contains a text report and log files for troubleshooting by B&R.

The following settings can also be made:

- **Report**:
  Specifies the storage location, filename and output format for the report. Alternatively, the file dialog box can be used with **Browse**.

Alternatively, the report can be created from the **command line** with the following command:

```
C:\Programme\BrAutomation\Adi\System\HmiReport\BnR.Hmi.Report.Cli.exe <Dateiname>
```

If no filename is specified, a text report is created with filename "<Material number>_<Serial number>.txt".

7.4.2 ADI Development Kit (Windows)

This software allows ADI functions to be accessed from Windows applications created with Microsoft Visual Studio, for example:

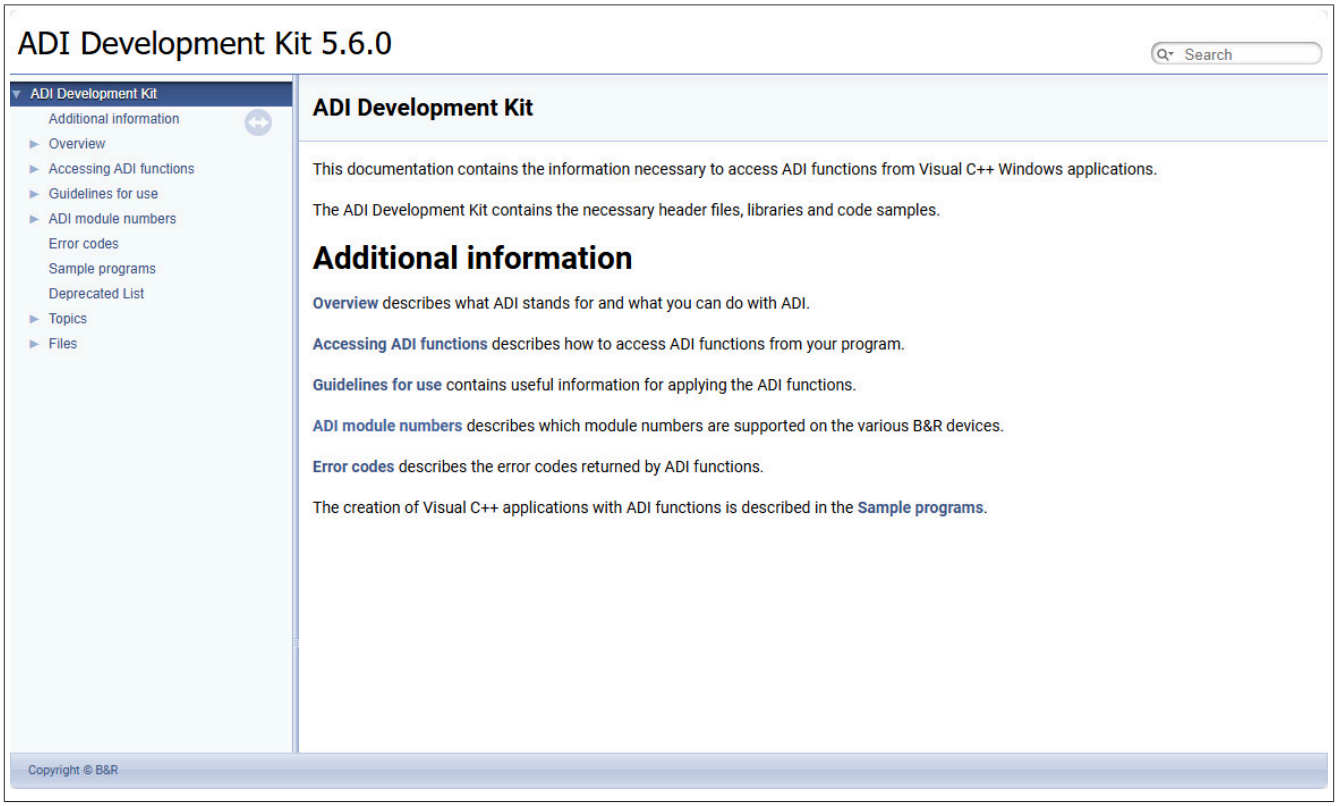


Figure 8: ADI Development Kit screenshots (version 3.10)

Features:

- Header files and import libraries
- Help files (in English)
- Example projects
- ADI DLL: For testing applications if no ADI driver is installed.

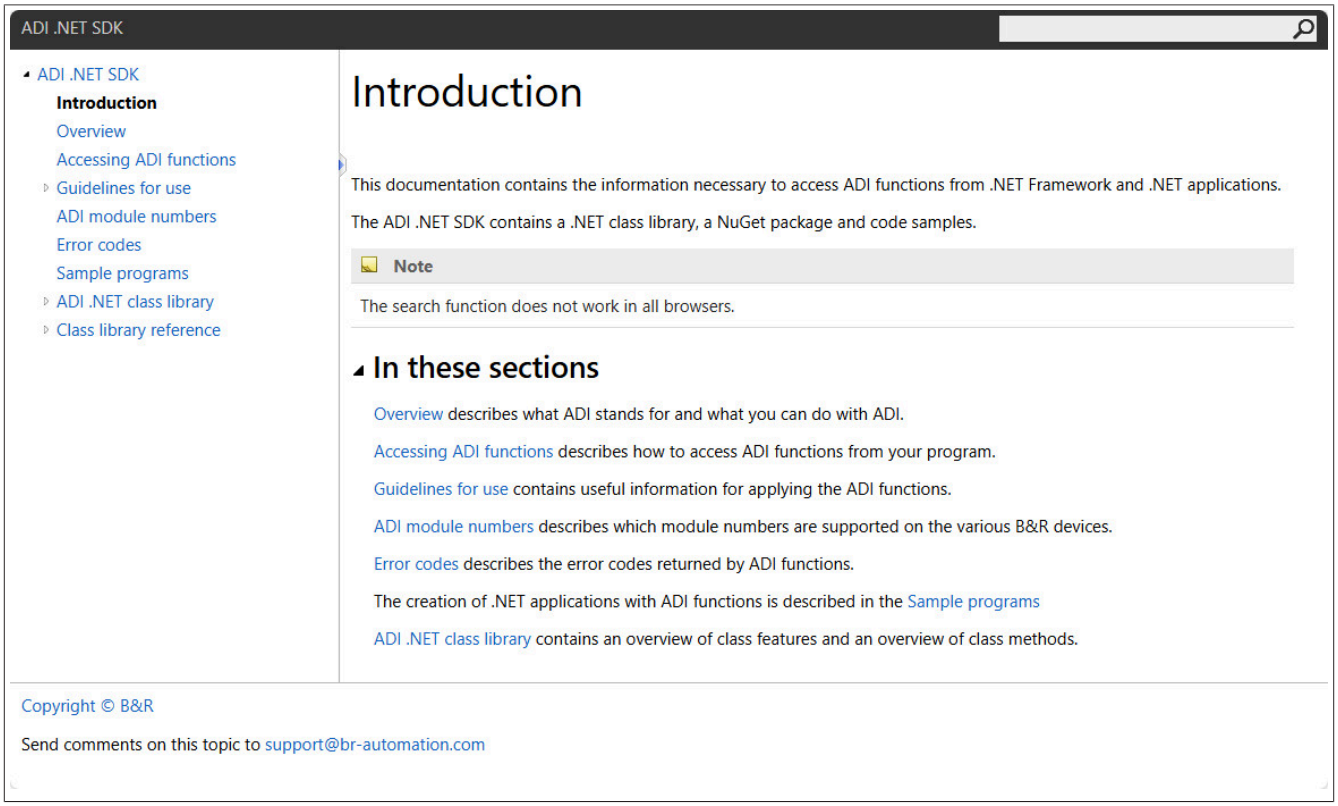
The appropriate ADI driver must be installed for the device. The ADI driver is already included in B&R images of embedded operating systems.

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

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

7.4.3 ADI .NET SDK (Windows)

This software allows ADI functions to be accessed from .NET applications created with Microsoft Visual Studio.



Features:

- ADI .NET class library
- Help files (in English)
- Example projects
- ADI DLL: For testing applications if no ADI driver is installed.

The appropriate ADI driver must be installed for the device. 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).

7.4.4 ADI OPC UA Server

This document contains technical information about B&R Automation Device Interface OPC UA Server (B&R ADI OPC UA Server).

The descriptions and figures refer to B&R ADI OPC UA Server version 2.0.0 and later.

ADI OPC UA Server provides the functions and information of the Automation Device Interface (ADI) as OPC UA variables. OPC UA stands for **O**pen **P**latform **C**ommunications **U**nified **A**rchitecture and is an international standard for secure, reliable, manufacturer- and platform-independent information exchange in industrial communication.

