

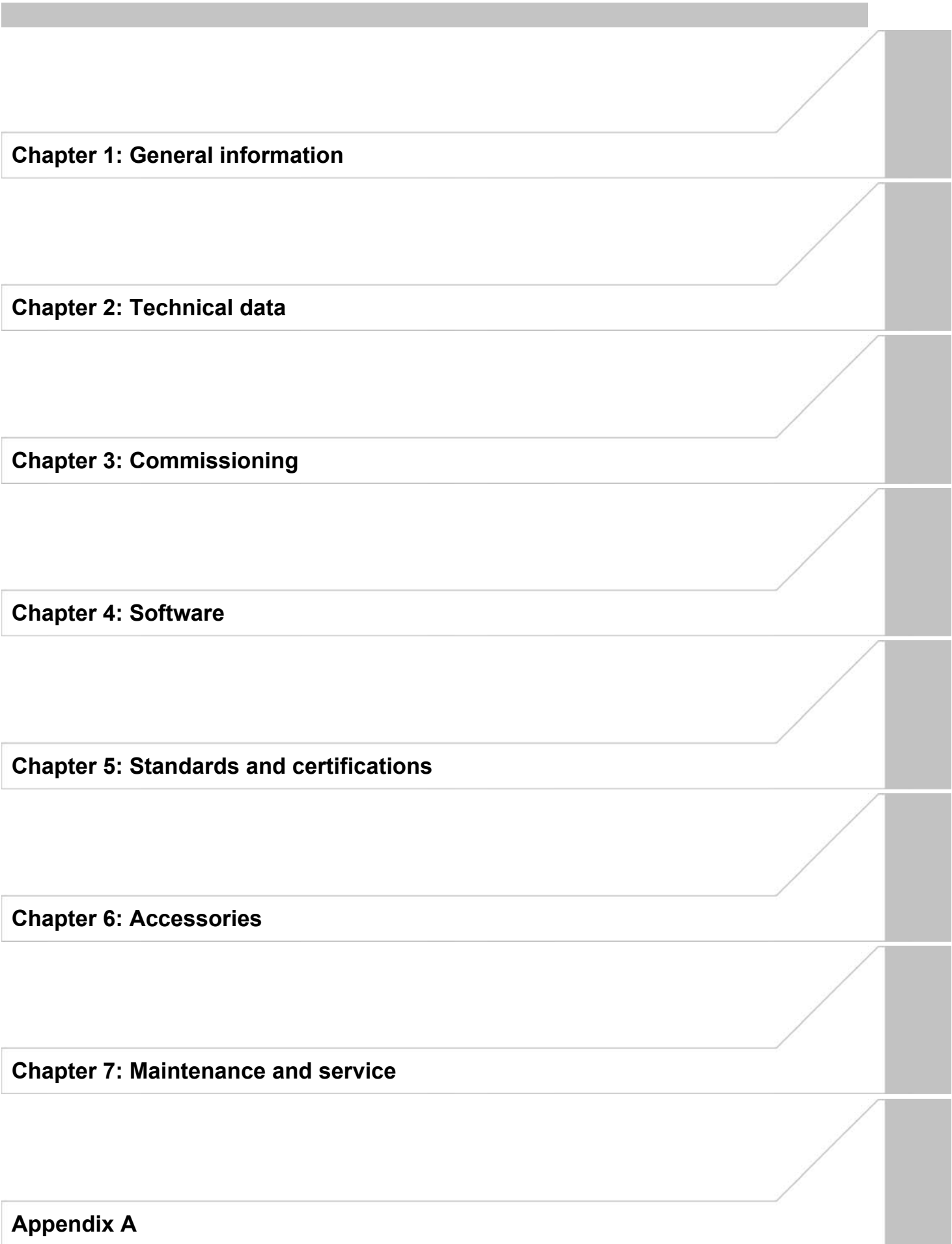
Automation Panel 800

User's Manual

Version: **2.50 (October 2014)**

Model no.: **MAAP800-ENG**

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Chapter 1 • General information

1 Manual history

Version	Date	Change
0.01 Preliminary	17-Jul-06	First version
1.00	28-Aug-06	- Updated section "Standards and certifications" on page 99. - Updated section "Software" on page 91. - Updated section "Commissioning" on page 72. - Updated section "Accessories" on page 103. "Glossary" on page 134 updated. - Updated table "Key switch switching element and button - Technical data" on page 128. - Revised model number overview. - Updated accessories. - Updated safety notices "Protection against electrostatic discharge" on page 10. "Pinout" on page 34 updated. - Updated dimensions of extension units. - Updated selection guide ("System components / configuration" on page 17).
1.10	30-Aug-06	- Updated key dimensions. - Corrected numbering of extensions ("Connection examples" on page 82). - Updated X2X cable pinout. - Updated section "X2X functionality during PC failure" on page 77. - Updated section "Internal numbering of the extension units" on page 84. - Updated cable photos.
1.20	03-Oct-06	- Updated SDL cables with extender 5CASDL.0x00-30 Rev. <A5. "5AC800.FLG1-00" on page 70 changed. - Modified section "Key and LED configurations" on page 85. "5AC800.COV2-00" on page 65 and "5AC800.COV2-00 - Dimensions" on page 65 updated. - Changed touch screen precision. - Updated section "Selecting display units" on page 82. - Updated section "Maintenance and service" on page 123. - Revised mounting orientations, +45° and -45°. - Revised connection examples (description of USB support, graphics). - Revised and corrected cable pinout. - Updated connector measurements (ODU MINI-SNAP). - Changed 30° extension connector to 60° extension connector and dimensions changed.
1.30	15-Nov-06	"5CAX2X.0xxx-20 - Pinout" on page 119 changed. - Updated 2 GB USB flash drive 5MMUSB.2048-00 from SanDisk. - Changed X2X / E-stop cable connection pinout (pin 7 and pin 8). - Modified perspective description. - Modified key switch information. - Modified German terminology for key switch. - Updated technical data on pages 52 and 74. - Updated technical data on page 95.
1.40	19-Feb-07	- Corrected hardware numbers for illuminated ring keys. - Updated descriptions of F-keys and C-keys on extension units. "Installing individual components" on page 73 updated. - Updated contents of delivery for the extension connector, extension covers and the extension flange. - Modified technical data for SDL cables Rev. ≥ A5. - Updated section "SDL flex cable test description" on page 101. - Updated section "Extension units" on page 126 regarding replacing legend strips. - Updated tolerances for 5CAPWR.0xxx-20 supply voltage cables.
1.50	13-Apr-07	- Discontinued USB flash drive 5MMUSB.0256-00 and USB flash drive 5MMUSB.1024-00. - Corrected hardware numbers and key switches in Figure 75 "5AC800.EXT3-02, 5AC800.EXT3-03 - Hardware numbers" on page 88 and Figure 76 "5AC800.EXT3-04, 5AC800.EXT3-05 - Hardware numbers" on page 88. - Updated photos in section 3 "Exchanging the legend strips" on page 124. - Revised section 1 "USB flash drives" on page 103. - Revised figures of extension units with illuminated ring keys.
1.60	05-Jun-07	- Revised description of the X2X Link supply voltage. - Corrected X2X cable model numbers.
1.70	11-Jun-07	Revised section "Connection examples" on page 82.

Table 1: Manual history

Version	Date	Change
1.80	08-Aug-07	- Updated section regarding the prevention of screen burn-in on LCD/TFT displays. - Updated section "Touch screen calibration" on page 89. - Updated information regarding temperature humidity diagrams. - Updated section 2.6.2 "Environmental conditions - Dust, humidity, aggressive gases" on page 11. - Revised section "Installing individual components" on page 73. - Note: Fasten the screws alternately and diagonally. - Updated information regarding loop resistance specifications of E-stop circuits in individual components and during startup ("Loop resistance" on page 80).
1.90	25-Mar-08	- Corrected error in the 5AC800.EXT1-00 hardware number specification. - Revised cable descriptions. - Revised vibration/shock specifications for all Automation Panel 800 devices. - Updated safety notices (Environmental conditions - Dust, humidity, aggressive gases) - Updated Visual Components key and LED numbering in section "Key and LED configurations" on page 85. - Revised section regarding the prevention of screen burn-in on LCD/TFT displays.
2.00	11-Sep-08	- Updated dimension diagrams for SDL cables and SDL cables with extender (corrected circular connector specifications). - Updated bending radius diagrams for SDL cables and SDL cables with extender (no ferrite in connection to circular connector). - Changed the order of cable descriptions (newer revisions first).
2.10	12-Nov-08	- Note: Updated technical data with "Pressing more than one key at a time may result in phantom keys and trigger unintended actions in some circumstances". - Updated key dimensions for extension units in the respective dimension diagrams. - Updated information regarding the B&R Key Editor. - Marked 5MMUSB.0512-00 as discontinued.
2.20	04-Mar-09	- Revised formatting in Table 65 "Chemical resistance of the panel overlay" on page 132. - Adjusted figure Figure 98 "Open housing" on page 125 to fit borders. - Revised wording and formatting of technical data (line breaks, etc.). - Revised section "USB flash drives" on page 103. - Revised Figure 2 "Base system configuration" on page 18 and the figure "Configuring optional components". - Updated temperature humidity diagrams for extension units. - Updated section "Environmentally friendly disposal" on page 12. - Revised Figure 56 "Support arm system mounting" on page 72. - Modified formatting in Table 44 "Selecting display units" on page 82. - Modified dimension lines in Figure 59 "Mounting orientation 0°" on page 75. - Changed spelling of "Compact Flash" to "CompactFlash" in German documentation. - Revised Figure 55 "5AC800.FLG1-00 - Dimensions" on page 71.
2.30	22-Feb-10	- Changed "Index" to "Stichwortverzeichnis" in German documentation. - Updated "Touch screen type" table entry in the technical data for devices. - Revised temperature humidity diagrams (USB flash drives, touch screens). - Modified informational text ("Information") regarding the panel membrane in Appendix A. - Updated SDL cable description with "flex" in titles, descriptions, figure captions, table captions and labels. - Updated section "Tips for extending the service life of the display" on page 90. - Changed "Temperature resistance" to "Ambient temperatures" (in the technical data for individual components). - Updated information/footnote regarding half-brightness time (technical data tables for 5AP820.1505-00 and 5AP880.1505-00). - Revised section "B&R Key Editor" on page 97 (version 2.80 changed to version 3.00). - Revised formatting (Embedded, °C, etc.). - Corrected length tolerance for supply voltage cable 5CAPWR.0300-20 on page 108. - Corrected LED hardware number corrected in Figure 72 "5AC800.EXT1-00 - Hardware numbers" on page 86. - Revised section "HMI Drivers & Utilities DVD" on page 120. - Modified "Caution!" safety notice in section "SDL cable connection" on page 34 (APC620 and PPC700 -> Industrial PCs). - Revised Figure 89 "5CASDL.0xxx-20 - Dimensions" on page 112. - Renamed "Connection examples" renamed to "Connection examples with an Automation PC 620". - Updated "Information:" safety notice on page Connection examples. - Removed section "SDL cables 5CASDL.0xxx-20 Rev. < A5" and section "SDL cables 5CASDL.0x00-30 Rev. < A5". - Removed revision number for SDL cables 5CASDL.0xxx-20 and 5CASDL.0x00-30 from chapter "Technical data" on page 15. - Corrected weight information for "5CAPWR.0xxx-20 voltage supply cables" on page Technical data and "5CAX2X.0xxx-20 X2X cables" on page Technical data. - Updated information regarding halogen-free and fire resistance in the technical data for SDL cables.

Table 1: Manual history

Version	Date	Change
2.40	05-Apr-13	- Updated section "Serial number sticker" on page 25. - Revised Figure 2 "Base system configuration" on page 18. - Revised section "Connection examples" on page 82. - Removed section "Preventing screen burn-in on LCD/TFT displays" from user's manual. - Updated section "Pixel errors" on page 90 in chapter "Commissioning" on page 72. - Updated section "Tips for extending the service life of the display" on page 90 in chapter "Commissioning" on page 72. - Revised chapter "Standards and certifications" on page 99. - Modified section "Organization of safety notices" on page 13, updated descriptions for "Caution" and "Warning". - Moved section "Cables" to chapter "Accessories" on page 103. - Revised entire manual according to current formatting standards. - Added "USB flash drives" on page 103. - Modified technical data for extension units "5AC800.EXT1-00" on page 36, "5AC800.EXT2-00" on page 39, "5AC800.EXT2-01" on page 42, "5AC800.EXT3-00" on page 45, "5AC800.EXT3-01" on page 48, "5AC800.EXT3-02" on page 51, "5AC800.EXT3-03" on page 54, "5AC800.EXT3-04" on page 57 and "5AC800.EXT3-05" on page 60. - Added sections "B&R Automation Device Interface (ADI) - Control Center" on page 91, "B&R Automation Device Interface (ADI) Development Kit" on page 93 and "B&R Automation Device Interface (ADI) .NET SDK" on page 95 to chapter "Software". - Updated all technical data.
2.50	2014-10-09	- Updated GOST-R certification information in the technical data. - Updated section "GOST-R" on page 100. - Updated sections "B&R Automation Device Interface (ADI) Development Kit" on page 93 and "B&R Automation Device Interface (ADI) .NET SDK" on page 95. - Changed touch screen sensors from Elo to AMT, see technical data for "Display units" on page 26. - Updated section "5-wire AMT touch screen" on page 130. - Information about installing individual components has been updated, see "Installing individual components" on page 73.

Table 1: Manual history

2 Safety guidelines

2.1 Intended use

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

2.2 Protection against electrostatic discharge

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

2.2.1 Packaging

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

2.2.2 Guidelines for proper ESD handling

Electrical components with a housing

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

Electrical components without a housing

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

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

Individual components

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

2.3 Policies and procedures

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

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

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

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

2.4 Transport and storage

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

2.5 Installation

- Installation must be performed according to this documentation using suitable equipment and tools.
- Devices may only be installed by qualified personnel without voltage applied. Before installation, voltage to the control cabinet must be switched off and prevented from being switched on again.
- General safety guidelines and national accident prevention regulations must be observed.
- Electrical installation must be carried out according to applicable guidelines (e.g. line cross sections, fuses, protective ground connections).