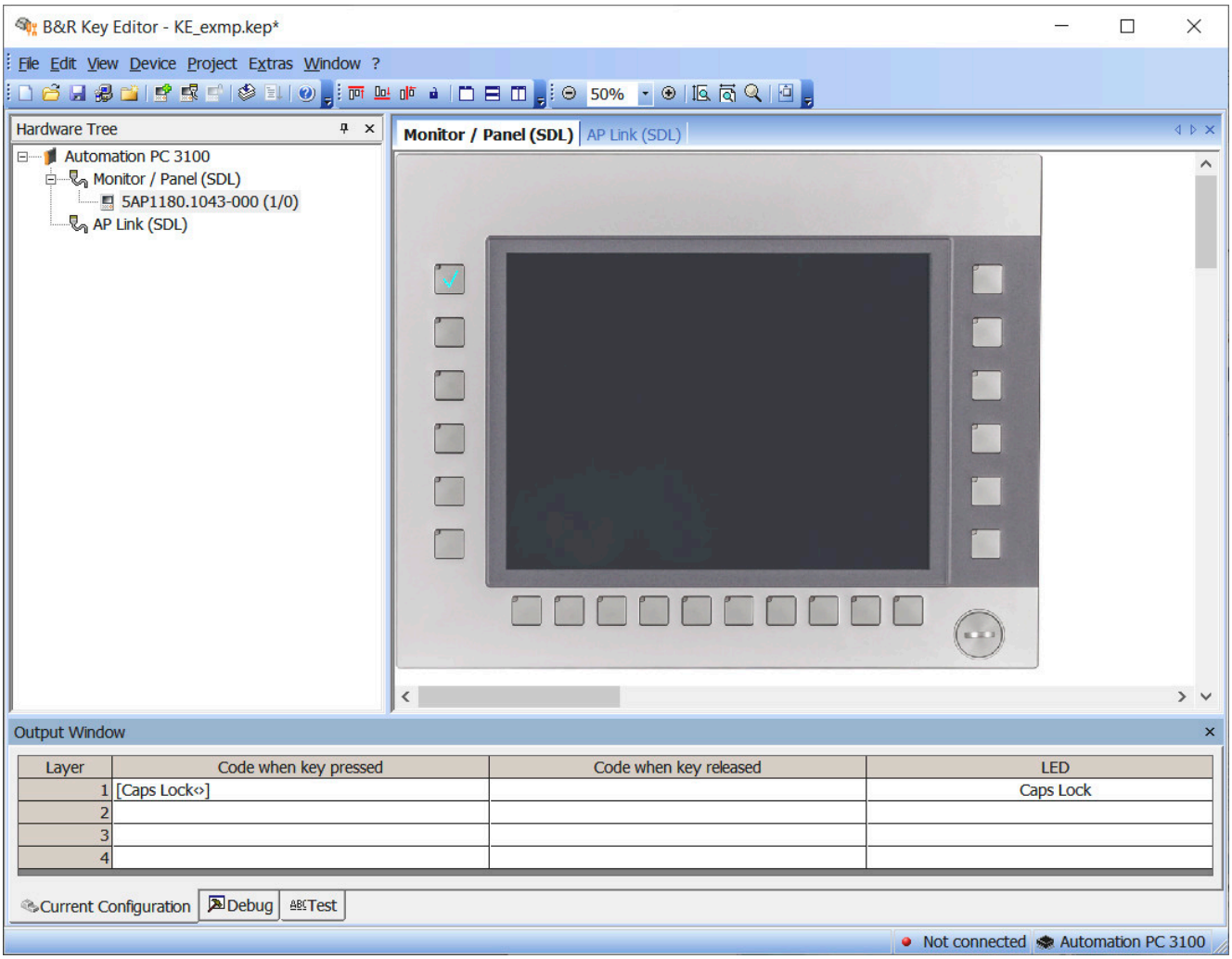
OPC UA is based on the client-server principle and, in the case of ADI OPC UA Server, enables temperatures and device information to be read from B&R devices, for example.

Additional information is available on the OPC Foundation (www.opcfoundation.org) website, for example.

The ADI OPC UA Server and user documentation can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

7.5 Key Editor

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



Features:

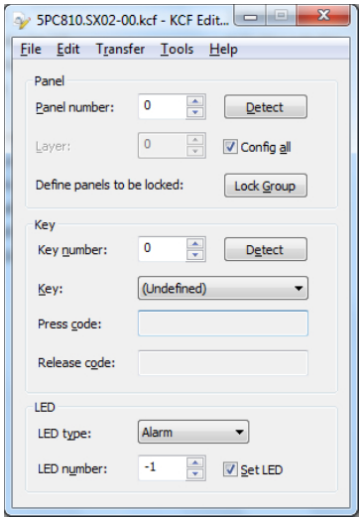
- Configuration of normal keys like on a keyboard (A, B, C, etc.)
- Keyboard shortcuts (CTRL+C, SHIFT+DEL, etc.) on one key
- Special key functions (change brightness, etc.)
- Assignment of LED functions (HDD access, power, etc.)
- 4 assignments possible per key (using layers)
- Configuration of the 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 Key Editor. The Key Editor and help documentation can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

7.6 KCF Editor

The KCF Editor can be used as a simple alternative to the Key Editor. It can also be used to adapt function keys and LEDs to the application software. In contrast to the Key Editor, operation does not take place using a graphical representation of the device, but via a simple Windows dialog box. The KCF Editor can therefore also be used for devices that are not yet supported in the Key Editor. The 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.



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)

If the KCF Editor is running on the target device and the ADI driver is installed, the following additional features are available:

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

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

7.7 HMI Service Center

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.

Up to version 2.0.0, the HMI Service Center was a paid product and could be ordered with material number 5SWUTI.0001-000. The HMI Service Center was delivered preinstalled on a USB flash drive.

Since version 3.0.0, the HMI Service Center is available as a download at no cost and can be installed on any USB flash drive with the HMI Service Center Maintenance tool.

For more detailed information, the HMI Service Center user's manual can be downloaded from the B&R website (https://www.br-automation.com).

7.7.1 Order data

Order number	Short description	Figure
	Accessories	
5SWUTI.0001-000	HMI Service Center USB flash drive - Hardware diagnostic software - For APC910/PPC900 - For PPC1200 - For APC2100/PPC2100 - For APC2200/PPC2200 - For APC3100/PPC3100 - For APC mobile - For AP800/AP900 - For AP9x3/AP9xD - For AP1000/AP5000	

The following limitations regarding supported hardware revisions must be observed:

Devices	Starting with D0	Up to E0	Starting with E0
Automation Panel 1000	•		
Automation Panel 5000	•		
Automation PC 3100	•		
Automation PC 3100 mobile			•
Automation PC 2200	•		
Automation PC 810		•	
Automation PC 511		•	
Automation PC 510		•	
Panel PC 3100	•		
Panel PC 2200	•		
Panel PC 1200			•
Panel PC 800		•	
Power Panel 500		•	

8 Maintenance

The following chapter describes maintenance work that can be carried out by qualified and trained end users themselves.

Information:

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

8.1 Cleaning

Danger!

In order to prevent unintentional operation (by touching the touch screen or keys), the device is only permitted to be cleaned when the power is switched off.

- Use a cloth moistened with dishwashing detergent, screen cleaner or alcohol (ethanol) to clean the device.
- The cleaning agent is not permitted to be applied directly to the device.
  Abrasive cleaners, aggressive solvents and chemicals, compressed air or steam cleaners are not permitted to be used.
- When cleaning, areas with adhesive labels and product information should be left out to avoid damage.

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 Measures to maintain backlight service life

- The display brightness can be set to the lowest level that is comfortable for the user's eyes.
- Bright images should be avoided as far as possible.
- A 50% reduction in brightness can increase the half-brightness time by about 50%.

8.2.1.2 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?

- Continuous switching 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 Information about display properties

The following limitations result from the current state of the technology and do not constitute any claims or warranty.

Pixel errors:

Displays can contain faulty pixels (pixel errors) due to the manufacturing process.

Color variation:

Displays can display colors or color ranges differently due to the manufacturing process, the properties of the components used, environmental influences and aging. This cannot be completely ruled out even with two similar devices of the same revision.

8.4 Repairs/Complaints and replacement parts

Danger!

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

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

9 Accessories

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 an accessory is used.

The following accessories have undergone functional testing by B&R in connection with the device used and approved for operation. B&R cannot assume any functional warranty for accessories that have not been approved.

9.1 General information

The following products can be used in the event of loss or for conversion or retrofitting.

9.1.1 Order data

Material number	Description
5ACCRHMI.0000-000	HMI grounding clip
5ACCRHMI.0001-000	Retaining clips 16 mm - 14 pcs. with 16 mm setscrews - For AP1000 and AP9x3
5ACCRHMI.0002-000	Retaining clips 20 mm - 14 pcs. with 20 mm setscrews - For AP1000 and AP9x3
5ACCRHMI.0003-000	Retaining clips 25 mm - 12 pcs. with 25 mm setscrews - For AP1000 and AP9x3

9.2 Installation accessories

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

- Consisting of:

  5ACCRHMI.0006-000

  - 1x torque screwdriver: 0.4 to 2.0 Nm
  - 1x bit set (5 pieces): Hex recess (2.5 mm, 3.0 mm, 5.0 mm), Torx (T10, T20)

9.2.1 Order data

Order number	Short description	Figure
	Miscellaneous	
5ACCRHMI.0006-000	HMI installation tool for control cabinet - 1x torque wrench 0.4 - 2.0 Nm - 1x hex head bit 2.5, length 89 mm - 1x hex head bit 3.0, length 89 mm - 1x hex head bit 5.0, length 89 mm - 1x Torx 10 bit, length 90 mm - 1x Torx 20 bit, length 89 mm	

9.3 Clamping blocks

9.3.1 5AC900.BLOC-00

9.3.1.1 General information

These replacement clamping blocks are used for mounting B&R panel devices.

9.3.1.2 Order data

Order number	Short description	Figure
	Accessories	
5AC900.BLOC-00	Terminal block with brackets, 10 pcs.; replacement part	

Table 60: 5AC900.BLOC-00 - Order data

9.3.2 5AC900.BLOC-01

9.3.2.1 General information

These replacement clamping blocks are used for mounting B&R panel devices.

9.3.2.2 Order data

Order number	Short description	Figure
	Accessories	
5AC900.BLOC-01	Clamping block without brackets, 10 pcs.; replacement part	

Table 61: 5AC900.BLOC-01 - Order data

9.4 Terminal block power supply

9.4.1 0TB103.9x

9.4.1.1 General information

One-row 3-pin terminal block 0TB103.9x is used for the power supply.

9.4.1.2 Order data

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

9.4.1.3 Technical data

Order number	0TB103.9	0TB103.91
General information		
Certifications		
CE	Yes	
UKCA	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	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck) [2]	
CCS	Yes	
LR	ENV3	
KR	Yes	
ABS	Yes	
BV	**EC31B** Temperature: 5 - 55°C Vibration: 0.7 g EMC: Bridge and open deck	
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!)	
Pitch	5.08 mm	
Connection cross section		
AWG wire	26 to 14 AWG	26 to 12 AWG
Wire end sleeves with plastic covering	0.20 to 1.50 mm²	
Single-wire	0.20 to 2.50 mm²	
Fine-stranded wires	0.20 to 1.50 mm²	0.20 to 2.50 mm²
With wire end sleeve	0.20 to 1.50 mm²	
Tightening torque	0.4 Nm	-
Electrical properties		
Nominal voltage	150 V	
Nominal current [4]	13 A / contact	15 A / contact
Contact resistance	≤5 mΩ	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	

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 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!

9.5 Cables

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

9.6 USB mass storage device

For additional information about compatible USB mass storage devices, see the B&R website (USB mass storage devices).

9.7 Line filter

9.7.1 5AC804.MFLT-00

9.7.1.1 General information

Line filter 5AC804.MFLT-00 may be necessary to meet maritime requirements regarding conducted interference emissions in power supply line per DNV.

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.

9.7.1.2 Order data

Order number	Short description	Figure
	Accessories	
5AC804.MFLT-00	Line filter	

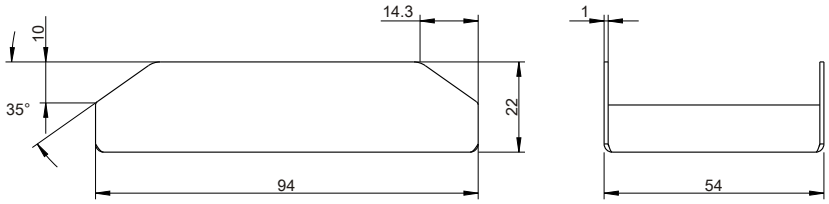
9.7.1.3 Technical data

Order number	5AC804.MFLT-00
General information	
Certifications	
CE	Yes
UKCA	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	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck) [2]
CCS	Yes
LR	ENV3
KR	Yes
ABS	Yes
BV	**EC31B** Temperature: 5 - 55°C Vibration: 0.7 g EMC: Bridge and open deck
Terminal block	
Connection cross section	
With wire end sleeve	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

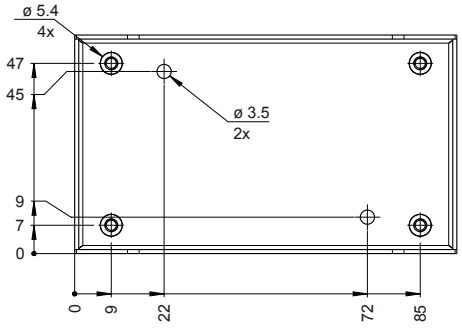
Order number	5AC804.MFLT-00
Dimensions	
Width	54 mm
Length	94 mm
Depth	32.15 mm
Weight	205 g

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 certificate for the product family.
3) IEC 61010-2-201 requirements must be observed.

9.7.1.4 Dimensions

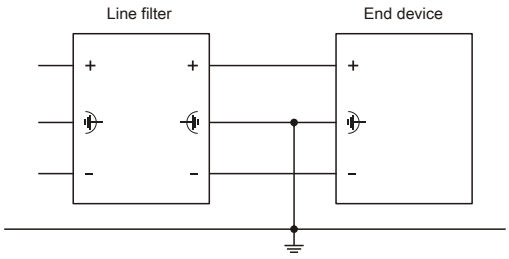


9.7.1.5 Drilling template



9.7.1.6 Connecting to the end device

The line filter must be connected between the power supply and the end device. The following figure shows a connection diagram.



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.

9.8 USB interface cover

9.8.1 5AC900.1201-00

9.8.1.1 General information

Flat front USB interface cover for the Automation Panel 1000 and Automation Panel 900.

9.8.1.2 Order data

Order number	Short description	Figure
	Accessories	
5AC900.1201-00	USB interface cover M20 IP65 flat	

Table 66: 5AC900.1201-00 - Order data

9.8.2 5AC900.1201-01

9.8.2.1 General information

Domed front USB interface cover with knurling and anti-loss strap for the Automation Panel 1000 and Automation Panel 900.

9.8.2.2 Order data

Order number	Short description	Figure
	Accessories	
5AC900.1201-01	USB interface cover M20 IP65 curved	

Table 67: 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 EMC Directive

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

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 (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, then the complete system will also not receive certification.

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 industrial environments.

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 simplifies the certification of your machines and systems in this economic area.

Underwriters Laboratories (UL) per standard UL 508, or
Underwriters Laboratories (UL) per standards UL 61010-1 and UL 61010-2-201

Canadian (CSA) standard per C22.2 no. 142-M1987, or
Canadian (CSA) standard per C22.2 No. 61010-1-12 and CSA C22.2 No. 61010-2-201:14

For additional information, see UL Product iQ Database.

The device is classified as "open type" for use in the area of "Industrial control equipment" sector per cULus. The device must therefore be installed in a UL 508-compliant protective housing as a requirement for certification or operation per cULus.

10.2.1.1 UL requirements

Caution!

- **The external circuits to be connected to this device must be separated from the MAINS supply or hazardous live voltage by reinforced or double insulation and meet the requirements of a SELV/PELV (Class III) circuit per UL/CSA/IEC 61010-1 and 61010-2-201.**
- **The final safety enclosure in which the module is installed must have adequate rigidity (per UL 61010-1 and UL 61010-2-201) and meet fire propagation requirements.**
- **Minimum temperature rating of the cables to be connected to the field wiring terminals: 90°C, AWG (Sol. / Str.) 22-12 / 22-12 (power supply). Use copper conductors only.**

Attention !

- **Les circuits externes à connecter à cet appareil doivent être séparés de l'alimentation secteur ou de la tension dangereuse par une isolation renforcée ou double et répondre aux exigences d'un circuit TBTS/TBTP (classe III) selon UL/CSA/IEC 61010-1 et 61010-2-201.**
- **L'enceinte de sécurité finale dans laquelle le module est installé doit être suffisamment rigide (conformément aux normes UL 61010-1 et UL 61010-2-201) et répondre aux exigences relative à la propagation du feu.**
- **Classe de température minimale des câbles à connecter aux borniers de raccordement 90°C, AWG (Sol. / Str.) 22-12 / 22-12 (alimentation). Utiliser uniquement des conducteurs en cuivre.**

The following instructions must be followed in order to install the device in accordance with UL/CSA standards.

Information:

- **The protection provided by the equipment may be impaired if the equipment is not used as specified.**

Operating conditions:

10.2.2 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).

10.2.3 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 simplifies the certification of your machines and systems in this economic area (based on EU conformity).

10.2.4 DNV certification

Products with this certification are certified by the classification society DNV and suitable for the maritime sector. DNV certificates (type approvals) are generally accepted by other classification societies during ship acceptance procedures.
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.

DNV certificates with specifications for permissible environmental conditions as well as a list of revisions from which the DNV type certification applies to individual devices are available on the B&R website (Downloads > Certificates > Maritime).