2.6 Operation

2.6.1 Protection against touching electrical parts

To operate programmable logic controllers, operating/monitoring devices or uninterruptible power supplies, it is necessary for certain parts to carry dangerous voltage levels over 42 VDC. Touching one of these parts can result in a life-threatening electric shock. This could lead to death, severe injury or damage to equipment.

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

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

2.6.2 Environmental conditions - Dust, humidity, aggressive gases

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

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

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

2.6.3 Viruses and dangerous programs

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

2.7 Environmentally friendly disposal

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

2.7.1 Separation of materials

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

Component	Disposal
Programmable logic controllers Operating/monitoring devices Uninterruptible power supply Batteries and rechargeable batteries Cables	Electronics recycling
Cardboard box / paper packaging	Paper / cardboard recycling
Plastic packaging	Plastic recycling

Table 2: Environmentally friendly separation of materials

Disposal must comply with applicable legal regulations.

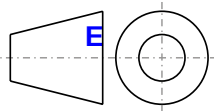
3 Organization of safety notices

Safety notices in this manual are organized as follows:

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

Table 3: Description of the safety notices used in this documentation

4 Guidelines



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

All dimensions are specified in mm.

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

Table 4: Range of nominal sizes

5 Overview

Product ID	Short description	on page
Accessories		
5AC800.150X-00	Slide-in label template 15" for Automation Panel 800 5AP880.1505-00; for 3 devices	107
5AC800.EXTX-00	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT2-00 and 5AC800.EXT2-01; for 3 devices	107
5AC800.EXTX-01	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT3-00 and 5AC800.EXT3-01; for 2 devices	107
5AC800.EXTX-02	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT3-04 and 5AC800.EXT3-05; for 2 devices	107
5AC800.EXTX-03	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT3-02 and 5AC800.EXT3-03; for 3 devices	107
Connectors		
5AC800.CON1-00	Straight connector for connecting keypad extensions to the Automation Panel 800	66
5AC800.CON2-00	60° angled connector for connecting keypad extensions to the Automation Panel 800	68
5AC800.COV1-00	Extension cover for the Automation Panel 800	63
5AC800.COV2-00	USB extension cover for the Automation Panel 800	65
Display units		
5AP820.1505-00	Automation Panel AP820; 15" XGA color TFT display with touch screen (resistive); connection for Smart Display Link; IP65 protection (with flange). 24 VDC.	26
5AP880.1505-00	Automation Panel AP880; 15" XGA color TFT display with touch screen (resistive); 40 function keys; connection for Smart Display Link; IP65 protection (with flange). 24 VDC.	30
Flanges		
5AC800.FLG1-00	Flange for the Automation Panel 800 and standard support arm systems (e.g. Rittal CP-S)	70
Keyboard attachments		
5AC800.EXT1-00	Keypad extension for the Automation Panel 800; USB port; IP65 protection	36
5AC800.EXT2-00	Keypad extension for the left side of the Automation Panel 800; 20 function keys and 20 system keys; IP65 protection	39
5AC800.EXT2-01	Keypad extension for the right side of the Automation Panel 800; 20 function keys and 20 system keys; IP65 protection	42
5AC800.EXT3-00	Keypad extension for the left side of the Automation Panel 800; 16 function keys, 8 illuminated ring keys; IP65 protection	45
5AC800.EXT3-01	Keypad extension for the right side of the Automation Panel 800; 16 function keys, 8 illuminated ring keys; IP65 protection	48
5AC800.EXT3-02	Keypad extension for the left side of the Automation Panel 800; 4 function keys, 12 illuminated ring keys, E-stop, key switch, IP65 protection	51
5AC800.EXT3-03	Keypad extension for the right side of the Automation Panel 800; 4 function keys, 12 illuminated ring keys, E-stop, key switch, IP65 protection	54
5AC800.EXT3-04	Keypad extension for the left side of the Automation Panel 800; 12 function keys, 8 illuminated ring keys, E-stop, key switch, IP65 protection	57
5AC800.EXT3-05	Keypad extension for the right side of the Automation Panel 800; 12 function keys, 8 illuminated ring keys, E-stop, key switch, IP65 protection	60
Other		
5SWHMI.0000-00	HMI Drivers & Utilities DVD	120
SDL flex cables		
5CASDL.0018-20	SDL flex cable for the Automation Panel 800, 1.8 m	111
5CASDL.0050-20	SDL flex cable for the Automation Panel 800, 5 m	111
5CASDL.0100-20	SDL flex cable for the Automation Panel 800, 10 m	111
5CASDL.0150-20	SDL flex cable for the Automation Panel 800, 15 m	111
5CASDL.0200-20	SDL flex cable for the Automation Panel 800, 20 m	111
5CASDL.0250-20	SDL flex cable for the Automation Panel 800, 25 m	111
5CASDL.0300-30	SDL flex cable with extender for the Automation Panel 800, 30 m	114
5CASDL.0400-30	SDL flex cable with extender for the Automation Panel 800, 40 m	114
Supply voltage cable		
5CAPWR.0018-20	Voltage supply cable for the Automation Panel 800, 1.8 m	108
5CAPWR.0050-20	Voltage supply cable for the Automation Panel 800, 5 m	108
5CAPWR.0100-20	Voltage supply cable for the Automation Panel 800, 10 m	108
5CAPWR.0150-20	Voltage supply cable for the Automation Panel 800, 15 m	108
5CAPWR.0200-20	Voltage supply cable for the Automation Panel 800, 20 m	108
5CAPWR.0250-20	Voltage supply cable for the Automation Panel 800, 25 m	108
5CAPWR.0300-20	Voltage supply cable for the Automation Panel 800, 30 m	108
5CAPWR.0400-20	Voltage supply cable for the Automation Panel 800, 40 m	108
USB accessories		
5MMUSB.2048-00	USB 2.0 flash drive, 2048 MB	103
5MMUSB.2048-01	USB 2.0 flash drive, 2048 MB, B&R	105
5MMUSB.4096-01	USB 2.0 flash drive, 4096 MB, B&R	105
X2X Link cables		
5CAX2X.0018-20	X2X cable for the Automation Panel 800, 1.8 m	117
5CAX2X.0050-20	X2X cable for the Automation Panel 800, 5 m	117
5CAX2X.0100-20	X2X cable for the Automation Panel 800, 10 m	117
5CAX2X.0150-20	X2X cable for the Automation Panel 800, 15 m	117
5CAX2X.0200-20	X2X cable for the Automation Panel 800, 20 m	117
5CAX2X.0250-20	X2X cable for the Automation Panel 800, 25 m	117
5CAX2X.0300-20	X2X cable for the Automation Panel 800, 30 m	117
5CAX2X.0400-20	X2X cable for the Automation Panel 800, 40 m	117

Chapter 2 • Technical data

1 Introduction

Automation Panel 800 (AP800) devices are fully closed display units. When installed on a support arm system, the operator panel can be placed in the most ergonomic position.

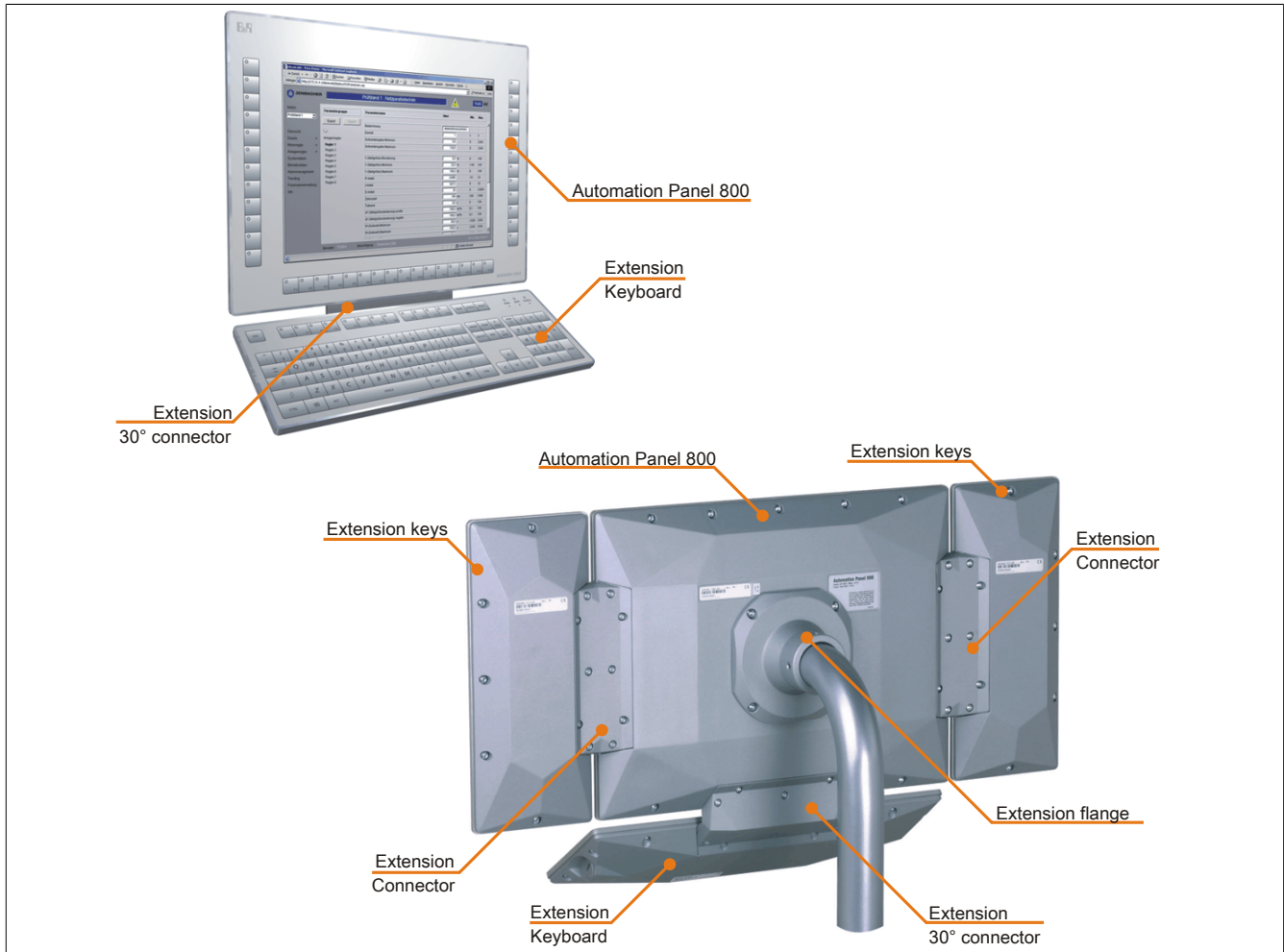


Figure 1: Automation Panel with extension units - Component overview

1.1 Features

- Fully closed system
- Touch screen
- Industrial high-density plug
- USB 1.1 interface¹⁾ (Type A)
- Can be expanded with extension units
- E-stop²⁾
- Key switch³⁾
- Illuminated ring keys⁴⁾
- SDL (Smart Display Link) transmission technology up to 40 meters
- Easy-to-configure function keys with the B&R Key Editor⁵⁾

¹⁾ Depends on the device configuration.

²⁾ Depends on the device configuration.

³⁾ Depends on the device configuration.

⁴⁾ Depends on the device configuration.

⁵⁾ Available for download from the B&R website (www.br-automation.com).

1.2 System components / configuration

The AP800 system can be assembled to meet individual requirements and operating conditions.

Additional information about the following overview:

- Select a display (select 1).
- Select the extension units according to requirements.
- Select extension connector and extension covers depending on the number of extension units.
- Select cables.

1.2.1 Base system configuration

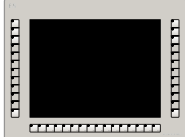
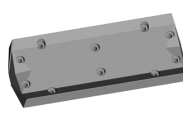
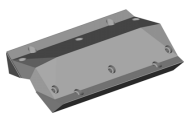
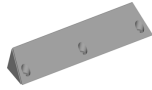
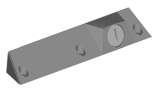
Base system configuration		
Display	Select 1	
The base system consists of one display unit. Variants: Display without keys Display with keys	 5AP820.1505-00	 5AP880.1505-00
Extensions		
Extension units	Select max. 1 per side	
The base device can be extended on the left and/or right side with any of these extension units.	 5AC800.EXT2-00 5AC800.EXT2-01	 5AC800.EXT3-00 5AC800.EXT3-01
Extension unit - Left Extension unit - Right	5AC800.EXT2-00 5AC800.EXT2-01	5AC800.EXT3-00 5AC800.EXT3-01
The base device can be extended underneath with an extension keyboard.	 5AC800.EXT1-00	
Extension connector	Select 1 per extension unit	
An extension connector is needed to connect each extension unit with the AP800 display.	 5AC800.CON1-00	 5AC800.CON2-00
Extension cover	Select 1 if no extension units connected	
An extension cover must be installed on each extension unit connection slot that is not being used on the AP800 display.	 5AC800.COV1-00	 5AC800.COV2-00
Flange		
A flange is attached to the back of the display for mounting.	 5AC800.FLG1-00	
Cables		
	Select 1 of each	
Select SDL cable with the necessary length. Variants: Cable without extender Cable with extender	SDL cable without extender  5CASDL.0018-20 5CASDL.0150-20 5CASDL.0050-20 5CASDL.0200-20 5CASDL.0100-20 5CASDL.0250-20	
	SDL cable with extender  5CASDL.0300-30 5CASDL.0400-30	
Select power cable with the necessary length.	 5CAPWR.0018-20 5CAPWR.0200-20 5CAPWR.0050-20 5CAPWR.0250-20 5CAPWR.0100-20 5CAPWR.0300-20 5CAPWR.0150-20 5CAPWR.0400-20	
Select X2X cable with the necessary length.	 5CAX2X.0018-20 5CAX2X.0200-20 5CAX2X.0050-20 5CAX2X.0250-20 5CAX2X.0100-20 5CAX2X.0300-20 5CAX2X.0150-20 5CAX2X.0400-20	

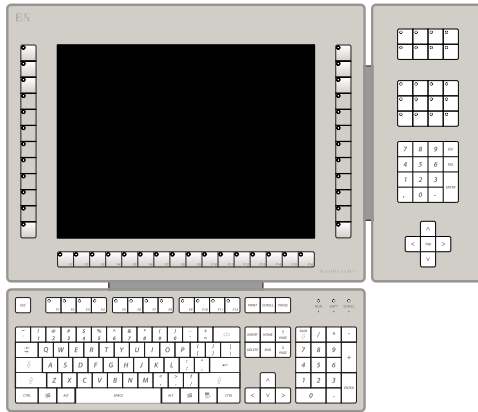
Figure 2: Base system configuration

2 Example configurations

The following 3 examples provide assistance for configuring AP800 systems by illustrating which components are required for a particular configuration.