Information:

Line filter 5AC804.MFLT-00 in the power supply line is mandatory for use in the maritime sector. For additional information, see section "Connecting to the end device" on page 159.

10.2.5 American Bureau of Shipping (ABS)

Products with this certification are suitable for use in the maritime sector according to the regulations of the classification society American Bureau of Shipping (ABS Rules).

Certificates with specifications for permissible environmental conditions as well as a list of revisions from which the certification applies to individual devices are available on the B&R website (Downloads > Certificates > Maritime).

Information:

The line filter 5AC804.MFLT-00 in the power supply line is mandatory for use in the maritime environment. For additional information, see section "Connecting to the end device" on page 159.

10.2.6 Bureau Veritas (BV)

Products with this certification are suitable for use in the maritime sector according to the regulations of the classification society Bureau Veritas (BV).

Certificates with specifications for permissible environmental conditions as well as a list of revisions from which the certification applies to individual devices are available on the B&R website (Downloads > Certificates > Maritime).

Information:

The line filter 5AC804.MFLT-00 in the power supply line is mandatory for use in the maritime environment. For additional information, see section "Connecting to the end device" on page 159.

10.2.7 Lloyd's Register (LR)

Products with this certification are suitable for use in the maritime sector according to the regulations of the classification society Lloyd's Register (LR).

Certificates with specifications for permissible environmental conditions as well as a list of revisions from which the certification applies to individual devices are available on the B&R website (Downloads > Certificates > Maritime).

Information:

The line filter 5AC804.MFLT-00 in the power supply line is mandatory for use in the maritime environment. For additional information, see section "Connecting to the end device" on page 159.

10.2.8 China Classification Society (CCS)

Products with this certification are suitable for use in the maritime sector according to the regulations of the classification society China Classification Society (CCS).

Certificates with specifications for permissible environmental conditions as well as a list of revisions from which the certification applies to individual devices are available on the B&R website (Downloads > Certificates > Maritime).

Information:

The line filter 5AC804.MFLT-00 in the power supply line is mandatory for use in the maritime environment. For additional information, see section "Connecting to the end device" on page 159.

10.2.9 Korean Register of Shipping (KR)

Products with this certification are suitable for use in the maritime sector according to the regulations of the classification society Korean Register of Shipping (KR).

Certificates with specifications for permissible environmental conditions are available on the B&R website (Downloads > Certificates > Maritime).

Information:

The line filter 5AC804.MFLT-00 in the power supply line is mandatory for use in the maritime environment. For additional information, see section "Connecting to the end device" on page 159.

10.2.10 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 simplifies 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

For additional information, see UL Product iQ Database.

Ind. Cont. Eq.
for Haz.Loc.
Cl. I, Div. 2,
Groups ABCD
E180196 (T4)

10.2.10.1 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.

10.2.10.2 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. Operation in any other way jeopardizes the safety and functionality of the devices and the 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 40.

Max. ambient temperatures deviating from the specifications in chapter "Maximum ambient temperature during operation" on page 40 must be observed for the following products for UL HazLoc-compliant operation.
If additional derating is required due to other factors (e.g. the individual components used), the calculation must be based on the values specified below.

Unless otherwise specified, all of the following information specifications refer to operation with link module 5DLSDL.1001-00 or 5DLSD3.1001-00.

Order number	Max. ambient temperature UL HazLoc
5AP1120.0573-000	55°C
5AP1151.0573-000	55°C
5AP1120.0702-000	55°C
5AP1130.0702-000	55°C
5AP1120.1043-000	55°C
5AP1180.1043-000	55°C
5AP1181.1043-000	55°C
5AP1182.1043-000	55°C
5AP1120.1214-000	55°C
5AP1120.121E-000	55°C
5AP1130.121E-000	55°C
5AP1120.1505-000	55°C
5AP1180.1505-000	55°C
5AP1181.1505-000	55°C
5AP1120.156B-000[1)]	55°C
5AP1120.1906-000	55°C

1) Only for operation with 5DLSDL.1001-00.

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.

10.2.10.3 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!

Risk of explosion: 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!

Risk of explosion: 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.

10.2.10.4 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 supply unit 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!

10.2.10.5 USB connection with the Automation Panel 1000

10.2.10.5.1 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!

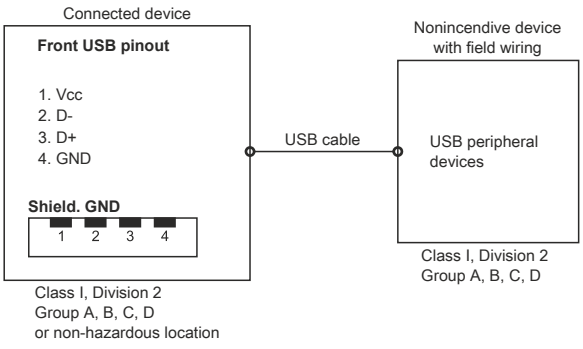
RISK OF EXPLOSION

- **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 that are installed in potentially explosive atmospheres, at least one of the following conditions must be met:**
  - **A suitable switch installed outside the hazardous area is used.**
  - **A switch certified according to the hazardous location class and division for** tube use **is 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!

10.2.10.5.2 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 68: 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 69: 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.

10.2.10.6 USB connection with the SDL or SDL3 link module

10.2.10.6.1 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!

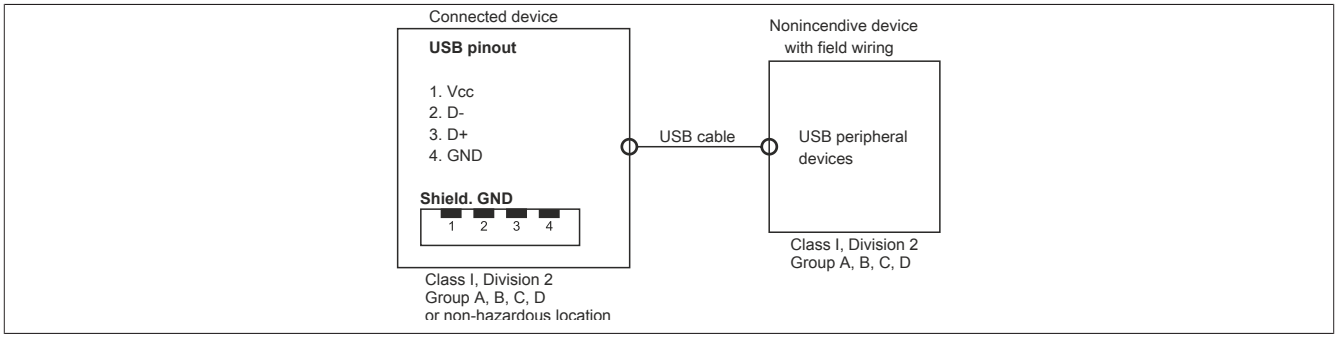
RISK OF EXPLOSION

- **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 that are installed in potentially explosive atmospheres, at least one of the following conditions must be met:**
  - **A suitable switch installed outside the hazardous area is used.**
  - **A switch certified according to the hazardous location class and division for** tube use **is 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!

10.2.10.6.2 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 70: 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 71: 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

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 has to 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)

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.

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.

Israel:
Ministry of Communications

מספר אישור התאמה אלחוטי של משרד התקשורת הוא 51-80526
.אסור להחליף את האנטנה המקורית של המכשיר ולא לעשות בו כל שינוי טכני אחר

México:
Instituto Federal de Telecomunicaciones (IFETEL)

La operación de este equipo está sujeta a las siguientes dos condiciones: (1) es posible que este equipo o dispositivo no cause interferencia perjudicial y (2) este equipo o dispositivo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

China
CMIIT

微功率设备应当在其产品使用说明（含电子显示的说明书）中注明以下内容：
（第一条和第八条需要具体说明，二至七条直接复制即可）
使用微功率短距离无线电发射设备应当符合国家无线电管理有关规定。
（一）符合“微功率短距离无线电发射设备目录和技术要求”的具体条款和使用场景，
采用的天线类型和性能，控制、调整及开关等使用方法；
具体条款：
C类设备：
（1）使用频率：13553-13567kHz
（2）10 米处磁场强度：不大于 42dBμA/m（准峰值检波）
（3）频率容限：100×10-6。
（4）特殊频带辐射发射：对于 13553-13567kHz 频段设备，频段两端偏移 140kHz 频率范
范围的 10 米处磁场强度不大于 9dBμA/m（准峰值检波）。
使用场景：工业
天线类型：印刷线路板
天线性能：0 dBi
控制、调整及开关产品的使用方法：不适用
（二）不得擅自改变使用场景或使用条件、扩大发射频率范围、加大发射功率（包括额 外加装射频功率放大器），不得擅自更改发射天线；
（三）不得对其他合法的无线电台（站）产生有害干扰，也不得提出免受有害干扰保护； （四）应当承受辐射射频能量的工业、科学及医疗（ISM）应用设备的干扰或其他合法 的无线电台（站）干扰；
（五）如对其他合法的无线电台（站）产生有害干扰时，应立即停止使用，并采取措施 消除干扰后方可继续使用；
（六）在航空器内和依据法律法规、国家有关规定、标准划设的射电天文台、气象雷达 站、卫星地球站（含测控、测距、接收、导航站）等军民用无线电台（站）、机场等的电磁 环境保护区域内使用微功率设备，应当遵守电磁环境保护及相关行业主管部门的规定；
（七）禁止在以机场跑道中心点为圆心、半径 5000 米的区域内使用各类模型遥控器；
（八）微功率设备使用时温度和电压的环境条件。
产品使用时的温度：0°C - 55°C
产品使用时的电压：5VDC