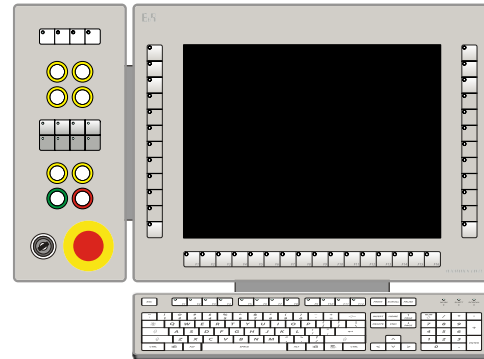
Example 1

Automation Panel 800 with extension units to the right and underneath.



Example 2

Automation Panel 800 mit Anbau links, gewinkelt (60°) unten und extra USB Anschluss rechts vom Automation Panel 800.



Example 3

Automation Panel 800 with extension units to the right, left and underneath (at a 60° angle).

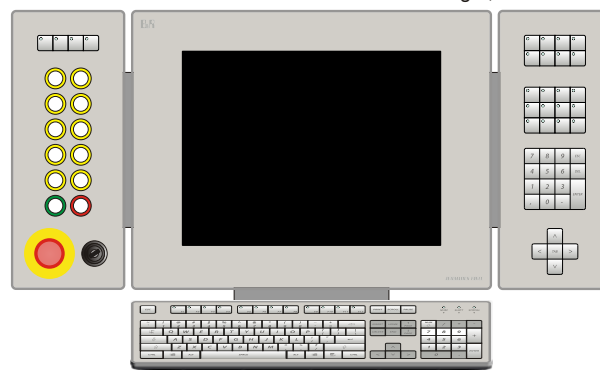


Figure 3: Example configurations

2.1 Example 1

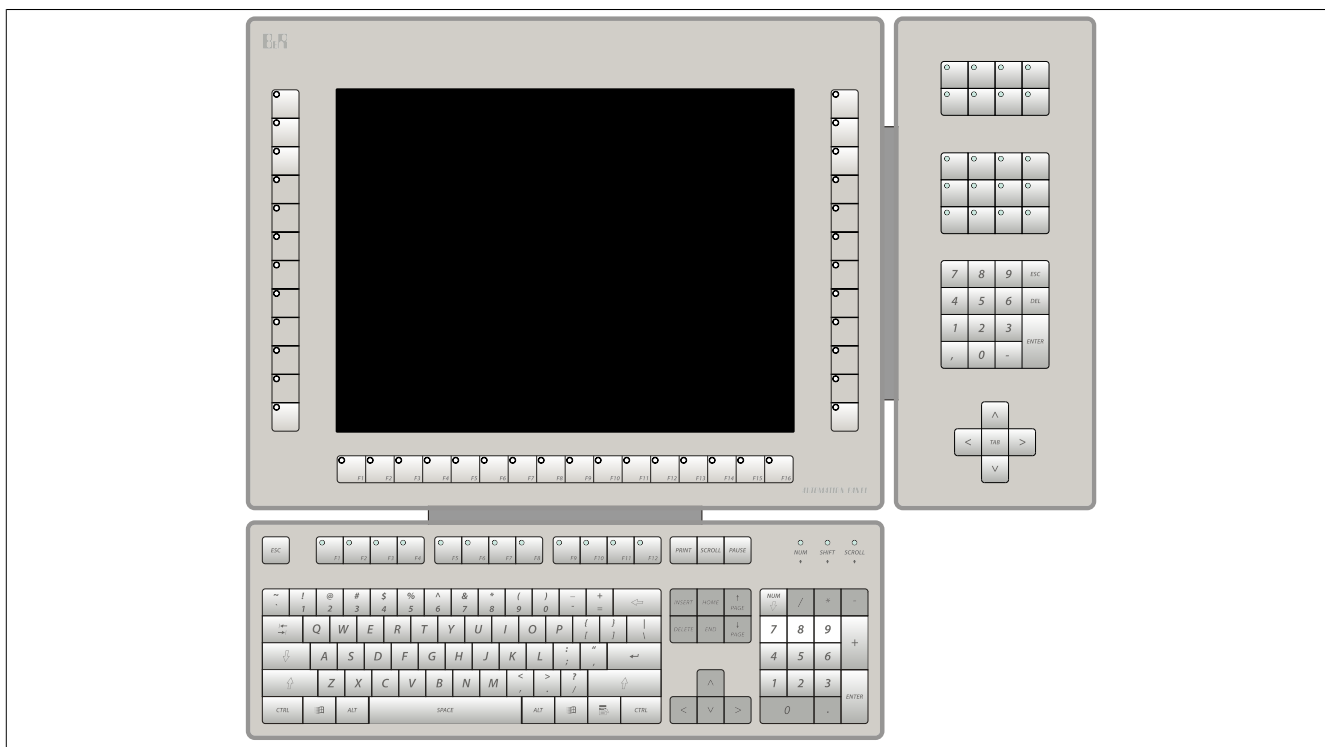


Figure 4: Example 1 - Configuration

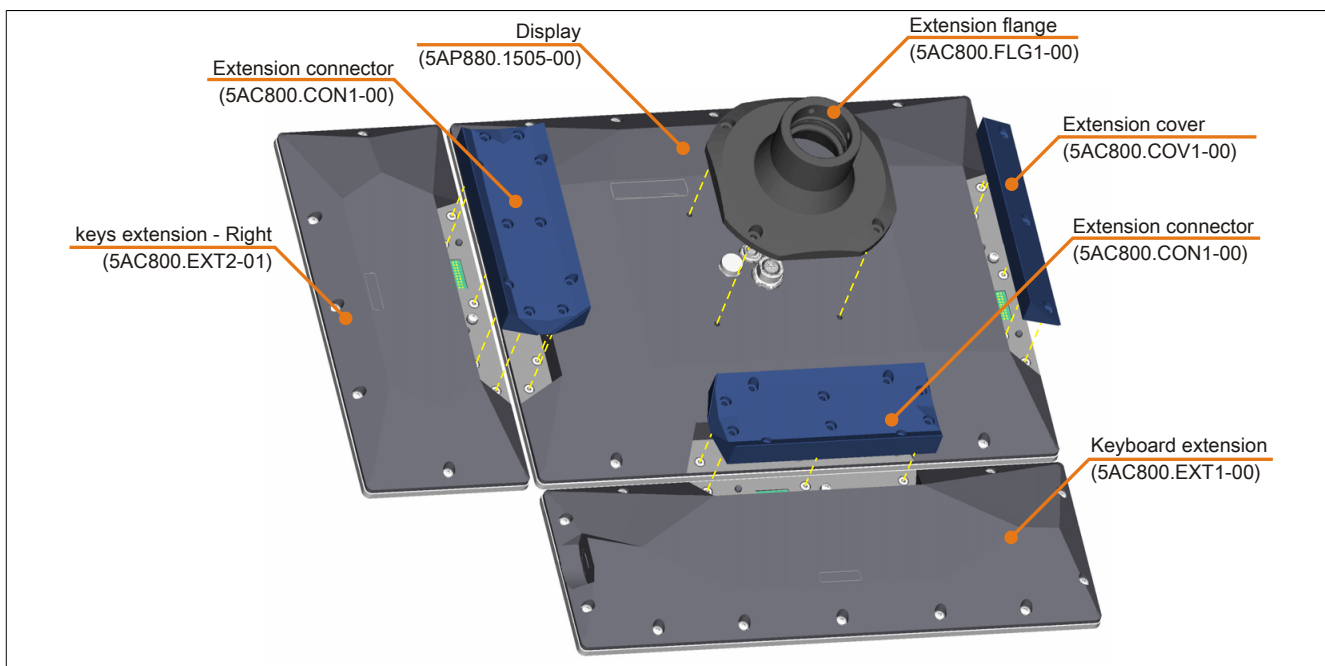


Figure 5: Example 1 - Required components

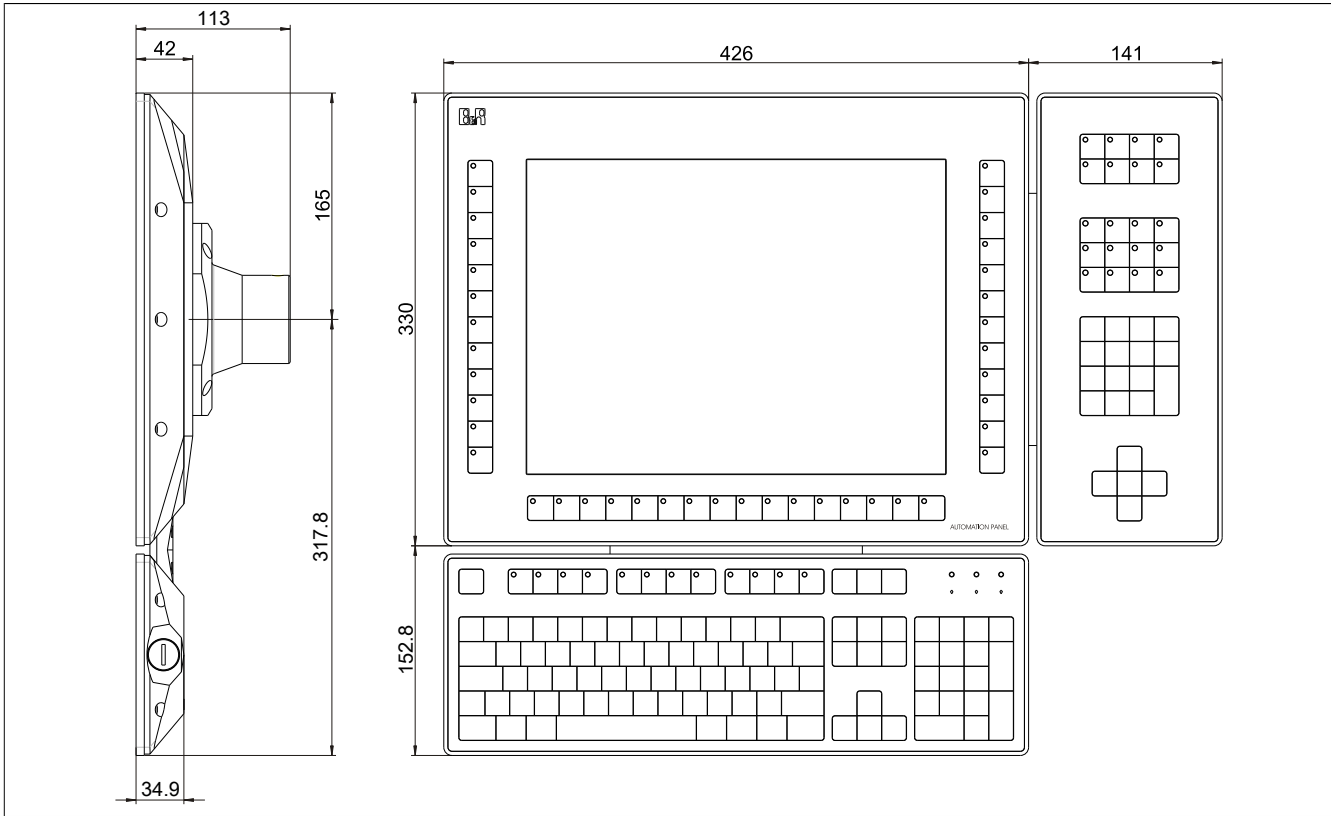


Figure 6: Example 1 - Dimensions

Model number	Short description	Quantity
5AP880.1505-00	TFT C XGA 15" FT	1
5AC800.EXT1-00	Keyboard extension	1
5AC800.EXT2-01	F keys extension - Right	1
5AC800.CON1-00	Extension connector	2
5AC800.COV1-00	Extension cover	1
5AC800.FLG1-00	Extension flange	1
5CASDL.0xxx-20	SDL cable for Automation Panel 800 (from 1.8 to 40 meters in length, see see "Order data" on page 111).	1
5CAPWR.0xxx-20	Voltage supply cable for Automation Panel 800 (from 1.8 to 40 meters in length, see see "Order data" on page 108).	1
5CAX2X.0xxx-20	X2X cable for Automation Panel 800 (from 1.8 to 40 meters in length, see see "Order data" on page 117).	1

Table 5: Example 1 - Overview of required components

2.2 Example 2

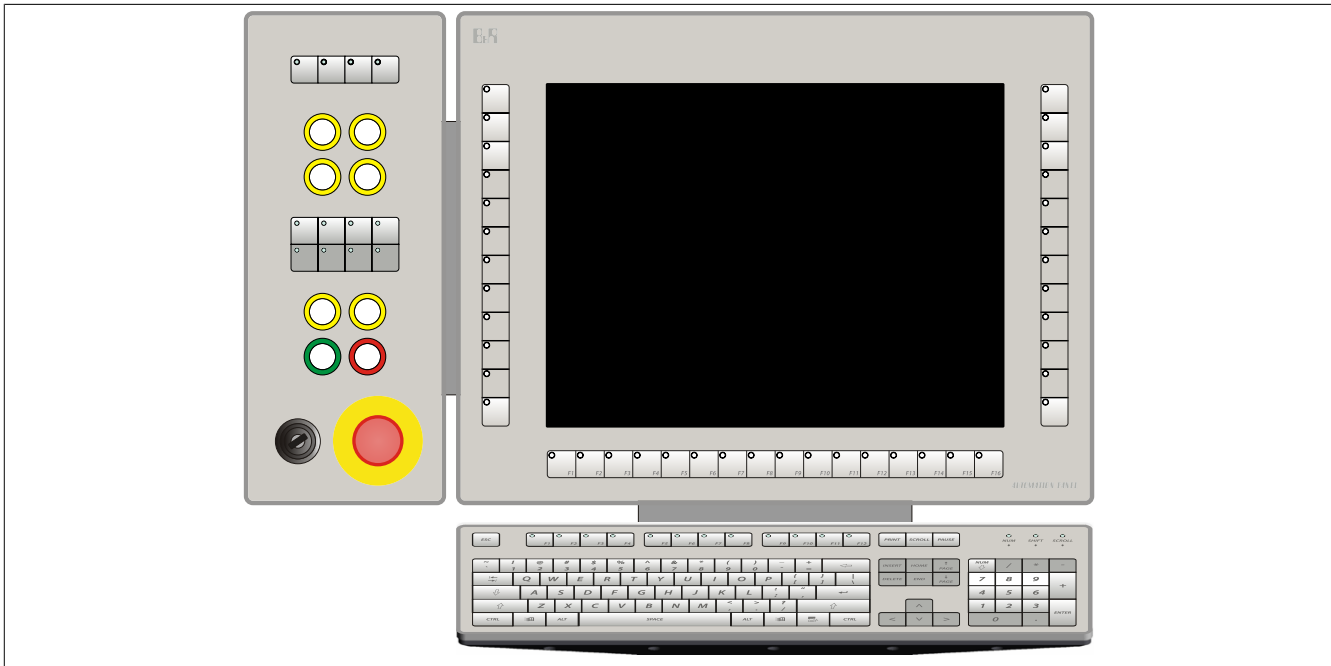


Figure 7: Example 2 - Configuration

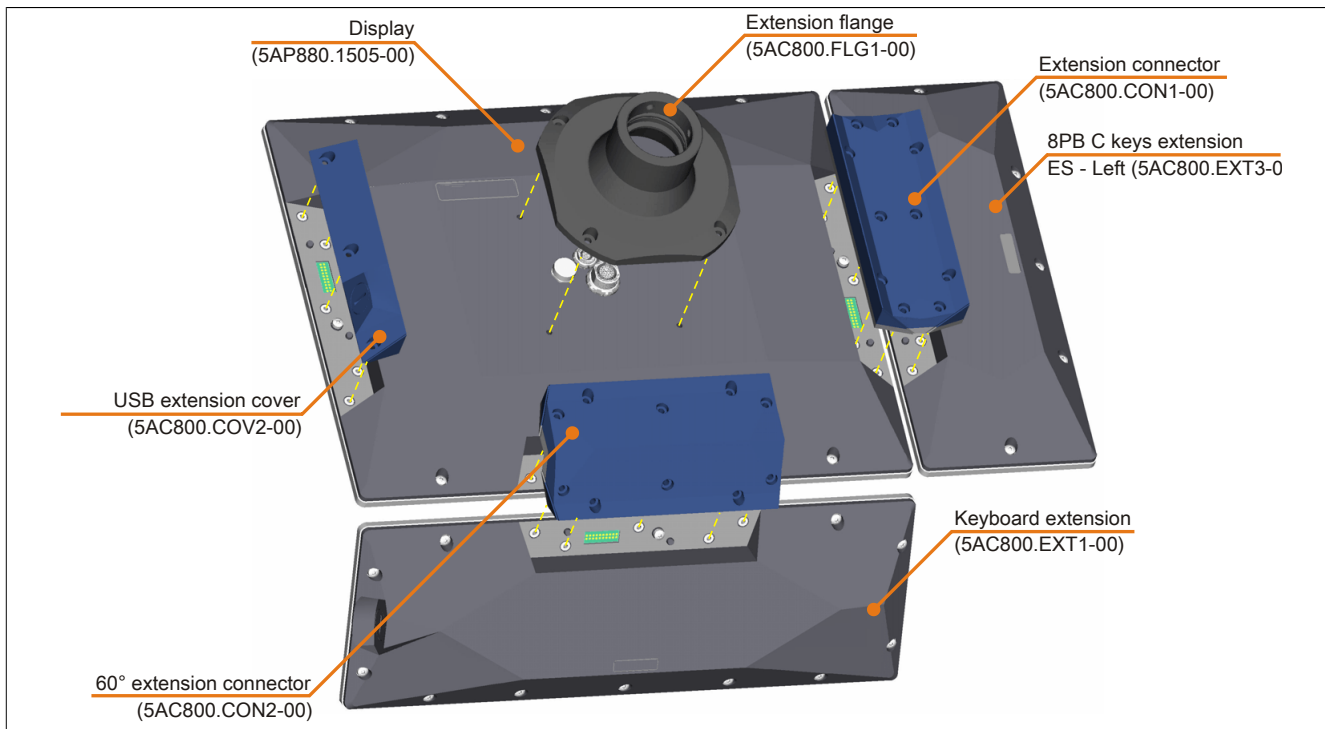


Figure 8: Example 2 - Required components

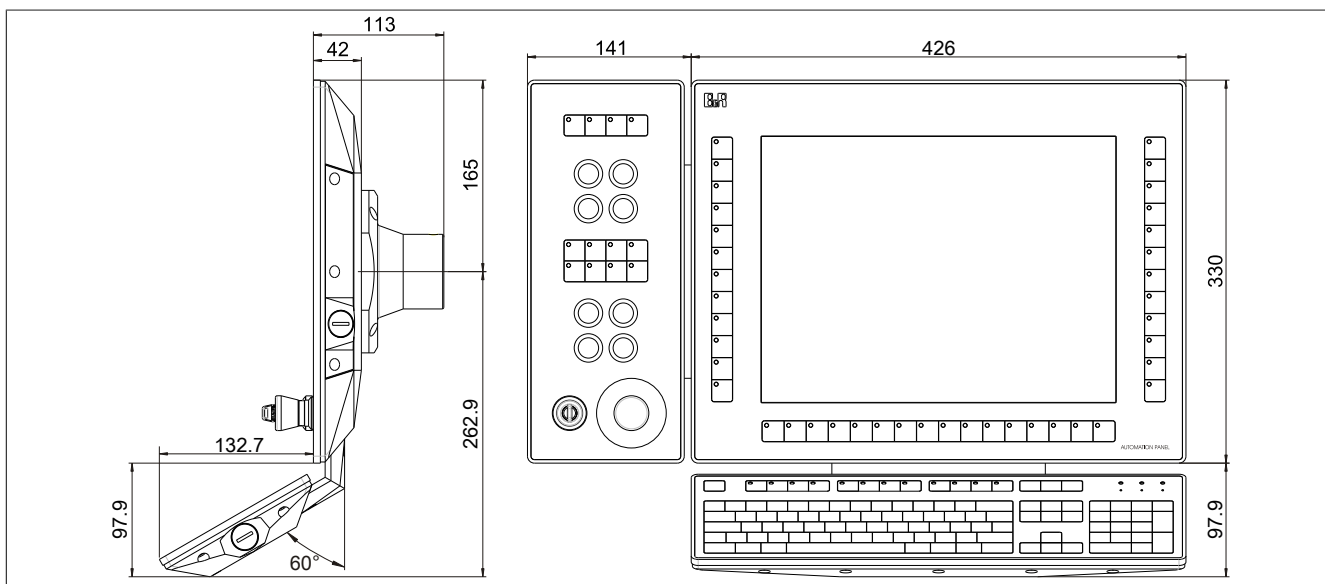


Figure 9: Example 2 - Dimensions

Model number	Short description	Quantity
5AP880.1505-00	TFT C XGA 15" FT	1
5AC800.EXT1-00	Keyboard extension	1
5AC800.EXT3-04	8PB ES C key extension - Left	1
5AC800.CON1-00	Extension connector	1
5AC800.CON2-00	60° extension connector	1
5AC800.COV2-00	USB extension cover	1
5AC800.FLG1-00	Extension flange	1
5CASDL.0xxx-20	SDL cable for Automation Panel 800 (from 1.8 to 40 meters in length, see "Order data" on page 111).	1
5CAPWR.0xxx-20	Voltage supply cable for Automation Panel 800 (from 1.8 to 40 meters in length, see "Order data" on page 108).	1
5CAX2X.0xxx-20	X2X cable for Automation Panel 800 (from 1.8 to 40 meters in length, see "Order data" on page 117).	1