Taiwan:
根據NCC低功率電波輻射性電機管理辦法 規定:

第十二條: 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。
第十四條: 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。 前項合法通信，指依電信法規定作業之無線電通信。 低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。
此模組於取得認證後將依規定於模組本體標示審驗合格標籤，並要求平台廠商於平台上標示『內含發射器模組:

RFM-2-NF	RFM-3-BTW
CCAM19LP1280T1	CCAM19LP1270T1

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

It is necessary to separate the different materials so that the devices can be fed into an environmentally friendly recycling process.

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.

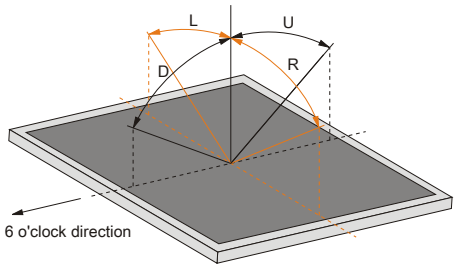
Appendix A Abbreviations

Abbreviations used in the document are explained here.

Abbreviation	Stands for	Description
NC	Normally closed	Stands for normally closed contact for a relay contact.
	Not connected	Used in the description of pinouts 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 normally open contact for a 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.
B_{10D}	-	Number of cycles until 10% of the components fail dangerously (per channel).
MTBF	Mean time between failures	The expected value of the operating time between two consecutive failures.
$MTTF_D$	Mean time to dangerous failure	Mean time to dangerous failure (per channel).
DC	Diagnostic coverage	Degree of diagnostic coverage
PL	Performance level	Discrete level specifying the ability of safety-related devices to perform a safety function under foreseeable conditions.
PFH	Probability of failure per hour	Probability of a failure per hour.
SIL	Safety integrity level	Safety integrity level

Appendix B Viewing angles

For viewing angle specifications (R, L, U, D) of the display types, see the technical data of the individual components.



Appendix C Chemical resistance

Single-touch panels are manufactured with the Autotex panel overlay.

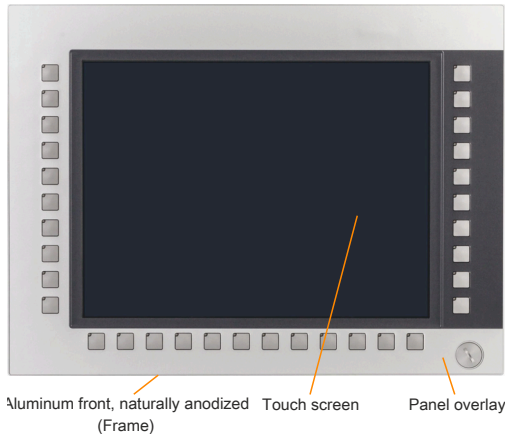


Figure 9: Single-touch panel with Autotex panel overlay, naturally anodized

The front of the following single-touch panels are coated:

- 5AP1120.101E-000
- 5AP1120.121E-000
- 5AP1120.156B-000

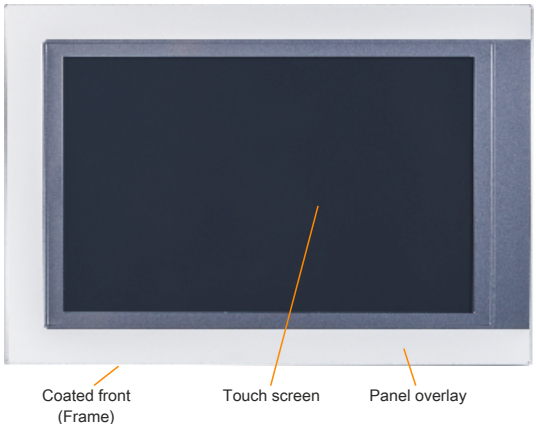


Figure 10: Single-touch panel with Autotex panel overlay, coated

The multi-touch panels are equipped with a continuous glass surface.

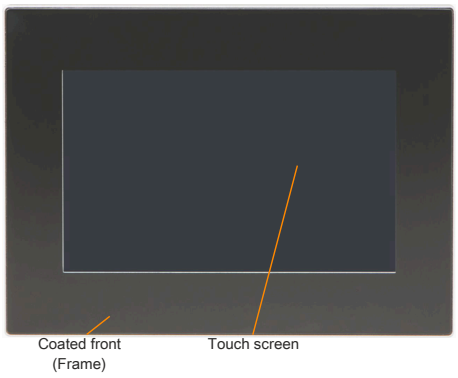


Figure 11: Multi-touch panel with glass surface

C.1 Autotex panel overlay (polyester)

Unless otherwise specified, the panel overlay is resistant to the following chemicals, materials and substances 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
- Butyl CELLOSOLVE (2-Butoxyethanol)
- Sodium hypochlorite <20%
- Cyclohexanol
- Cyclohexanone
- Decon
- Diacetone alcohol
- Dibutyl phthalate
- Diesel
- Diethyl ether
- Diethyl phthalate
- Dioxan
- Dowandol DRM/PM
- Iron II chloride ($FeCl_2$)
- Iron III chloride ($FeCl_3$)
- Acetic acid <50%
- Butyl acetate
- 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%
- Paraffin oil
- Phosphoric acid <30%
- Castor oil
- Nitric acid <10%
- Hydrochloric acid <36%
- Sea water
- Sulphuric acid <10%
- Silicon oil
- Tenside
- Turpentine oil substitute
- Toluene
- Triacetin
- Trichloracetic acid < 50%
- Trichloroethane
- Thinner (white spirit)
- Washing agents
- Water
- Hydrogen peroxide <25%
- Fabric conditioner
- Xylene

Per DIN 42115 Part 2, the panel overlay is resistant to exposure to glacial acetic acid for less than one hour without visible damage.

C.2 Coated aluminum front

Unless otherwise specified, the coated aluminum front is resistant to the following chemicals, materials and substances 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%
- Gear oil
- 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

C.3 Touch screen

5-wire touch screen (single-touch)

Unless otherwise specified, the touch screen is resistant to the following chemicals, materials and substances 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

Capacitive touch screen (multi-touch)

Unless otherwise specified, the touch screen is resistant to the following chemicals, materials and substances 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

Appendix D 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

D.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 181.

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				-

Diagonal	Format		PP100/200	PP300/400	PP500	AP900	AP1000[1)]	PPC700	PPC800
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	
	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.

D.2 Compatibility details

D.2.1 Example

The dimensions (mm) in the subsequent figures have the following meaning.

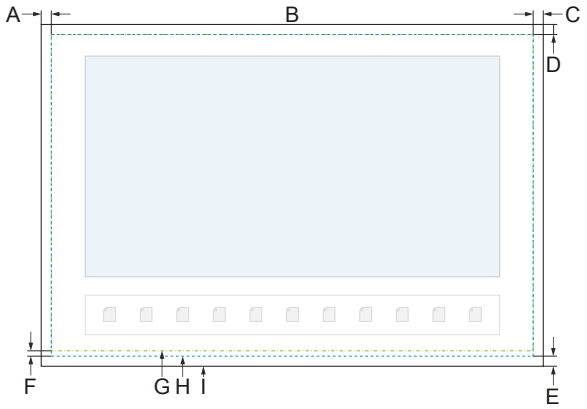
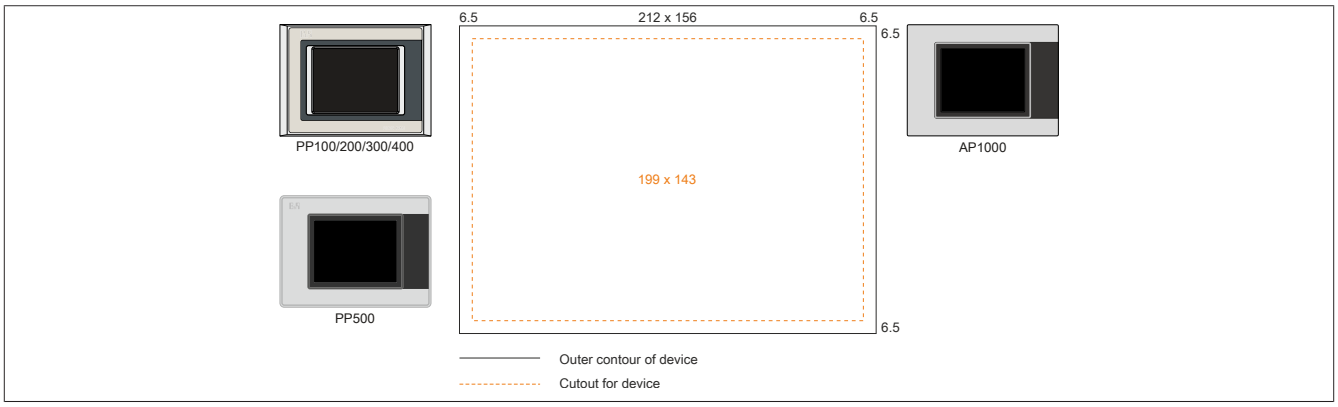