Table 6: Example 2 - Overview of required components

2.3 Example 3

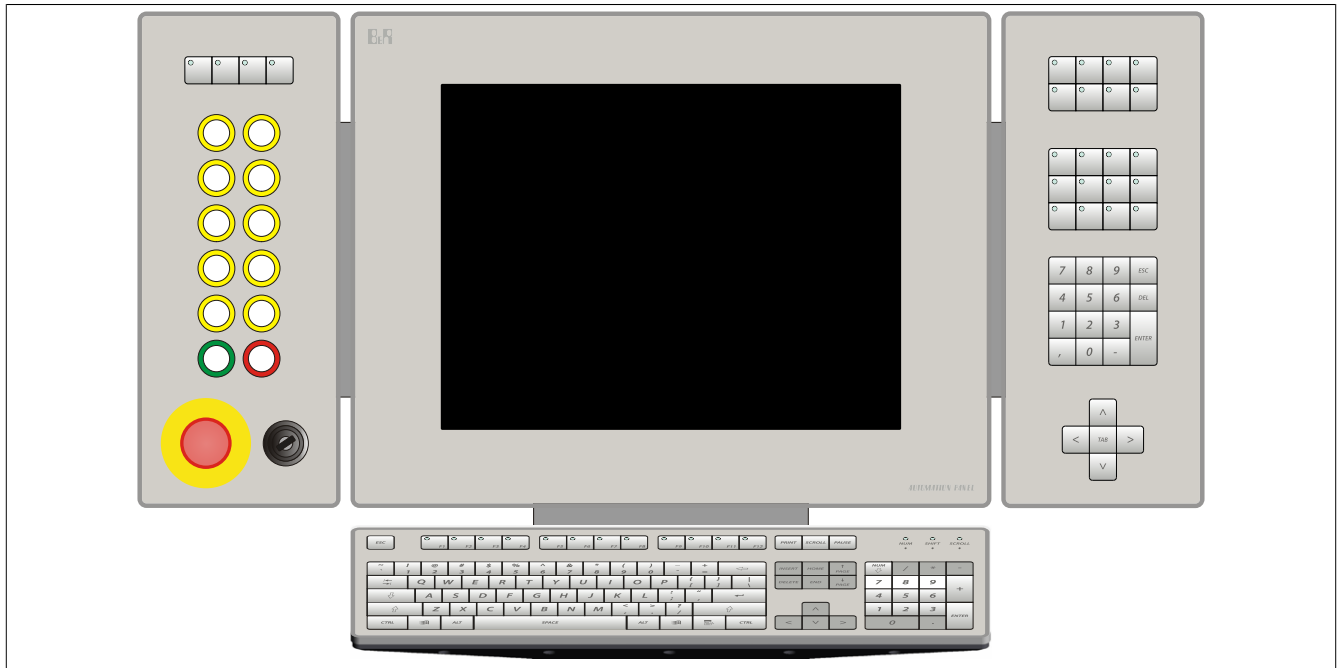


Figure 10: Example 3 - Configuration

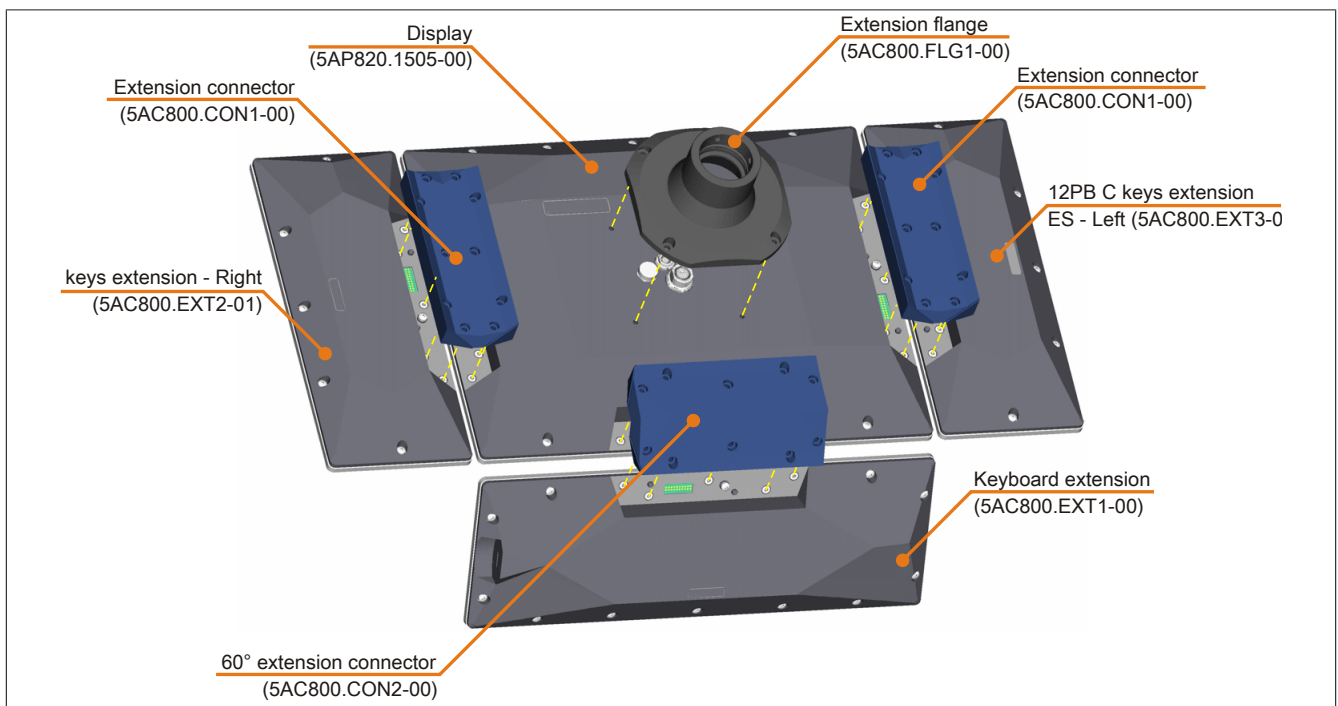


Figure 11: Example 3 - Required components

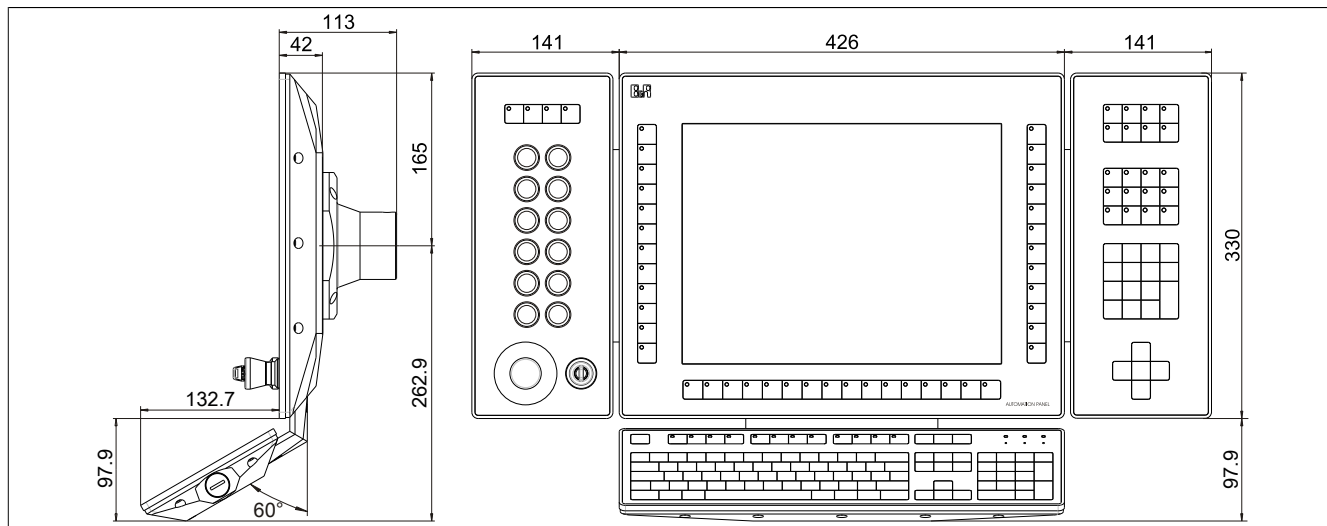


Figure 12: Example 3 - Dimensions

Model number	Short description	Quantity
5AP820.1505-00	TFT C XGA 15" T	1
5AC800.EXT2-01	F keys extension - Right	1
5AC800.EXT3-02	12PB ES C key extension - Left	1
5AC800.EXT1-00	Keyboard extension	1
5AC800.CON1-00	Extension connector	2
5AC800.CON2-00	60° extension connector	1
5AC800.FLG1-00	Extension flange	1
5CASDL.0xxx-20	SDL cable for Automation Panel 800 (from 1.8 to 40 meters in length, see see "Order data" on page 111).	1
5CAPWR.0xxx-20	Voltage supply cable for Automation Panel 800 (from 1.8 to 40 meters in length, see see "Order data" on page 108).	1
5CAX2X.0xxx-20	X2X cable for Automation Panel 800 (from 1.8 to 40 meters in length, see see "Order data" on page 117).	1

Table 7: Example 3 - Overview of required components

3 Complete system

3.1 Serial number sticker

A unique serial number sticker with a barcode (Code 128) is affixed to each B&R device for identification purposes. This serial number represents all of the individual components built into the system (model number, name, revision, serial number, delivery date and duration of warranty).



Figure 13: Serial number sticker (back)

This information can also be found on the B&R website by entering the serial number of the complete system in the search field tab (after selecting the "Serial number" option) at the top of the website www.br-automation.com. The search provides a detailed list of installed components.

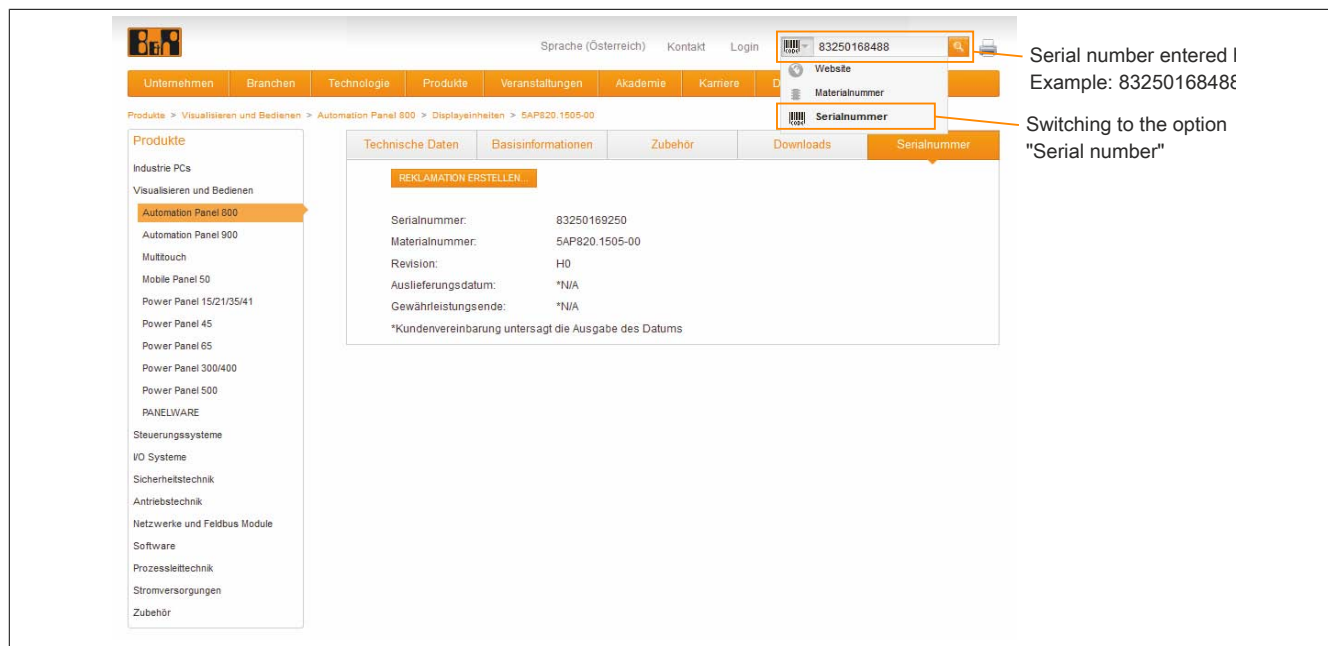


Figure 14: Example of serial number search

4 Individual components

4.1 Display units

4.1.1 5AP820.1505-00

4.1.1.1 General information

- Automation Panel AP820
- Support arm mounting for optimum ergonomics
- 15" XGA color TFT display with touch screen (resistive)
- Connection for Smart Display Link
- IP65 protection (with flange)
- 24 VDC

4.1.1.2 Order data

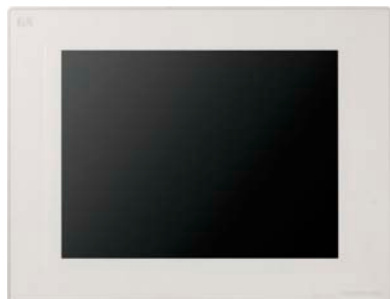
Model number	Short description	Figure
	Display units	
5AP820.1505-00	Automation Panel AP820; 15" XGA color TFT display with touch screen (resistive); connection for Smart Display Link; IP65 protection (with flange). 24 VDC.	
	Required accessories	
	Supply voltage cable	
5CAPWR.0018-20	Voltage supply cable for the Automation Panel 800, 1.8 m	
5CAPWR.0050-20	Voltage supply cable for the Automation Panel 800, 5 m	
5CAPWR.0100-20	Voltage supply cable for the Automation Panel 800, 10 m	
5CAPWR.0150-20	Voltage supply cable for the Automation Panel 800, 15 m	
5CAPWR.0200-20	Voltage supply cable for the Automation Panel 800, 20 m	
5CAPWR.0250-20	Voltage supply cable for the Automation Panel 800, 25 m	
5CAPWR.0300-20	Voltage supply cable for the Automation Panel 800, 30 m	
5CAPWR.0400-20	Voltage supply cable for the Automation Panel 800, 40 m	
	Optional accessories	
	Connectors	
5AC800.CON1-00	Straight connector for connecting keypad extensions to the Automation Panel 800	
5AC800.CON2-00	60° angled connector for connecting keypad extensions to the Automation Panel 800	
5AC800.COV1-00	Extension cover for the Automation Panel 800	
5AC800.COV2-00	USB extension cover for the Automation Panel 800	
	Flanges	
5AC800.FLG1-00	Flange for the Automation Panel 800 and standard support arm systems (e.g. Rittal CP-S)	
	Keyboard attachments	
5AC800.EXT1-00	Keypad extension for the Automation Panel 800; USB port; IP65 protection	
5AC800.EXT2-00	Keypad extension for the left side of the Automation Panel 800; 20 function keys and 20 system keys; IP65 protection	
5AC800.EXT2-01	Keypad extension for the right side of the Automation Panel 800; 20 function keys and 20 system keys; IP65 protection	
5AC800.EXT3-00	Keypad extension for the left side of the Automation Panel 800; 16 function keys, 8 illuminated ring keys; IP65 protection	
5AC800.EXT3-01	Keypad extension for the right side of the Automation Panel 800; 16 function keys, 8 illuminated ring keys; IP65 protection	
5AC800.EXT3-02	Keypad extension for the left side of the Automation Panel 800; 4 function keys, 12 illuminated ring keys, E-stop, key switch, IP65 protection	
5AC800.EXT3-03	Keypad extension for the right side of the Automation Panel 800; 4 function keys, 12 illuminated ring keys, E-stop, key switch, IP65 protection	
5AC800.EXT3-04	Keypad extension for the left side of the Automation Panel 800; 12 function keys, 8 illuminated ring keys, E-stop, key switch, IP65 protection	
5AC800.EXT3-05	Keypad extension for the right side of the Automation Panel 800; 12 function keys, 8 illuminated ring keys, E-stop, key switch, IP65 protection	

Table 8: 5AP820.1505-00 - Order data

4.1.1.3 Interfaces

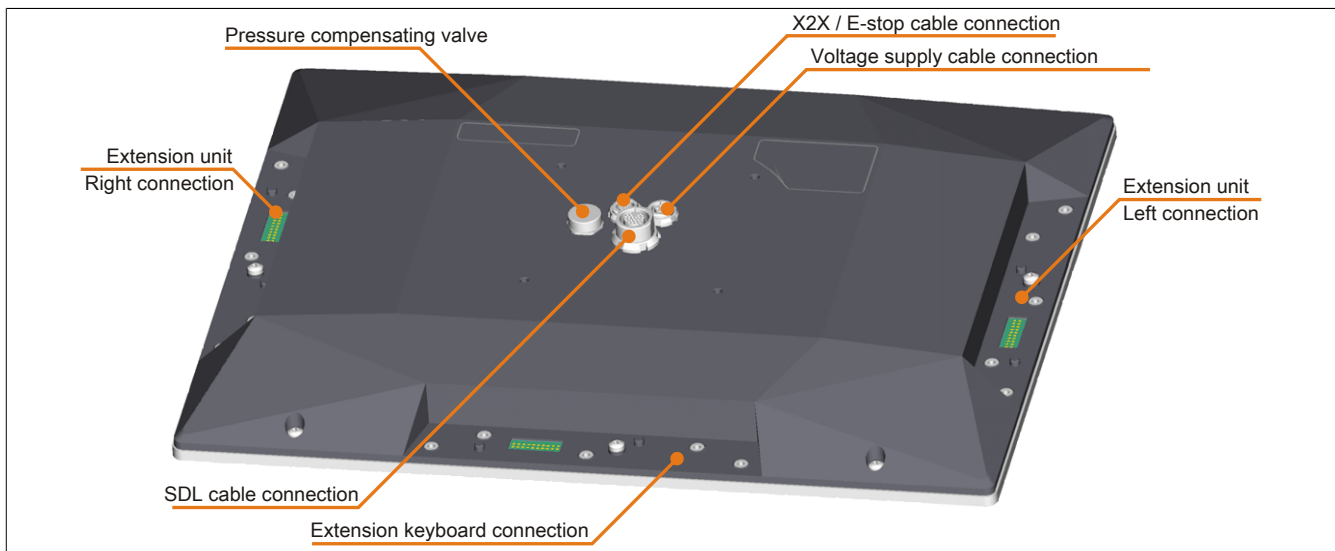


Figure 15: 5AP820.1505-00 - Interfaces

4.1.1.4 Technical data

Product ID	5AP820.1505-00	
Revision	G0	H0
General information		
B&R ID code	0x2085	
Certification		
CE	Yes	
cULus	Yes	
GOST-R	Yes	
Interfaces		
X2X Link	Yes	
Monitor/Panel interface		
Type	SDL ¹⁾	
Display		
Type	TFT color	
Display size	15" (381 mm)	
Colors	16 million	
Resolution	XGA, 1024 x 768 pixels	
Contrast	400:1	
Viewing angles		
Horizontal	Direction R / Direction L = 85°	
Vertical	Direction U / Direction D = 85°	
Backlight		
Type	CCFL	
Brightness	250 cd/m²	
Half-brightness time ²⁾	50,000 h	
Touch screen ³⁾		
Type	Elo AccuTouch	AMT
Technology	Analog, resistive	
Controller	Elo, serial, 12-bit	
Transmittance	Up to 78%	
Keys		
Function keys	No	
Soft keys	No	
System keys	No	
Service life	-	
LED brightness	-	
Electrical characteristics		
Nominal voltage	24 VDC ±25%	
Nominal current	3.2 A	
Starting current	Typ. 5 A, max. 30 A for <300 µs	
Power consumption	Typ. 27 W, max. 35 W	
E-stop circuit loop resistance	Max. 5.5 Ω	
Operating conditions		
EN 60529 protection	All sides: IP65, dust and sprayed water protection	

Table 9: 5AP820.1505-00, 5AP820.1505-00 - Technical data

Product ID	5AP820.1505-00
Environmental conditions	
Temperature Operation	0 to 50°C (mounting orientation 0°) 0 to 50°C (mounting orientation up to -45°) 0 to 45°C (mounting orientation up to +45°)
Storage Transport	-25 to 60°C -25 to 60°C
Vibration Operation (continuous) Operation (occasional) Storage Transport	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 Storage Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Altitude ⁴⁾ Operation	Max. 3000 m
Mechanical characteristics	
Housing Material Paint	Aluminum (ADC12) Similar to silver metallic (semi-matt)
Front ⁵⁾ Frame Design Panel overlay Material Light background Gasket	Naturally anodized aluminum Gray Polyester Similar to Pantone 427CV Foam perimeter seal
Dimensions Width Height Depth	426 mm 330 mm 41.3 mm (without flange)
Weight	Approx. 5000 g

Table 9: 5AP820.1505-00, 5AP820.1505-00 - Technical data

- 1) SDL = Smart Display Link.
- 2) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
- 3) Drivers for approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).
- 4) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 5) There may be visible deviations in the color and surface appearance depending on the process or batch.

4.1.1.5 Temperature humidity diagram

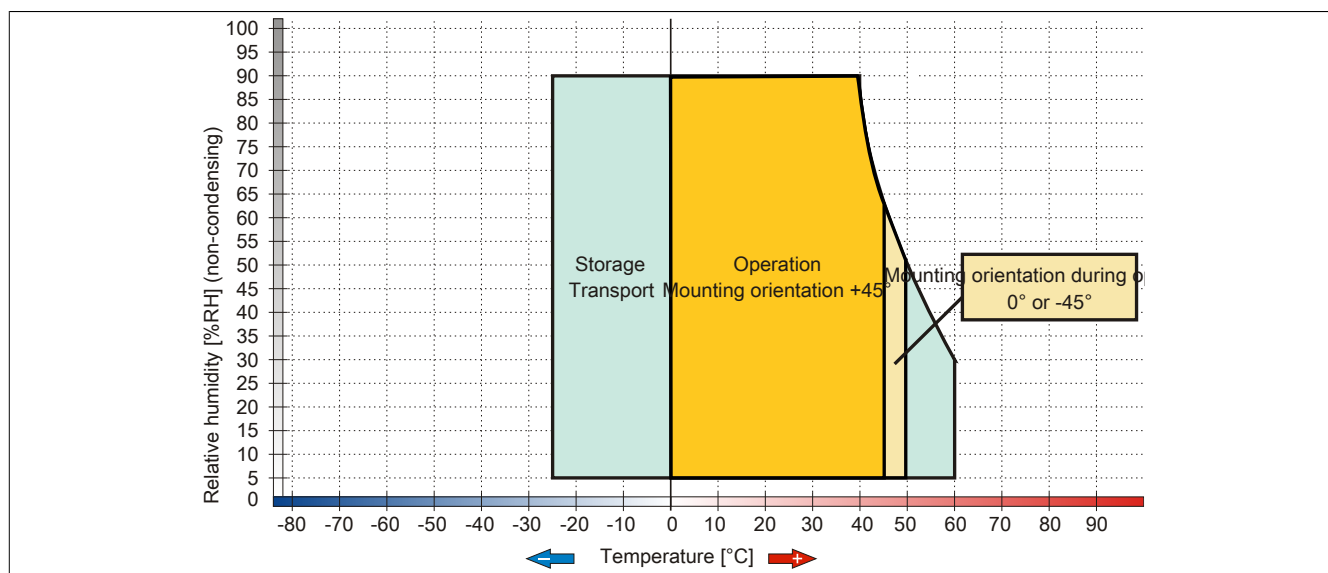


Figure 16: 5AP820.1505-00 - Temperature humidity diagram

4.1.1.6 Dimensions

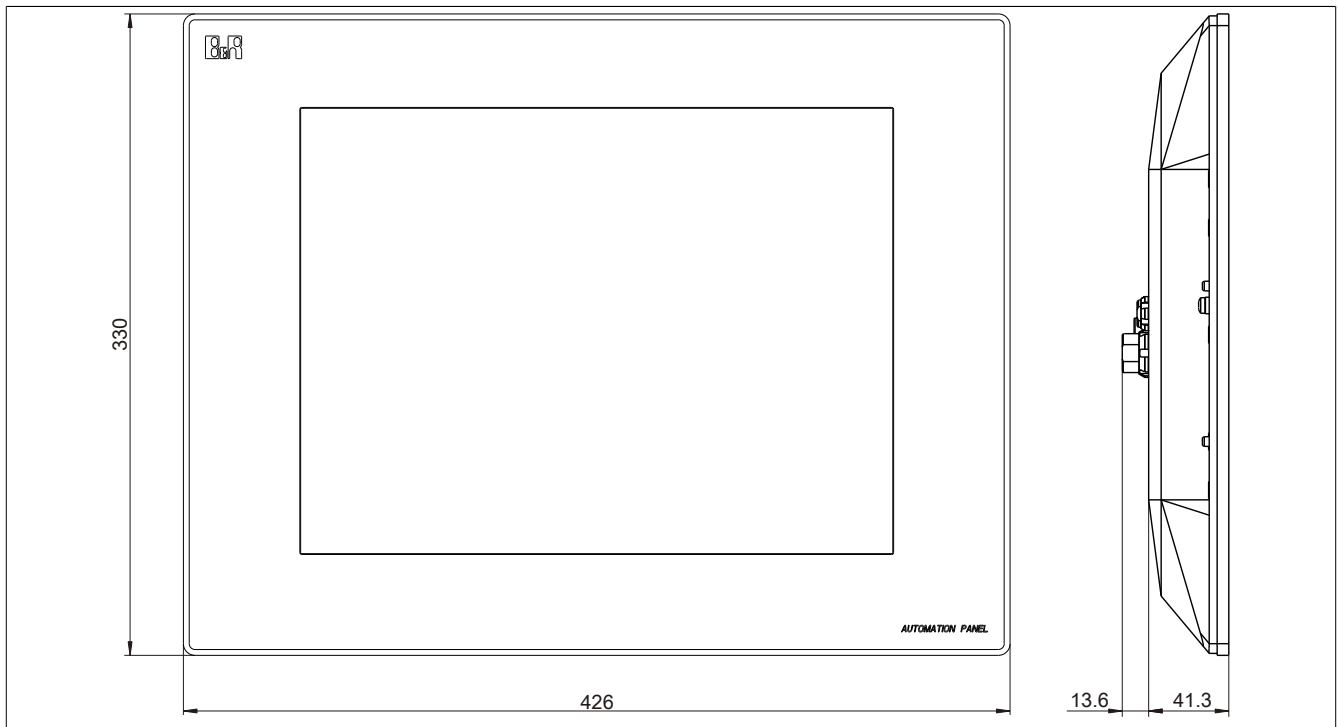


Figure 17: 5AP820.1505-00 - Dimensions

4.1.2 5AP880.1505-00

4.1.2.1 General information

- Automation Panel AP880
- Support arm mounting for optimal ergonomics
- 15" XGA color TFT display with touch screen (resistive)
- 40 function keys
- Connection for Smart Display Link
- IP65 protection (with flange)
- 24 VDC

4.1.2.2 Order data

Model number	Short description	Figure
	Display units	
5AP880.1505-00	Automation Panel AP880; 15" XGA color TFT display with touch screen (resistive); 40 function keys; connection for Smart Display Link; IP65 protection (with flange). 24 VDC.	
	Required accessories	
	Supply voltage cable	
5CAPWR.0018-20	Voltage supply cable for the Automation Panel 800, 1.8 m	
5CAPWR.0050-20	Voltage supply cable for the Automation Panel 800, 5 m	
5CAPWR.0100-20	Voltage supply cable for the Automation Panel 800, 10 m	
5CAPWR.0150-20	Voltage supply cable for the Automation Panel 800, 15 m	
5CAPWR.0200-20	Voltage supply cable for the Automation Panel 800, 20 m	
5CAPWR.0250-20	Voltage supply cable for the Automation Panel 800, 25 m	
5CAPWR.0300-20	Voltage supply cable for the Automation Panel 800, 30 m	
5CAPWR.0400-20	Voltage supply cable for the Automation Panel 800, 40 m	
	Optional accessories	
	Connectors	
5AC800.CON1-00	Straight connector for connecting keypad extensions to the Automation Panel 800	
5AC800.CON2-00	60° angled connector for connecting keypad extensions to the Automation Panel 800	
5AC800.COV1-00	Extension cover for the Automation Panel 800	
5AC800.COV2-00	USB extension cover for the Automation Panel 800	
	Flanges	
5AC800.FLG1-00	Flange for the Automation Panel 800 and standard support arm systems (e.g. Rittal CP-S)	
	Keyboard attachments	
5AC800.EXT1-00	Keypad extension for the Automation Panel 800; USB port; IP65 protection	
5AC800.EXT2-00	Keypad extension for the left side of the Automation Panel 800; 20 function keys and 20 system keys; IP65 protection	
5AC800.EXT2-01	Keypad extension for the right side of the Automation Panel 800; 20 function keys and 20 system keys; IP65 protection	
5AC800.EXT3-00	Keypad extension for the left side of the Automation Panel 800; 16 function keys, 8 illuminated ring keys; IP65 protection	
5AC800.EXT3-01	Keypad extension for the right side of the Automation Panel 800; 16 function keys, 8 illuminated ring keys; IP65 protection	
5AC800.EXT3-02	Keypad extension for the left side of the Automation Panel 800; 4 function keys, 12 illuminated ring keys, E-stop, key switch, IP65 protection	
5AC800.EXT3-03	Keypad extension for the right side of the Automation Panel 800; 4 function keys, 12 illuminated ring keys, E-stop, key switch, IP65 protection	
5AC800.EXT3-04	Keypad extension for the left side of the Automation Panel 800; 12 function keys, 8 illuminated ring keys, E-stop, key switch, IP65 protection	
5AC800.EXT3-05	Keypad extension for the right side of the Automation Panel 800; 12 function keys, 8 illuminated ring keys, E-stop, key switch, IP65 protection	

Table 10: 5AP880.1505-00 - Order data

4.1.2.3 Interfaces

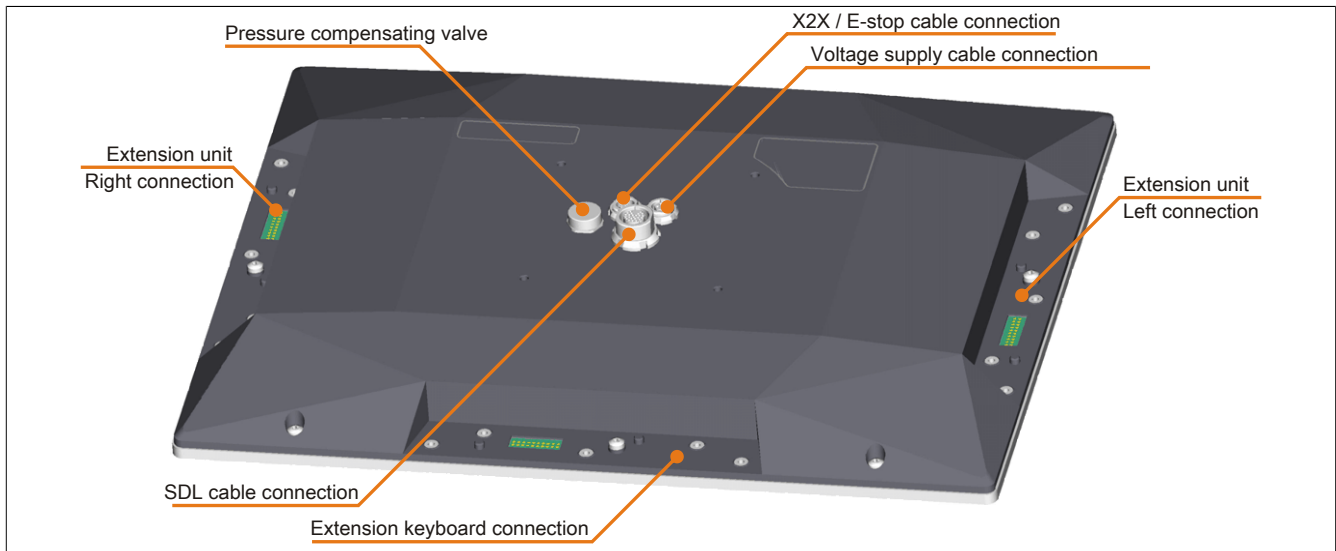


Figure 18: 5AP880.1505-00 - Interfaces

4.1.2.4 Technical data

Product ID	5AP880.1505-00	
Revision	G0	H0
General information		
B&R ID code	0x2087	
Certification		
CE	Yes	
cULus	Yes	
GOST-R	Yes	
Interfaces		
X2X Link	Yes	
Monitor/Panel interface		
Type	SDL ¹⁾	
Display		
Type	TFT color	
Display size	15" (381 mm)	
Colors	16 million	
Resolution	XGA, 1024 x 768 pixels	
Contrast	400:1	
Viewing angles		
Horizontal	Direction R / Direction L = 85°	
Vertical	Direction U / Direction D = 85°	
Backlight		
Type	CCFL	
Brightness	250 cd/m²	
Half-brightness time ²⁾	50,000 h	
Touch screen ³⁾		
Type	Elo AccuTouch	AMT
Technology	Analog, resistive	
Controller	Elo, serial, 12-bit	
Transmittance	Up to 78%	
Keys ⁴⁾		
Function keys	40 with LED (yellow)	
Soft keys	No	
System keys	No	
Service life	>1,000,000 actuations at 1 ±0.3N to 3 ±0.3 N actuating force	
LED brightness		
Yellow	Typ. 60 mcd	
Electrical characteristics		
Nominal voltage	24 VDC ±25%	
Nominal current	3.2 A	
Starting current	Typ. 5 A, max. 30 A for <300 µs	
Power consumption	Typ. 27 W, max. 36 W	
E-stop circuit loop resistance	Max. 5.5 Ω	
Operating conditions		
EN 60529 protection	All sides: IP65, dust and sprayed water protection	

Table 11: 5AP880.1505-00, 5AP880.1505-00 - Technical data

Product ID	5AP880.1505-00
Environmental conditions	
Temperature Operation	0 to 50°C (mounting orientation 0°) 0 to 50°C (mounting orientation up to -45°) 0 to 45°C (mounting orientation up to +45°)
Storage Transport	-25 to 60°C -25 to 60°C
Vibration Operation (continuous) Operation (occasional) Storage Transport	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 Storage Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Altitude ⁵⁾ Operation	Max. 3000 m
Mechanical characteristics	
Housing Material Paint	Aluminum (ADC12) Similar to silver metallic (semi-matt)
Front ⁶⁾ Frame Design Panel overlay Material Light background Color slide-in labels Gasket	Naturally anodized aluminum Gray Polyester Similar to Pantone 427CV Similar to Pantone white, to Pantone 429CV Foam perimeter seal
Dimensions Width Height Depth	426 mm 330 mm 41.3 mm (without flange)
Weight	Approx. 5000 g

Table 11: 5AP880.1505-00, 5AP880.1505-00 - Technical data

- 1) SDL = Smart Display Link.
- 2) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
- 3) Drivers for approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).
- 4) Key and LED functions can be configured with the B&R Key Editor, which is available in the Downloads sections of the B&R website (www.br-automation.com). This software is also included on the B&R HMI Driver & Utilities DVD (model number 5SWHMI.0000-00).
- 5) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 6) There may be visible deviations in the color and surface appearance depending on the process or batch.