Diagram legend			
A	Spacing (left) to device edge	F	Difference value
B	Outer dimensions	G	Installation dimensions/Cutout for PP100/200/300/400 device
C	Spacing (right) to device edge	H	Installation dimensions/Cutout AP900/PP500/PPC700 device
D	Spacing (top) to device edge	I	Outer contour of device
E	Spacing (bottom) to device edge		

D.2.2 5.7" devices

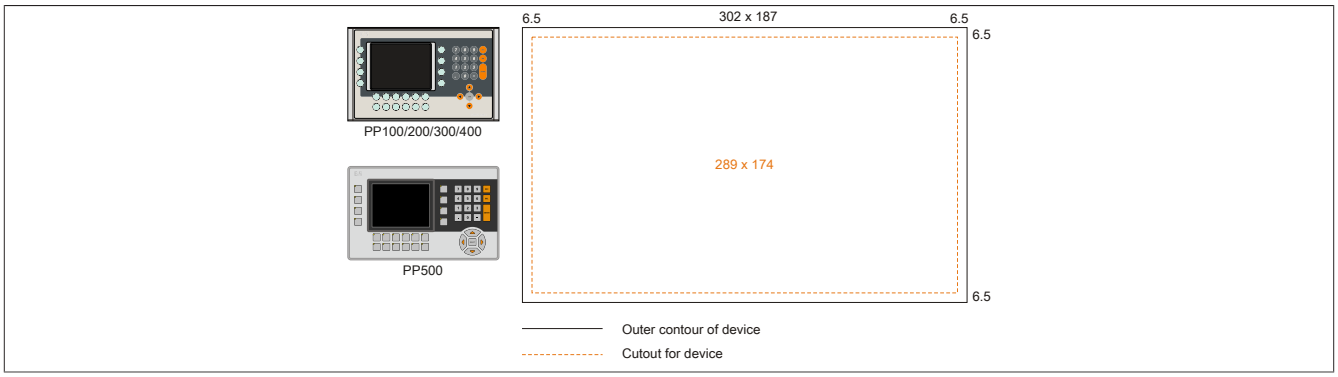
The cutout tolerance for the PP100/200, PP300/400, PP500, AP900, PPC700 and PPC800 is ±0.5 mm.
The cutout tolerance for the AP1000 is +0 mm / -0.5 mm.

Installation compatibility - 5.7" devices - Landscape1



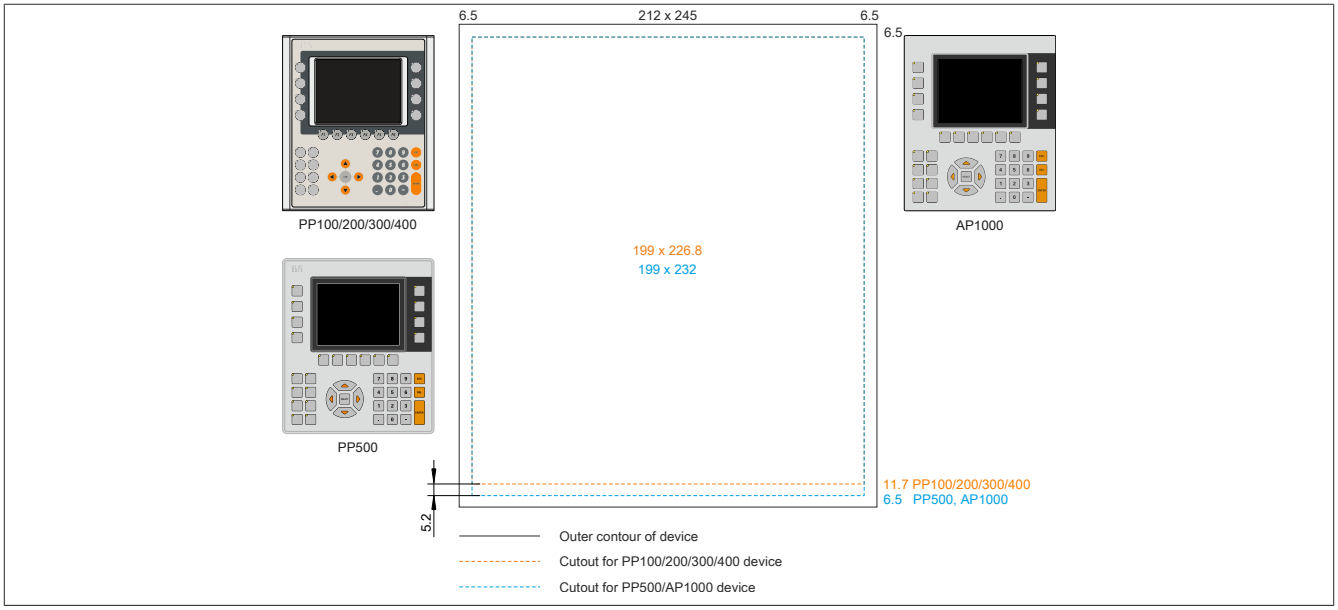
The 5.7" Automation Panel 1000, Power Panel 500, Power Panel 300/400 and Power Panel 100/200 devices in Landscape1 format are 100% compatible.

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.

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).

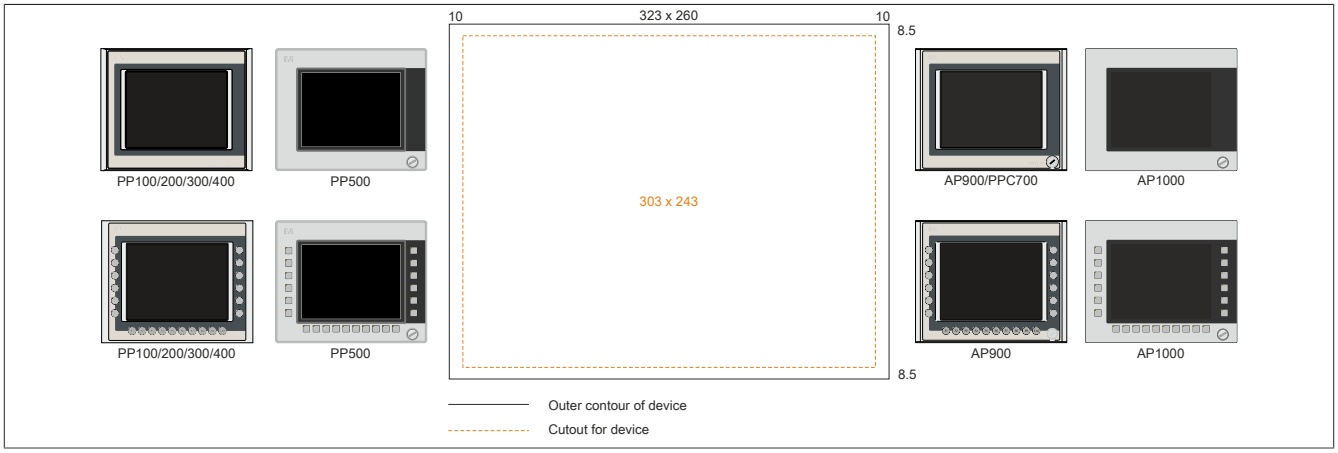
The larger cutout can be used conditionally for all devices:

- 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).