4.1.2.5 Temperature humidity diagram

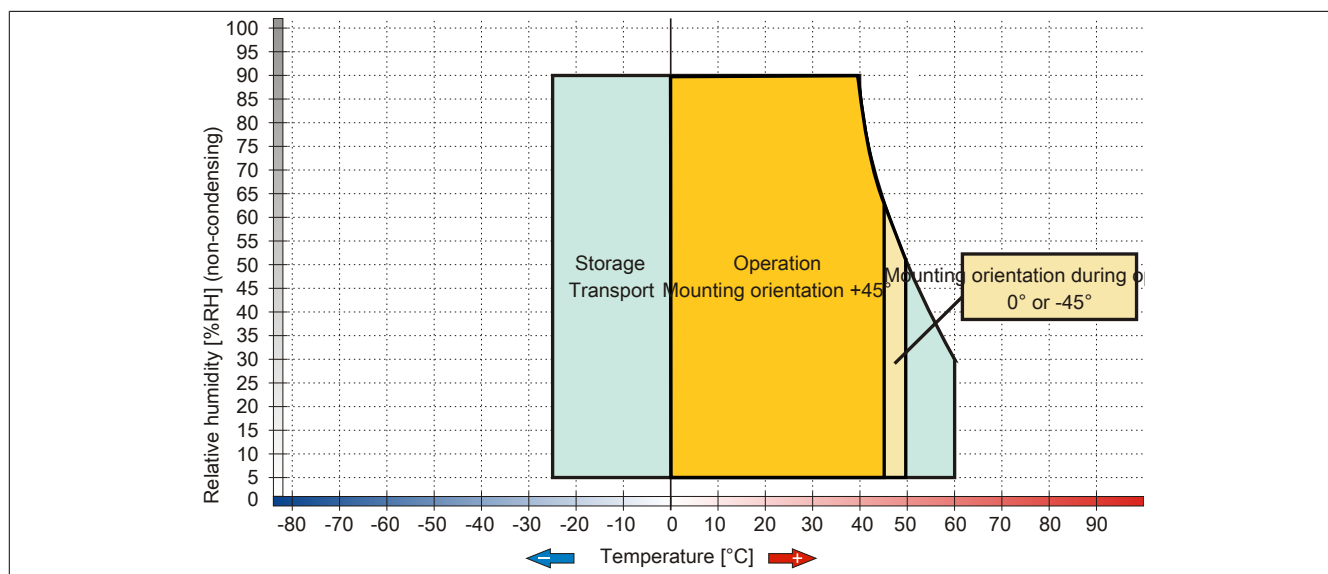


Figure 19: 5AP880.1505-00 - Temperature humidity diagram

4.1.2.6 Dimensions

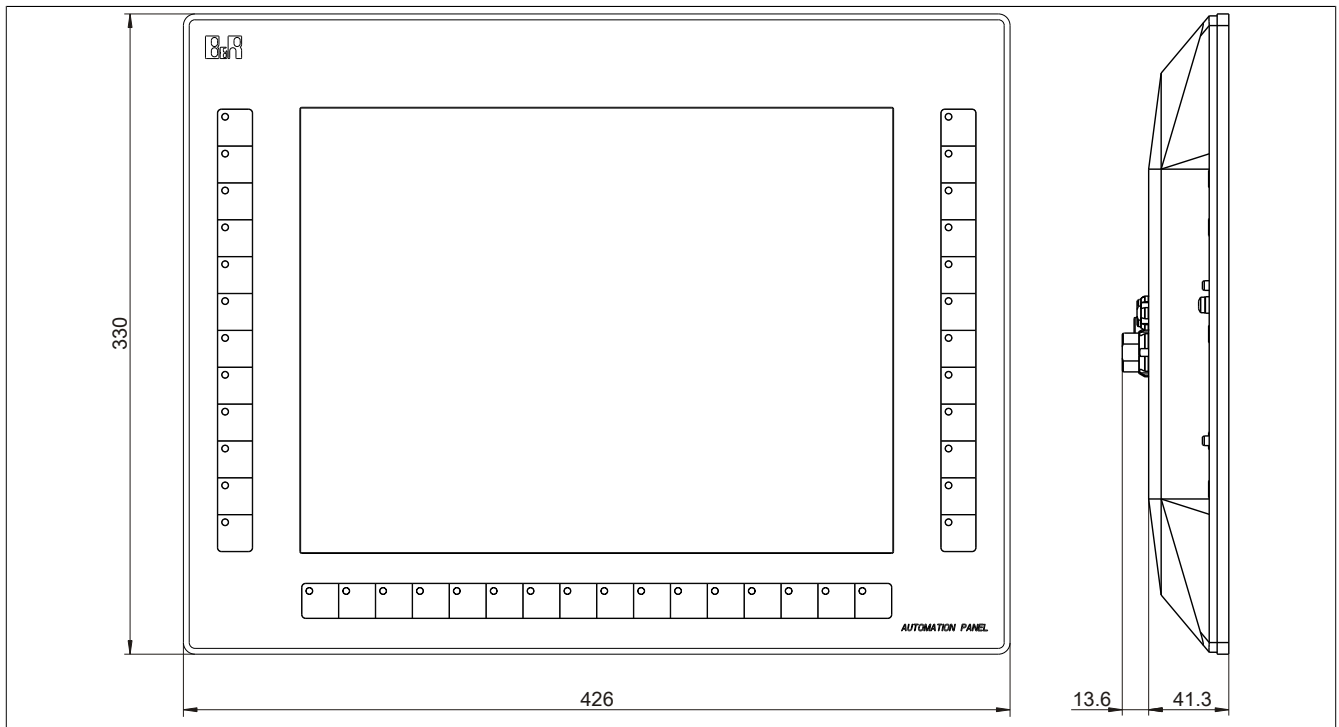


Figure 20: 5AP880.1505-00 - Dimensions

4.1.2.7 Key dimensions

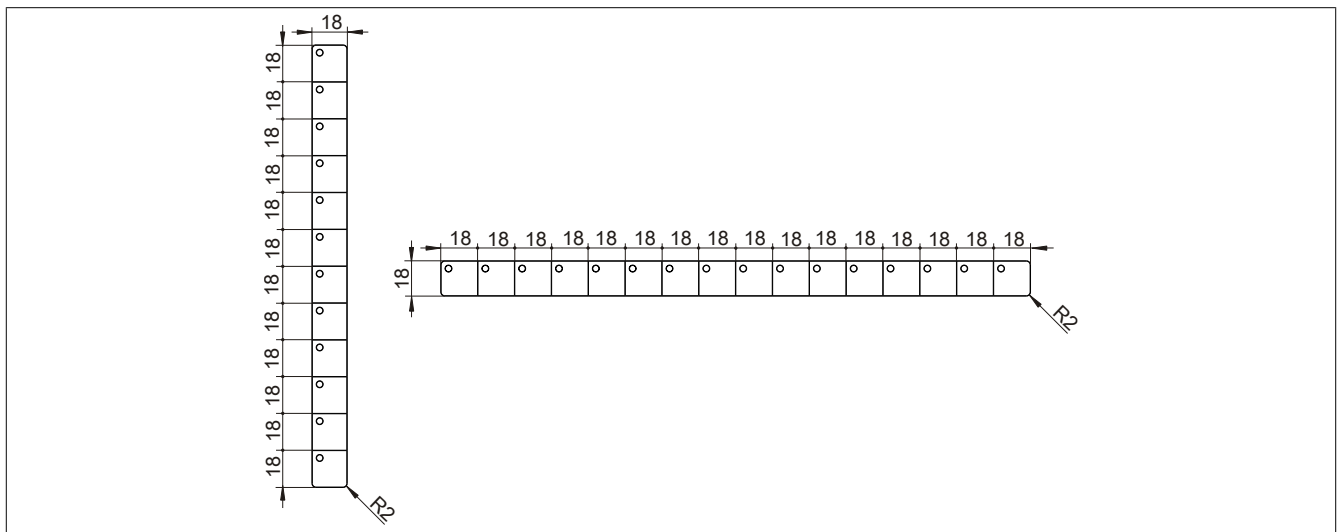


Figure 21: 5AP880.1505-00 - Key dimensions

4.1.3 Pinout

Information:

The following information is valid for both display units (5AP820.1505-00 and 5AP880.1505-00).

4.1.3.1 SDL cable connection

Caution!

SDL cables can only be plugged in and unplugged when the industrial PC (e.g. APC810) and display device (Automation Panel 800) are turned off.

SDL cable connection - Pinout			
ODU 24-pin MINI-SNAP			
Pin	Assignment	Pin	Assignment
1	XUSB1-	13	T.M.D.S. Clock +
2	XUSB0-	14	T.M.D.S. DATA 0/XUSB1 Shield
3	NC	15	T.M.D.S. Data 0-
4	T.M.D.S. Clock Shield	16	T.M.D.S. Data 0+
5	XUSB1+	17	T.M.D.S. DATA 1/XUSB0 Shield
6	+ 5 V power ¹⁾	18	DDC Clock T.M.D.S. DATA 1-
7	XUSB0+	19	DDC Data T.M.D.S. DATA 1+
8	Hot plug detect	20	Ground (return for + 5V, HSync and VSync)
9	DDC clock	21	T.M.D.S. Data 2-
10	DDC data	22	T.M.D.S. Data 2+
11	SDL+	23	T.M.D.S. Data 2/SDL Shield
12	T.M.D.S. Clock -	24	SDL-



Table 12: SDL cable connection - Pinout

1) Protected internally by a multifuse.

4.1.3.2 Supply voltage cable connection

Supply voltage - Pinout	
ODU 3-pin MINI-SNAP, electrically isolated	
Pin	Assignment
1	+
2	Functional ground
3	-

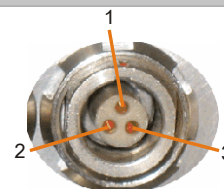


Table 13: Supply voltage - Pinout

4.1.3.3 X2X / E-stop cable connection

Pinout - X2X / E-stop cable connection	
ODU 10-pin MINI-SNAP, electrically isolated	
Pin	Assignment
1	E-stop N.C. contact 1 (12)
2	E-stop N.C. contact 2 (22)
3	X2X_+24V (bus supply +)
4	E-stop N.C. contact 1 (11)
5	E-stop N.C. contact 2 (21)
6	X2X_0V (bus supply -)
7	n. c.
8	n. c.
9	X2X\ (IN)
10	X2X (IN)

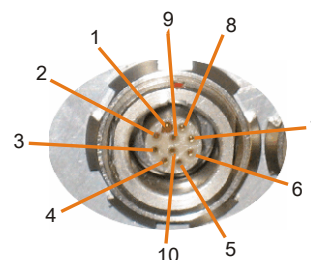


Table 14: Pinout - X2X / E-stop cable connection

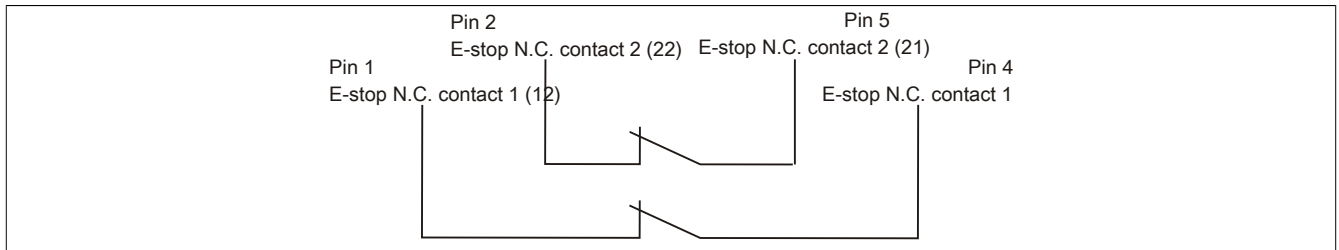


Figure 22: E-stop circuit connections

4.2 Extension units

4.2.1 5AC800.EXT1-00

4.2.1.1 General information

This keypad extension for the Automation Panel 800 is equipped with an integrated USB port and provides IP65 protection.