D.2.3 10.4" devices

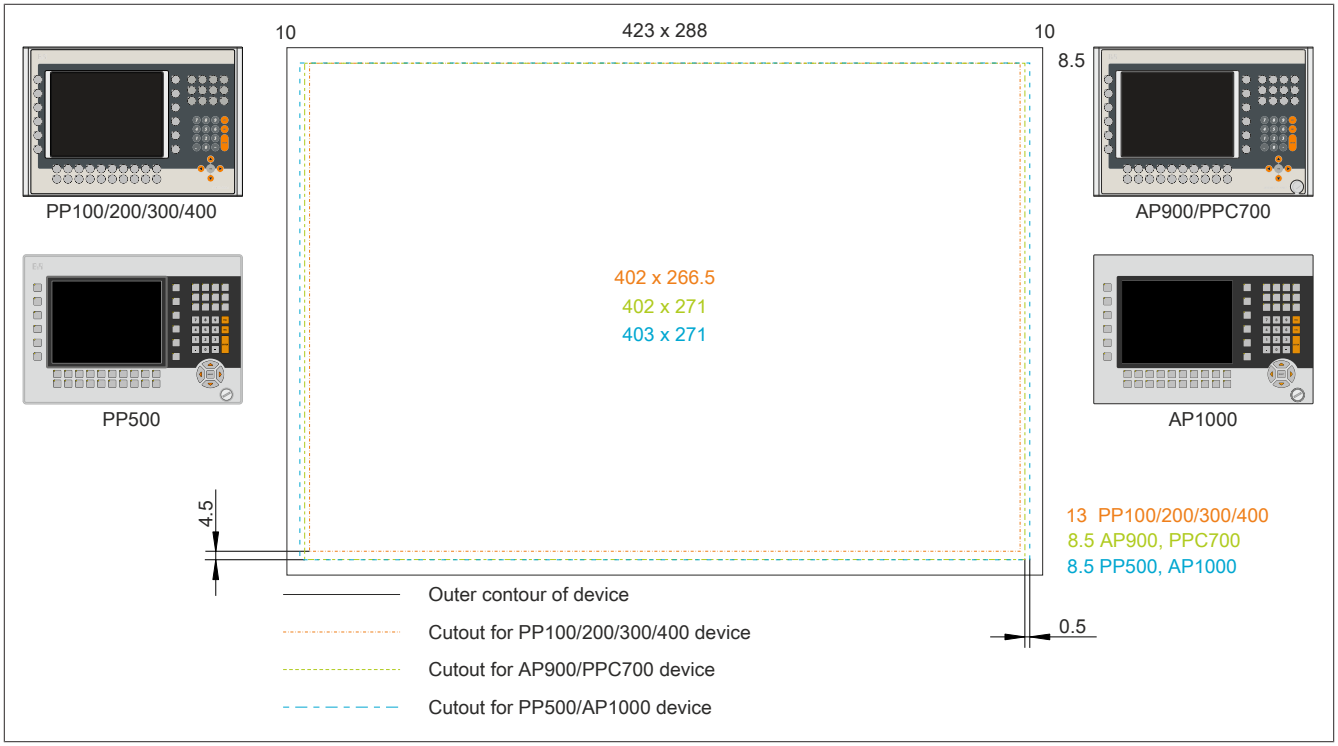
The cutout tolerance for the PP100/200, PP300/400, PP500, AP900, PPC700 and PPC800 is ±0.5 mm. The cutout tolerance for the AP1000 is +0 mm / -0.5 mm.

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.

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).

Installation compatibility - 10.4" devices - Portrait1

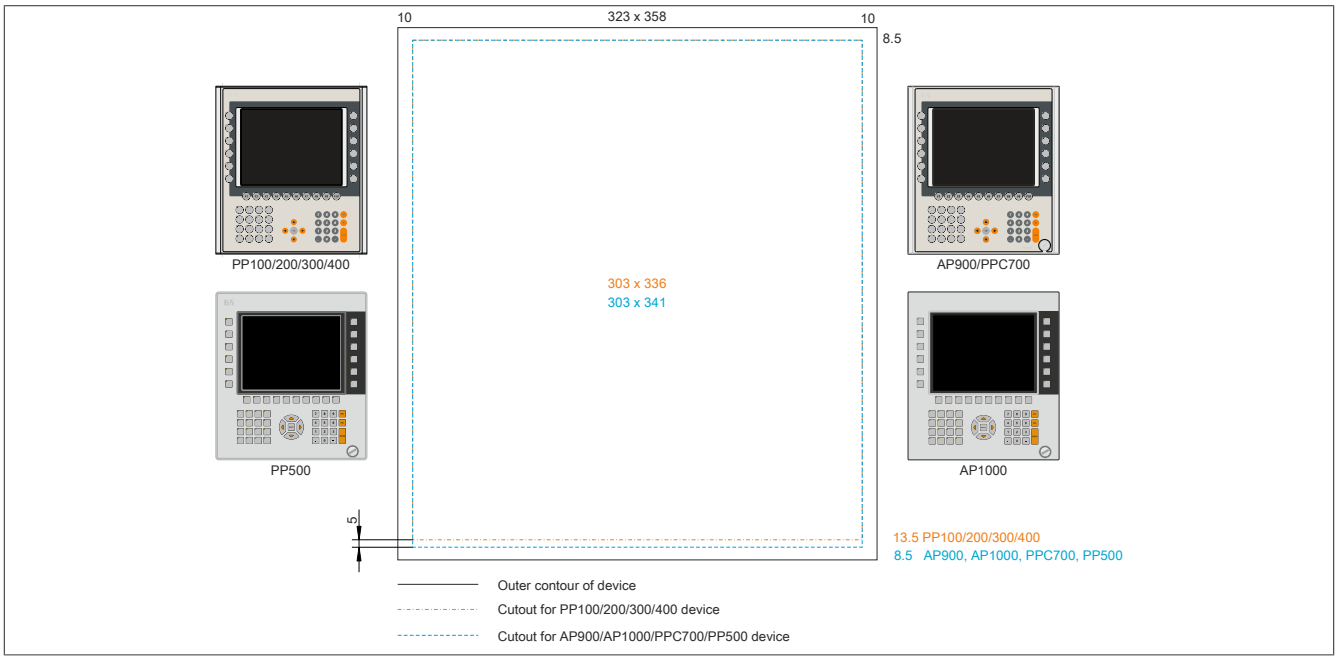


Figure 12: Installation compatibility - 10.4" devices - Portrait1

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).

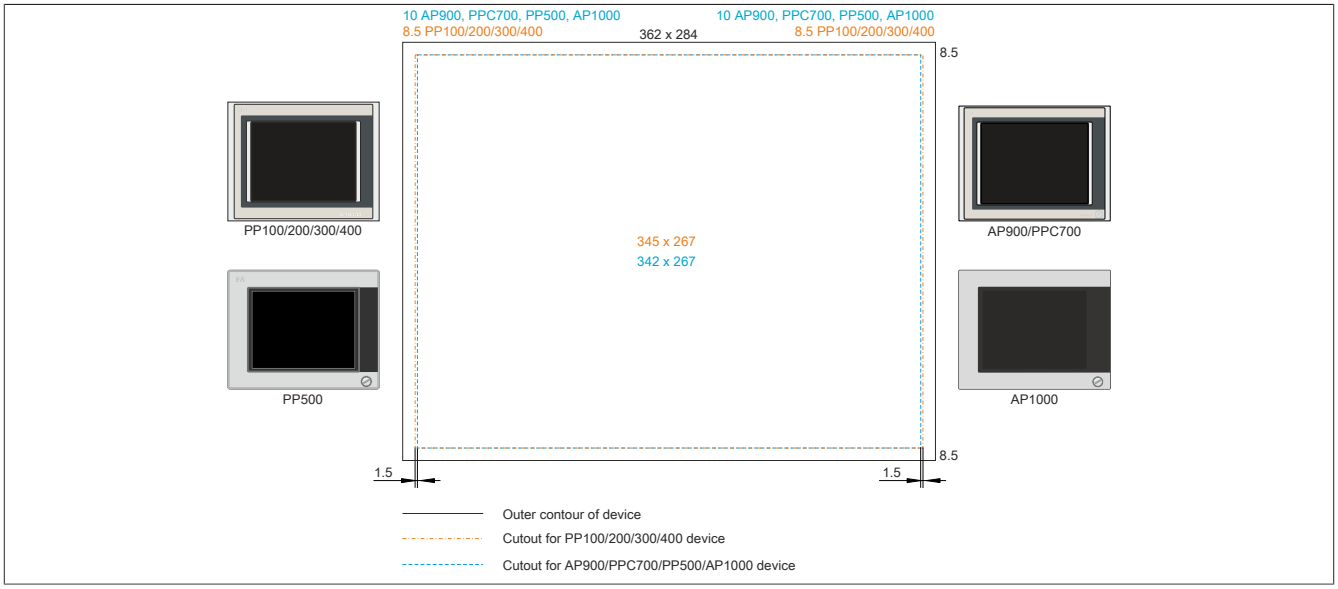
The larger cutout can be used conditionally for all devices:

- 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).

D.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.

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).

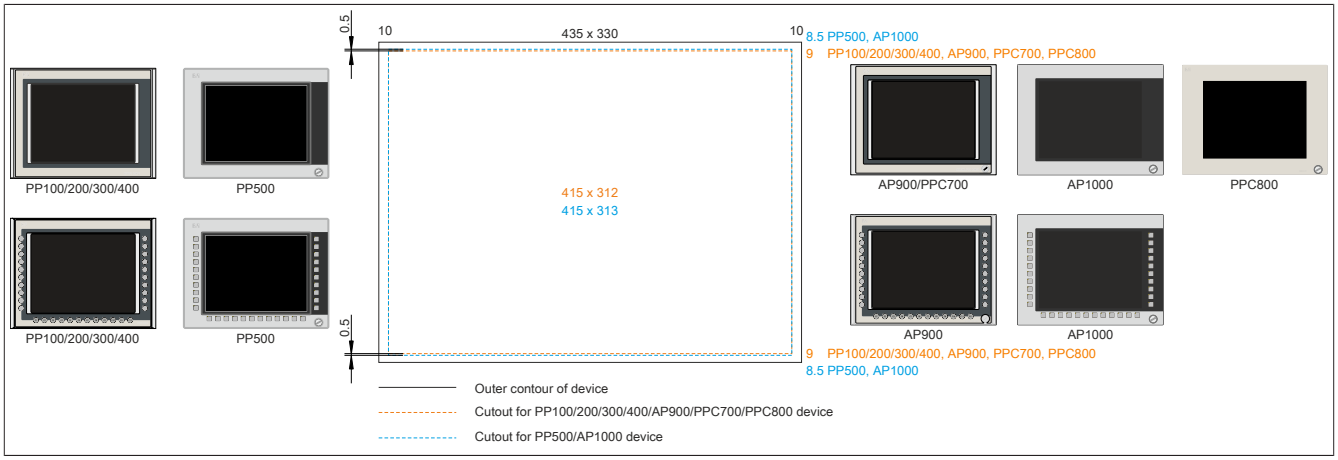
The larger cutout can be used conditionally for all devices:

- 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.

D.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.

Installation compatibility - 15" devices - Landscape1

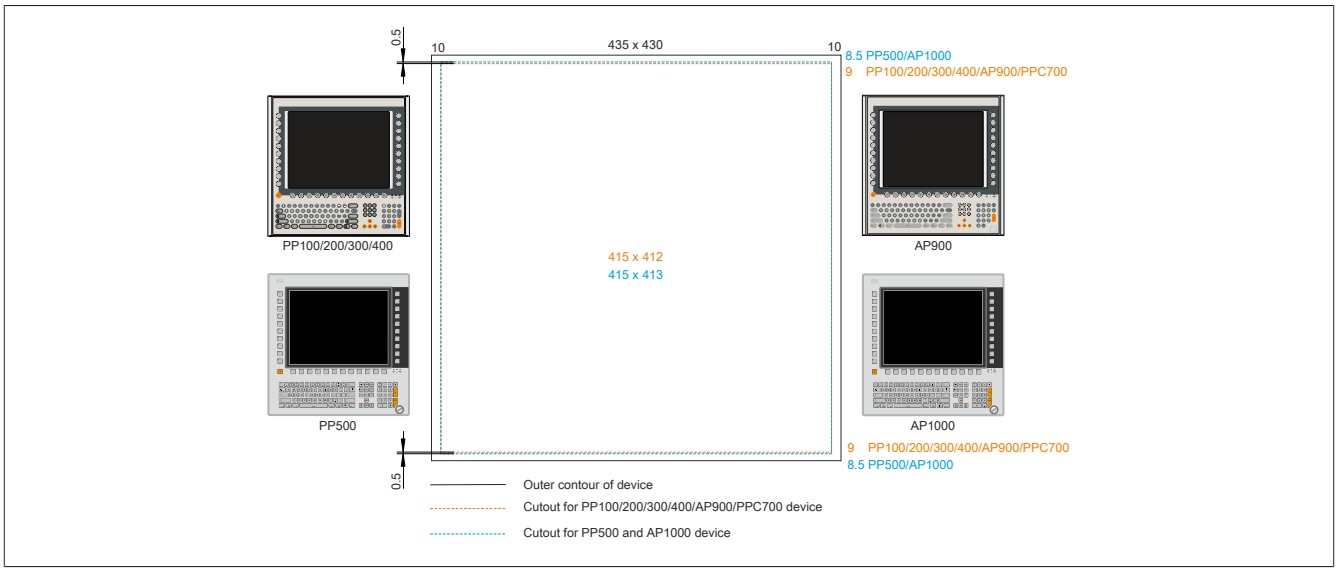


15" Automation Panel 1000 and Power Panel 500 devices are not 100% compatible with Power Panel 100/200, Power Panel 300/400, Automation Panel 900, Panel PC 700 and Panel PC 800 devices in Landscape1 format. Automation Panel 1000 and Power Panel 500 devices need a cutout that is 0.5 mm larger (top and 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).

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).

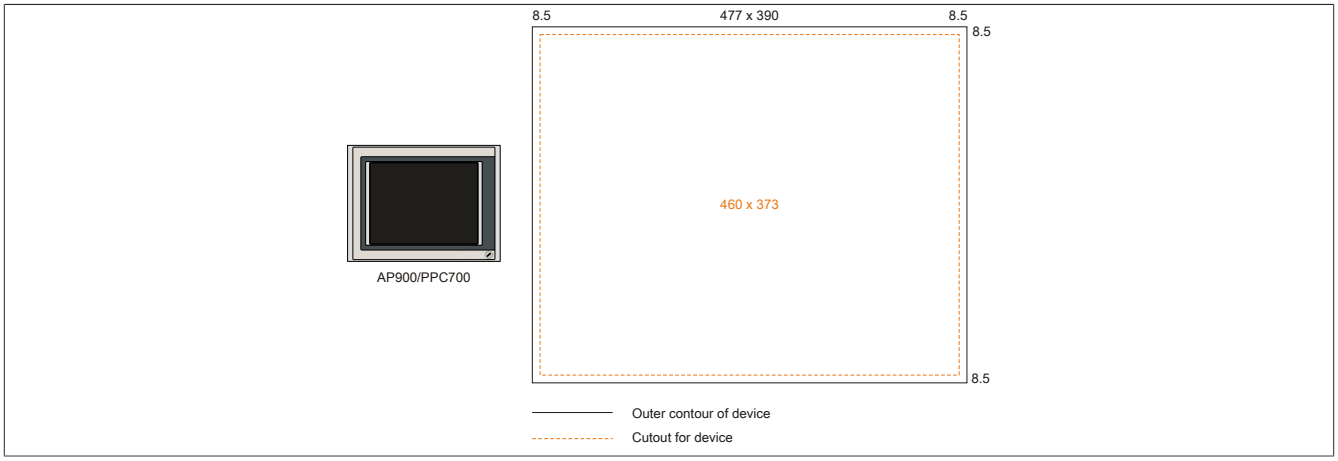
The larger cutout can be used conditionally for all devices:

- 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).

D.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.

Installation compatibility - 17" devices - Landscape1

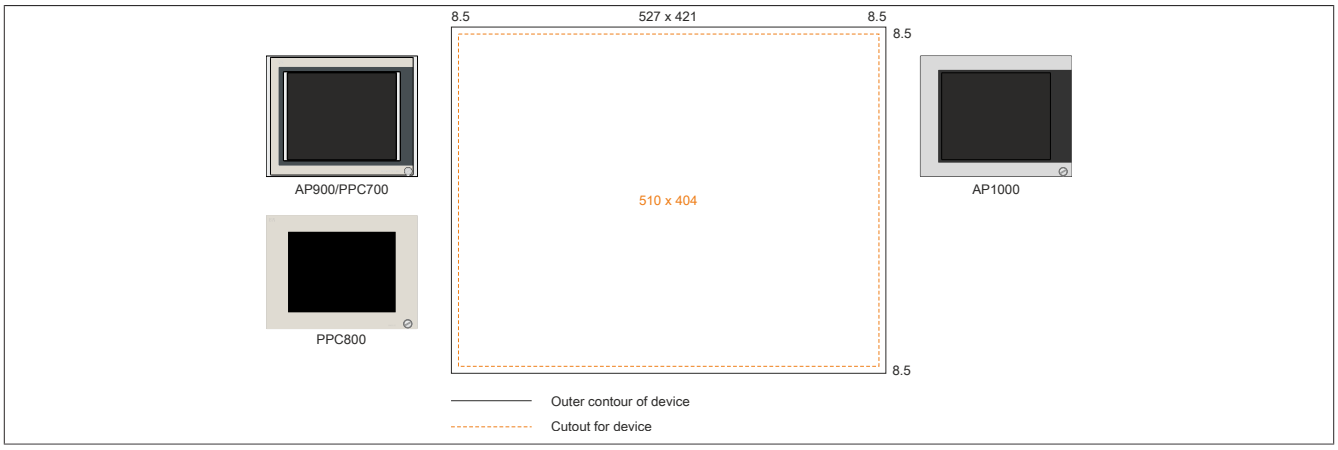


The 17" Automation Panel 900 and Panel PC 700 in Landscape1 format are 100% compatible.

D.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.

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.

D.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.

Installation compatibility - 21.3" devices - Landscape1