- AP800 keypad extension (bottom)
- Alphanumeric Windows keyboard
- US International keyboard layout
- USB 1.1 interface
- IP65 protection

4.2.1.2 Order data

Model number	Short description	Figure
5AC800.EXT1-00	Keyboard attachments	
	Keypad extension for the Automation Panel 800; USB port; IP65 protection	

Table 15: 5AC800.EXT1-00 - Order data

4.2.1.3 Interfaces

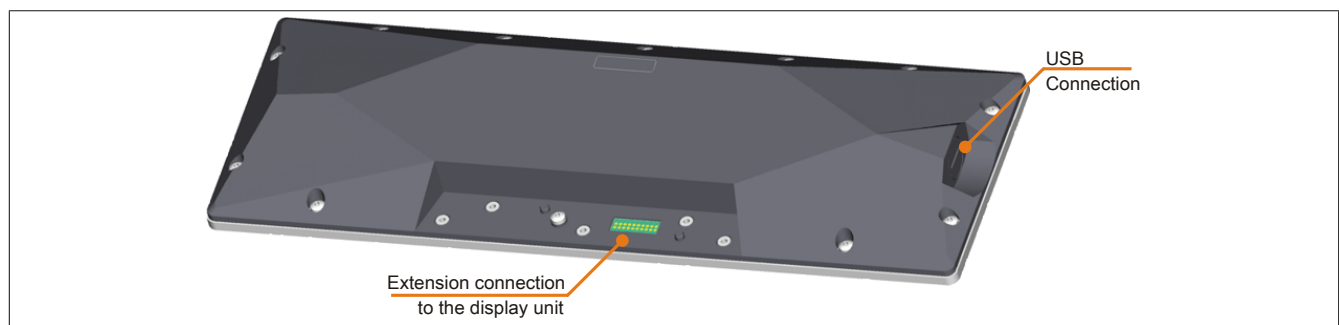


Figure 23: 5AC800.EXT1-00 - Interfaces

4.2.1.4 Technical data

Product ID	5AC800.EXT1-00
General information	
LEDs	3
Certification	
CE	Yes
cULus	Yes
GOST-R	Yes
Interfaces	
USB	
Quantity	1
Type	USB 1.1
Design	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s)
Current load	Max. 500 mA
Keys ¹⁾	
Function keys	No
Soft keys	No
System keys	Alphanumeric keys, numeric keys, cursor block
E-stop	No
Key switches	No
LED brightness	
Yellow	60 mcd
Green	35 mcd

Table 16: 5AC800.EXT1-00 - Technical data

Product ID	5AC800.EXT1-00
Electrical characteristics	
Power consumption	Max. 4 W
E-stop circuit loop resistance	Max. 1 Ω
Operating conditions	
EN 60529 protection	All sides: IP65, dust and sprayed water protection
Environmental conditions	
Temperature	
Operation	0 to 50°C
Storage	-25 to 60°C
Transport	-25 to 60°C
Vibration	
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g
Storage	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Transport	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Shock	
Operation	15 g, 11 ms
Storage	30 g, 15 ms
Transport	30 g, 15 ms
Altitude ²⁾	
Operation	Max. 3000 m
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt)
Front ³⁾	
Frame	Naturally anodized aluminum
Design	Gray
Panel overlay	
Light background	Similar to Pantone 427CV
Installation	Required for installation below an Automation Panel 800 display
Dimensions	
Width	426 mm
Height	146.8 mm
Depth	34.9 mm
Weight	1600 g

Table 16: 5AC800.EXT1-00 - Technical data

- 1) Key and LED functions can be configured with the B&R Key Editor, which is available in the Downloads sections of the B&R website (www.br-automation.com). This software is also included on the B&R HMI Driver & Utilities DVD (model number 5SWHMI.0000-00).
- 2) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

4.2.1.5 Temperature humidity diagram

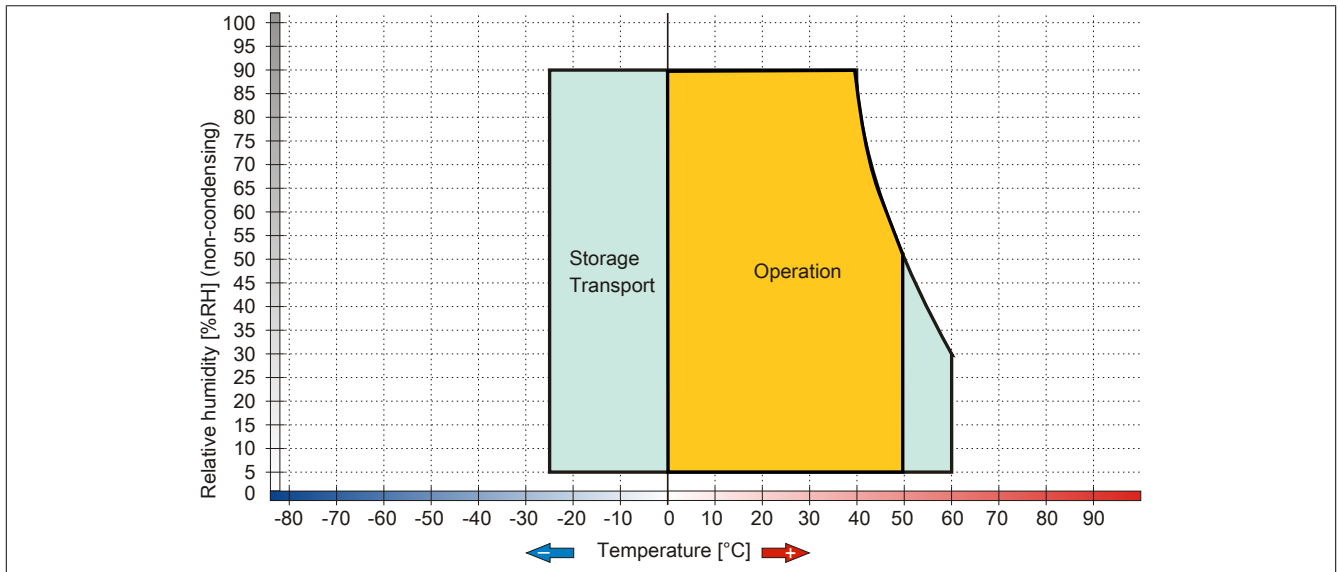


Figure 24: Keyboard extension - Temperature humidity diagram

4.2.1.6 Dimensions

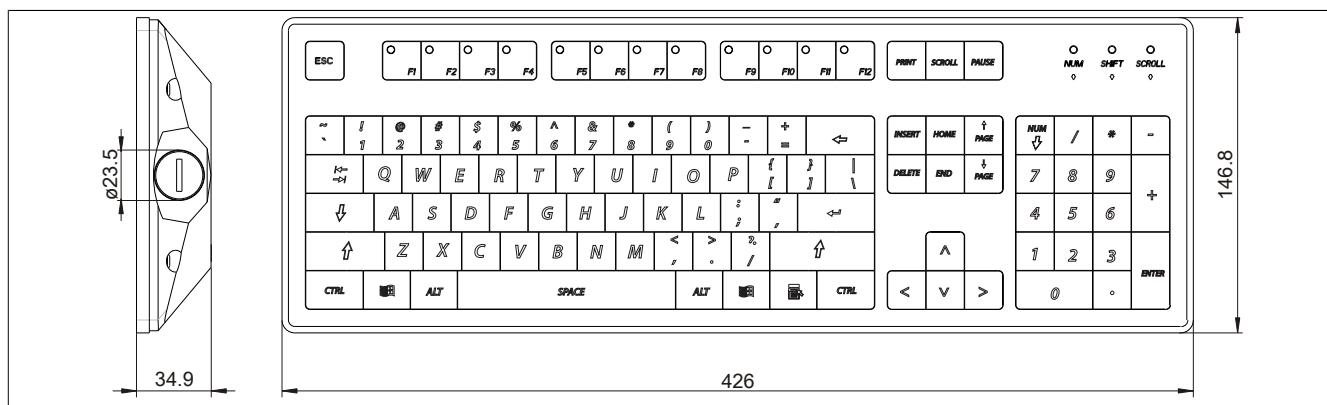


Figure 25: 5AC800.EXT1-00 - Dimensions

4.2.1.7 Key dimensions

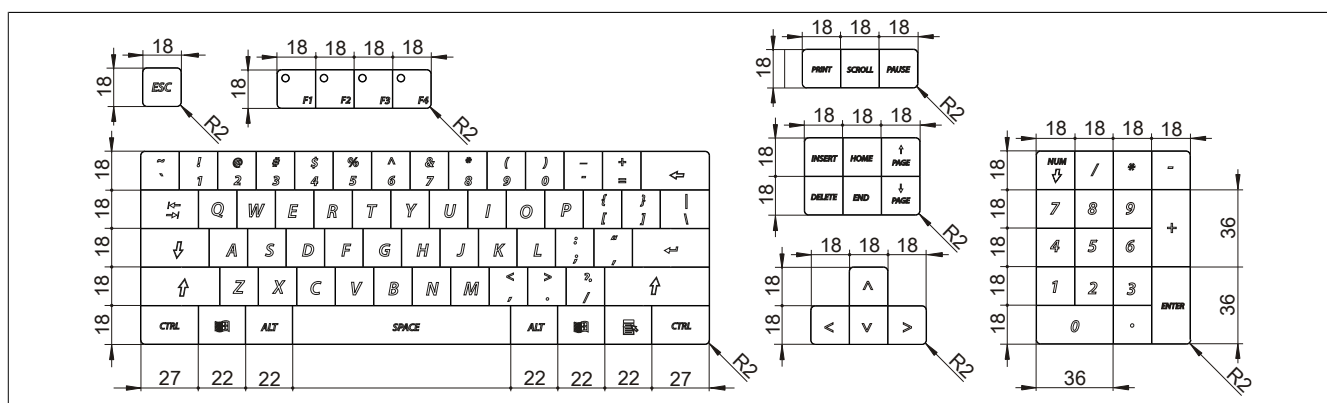


Figure 26: 5AC800.EXT1-00 - Key dimensions

4.2.2 5AC800.EXT2-00

4.2.2.1 General information

The keyboard expansion is equipped with 20 function keys and 20 system keys and can be mounted on the left side of the Automation Panel 800.

- AP800 keyboard expansion (left)
- 20 function keys
- 20 system keys
- IP65 protection

4.2.2.2 Order data

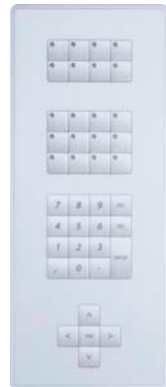
Model number	Short description	Figure
	Keyboard attachments	
5AC800.EXT2-00	Keypad extension for the left side of the Automation Panel 800; 20 function keys and 20 system keys; IP65 protection	
	Optional accessories	
	Accessories	
5AC800.EXTX-00	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT2-00 and 5AC800.EXT2-01; for 3 devices	

Table 17: 5AC800.EXT2-00 - Order data

4.2.2.3 Keys and interfaces

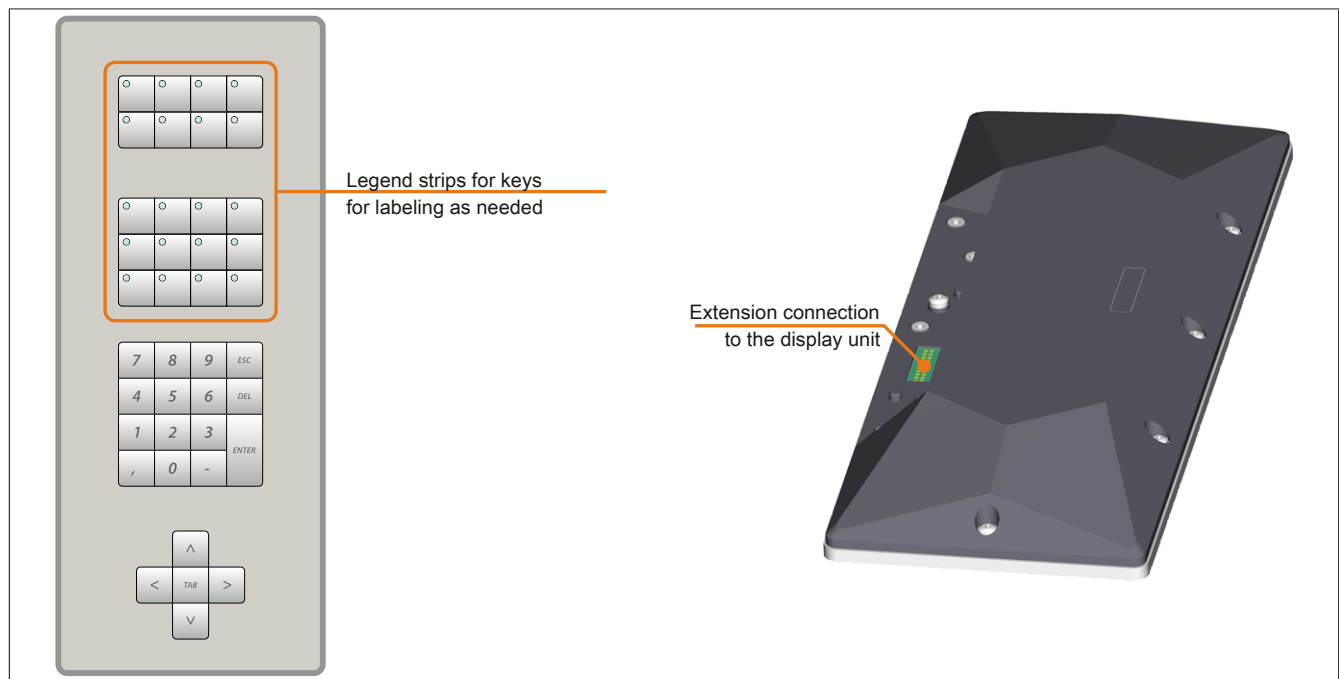


Figure 27: 5AC800.EXT2-00 - Keys and interfaces

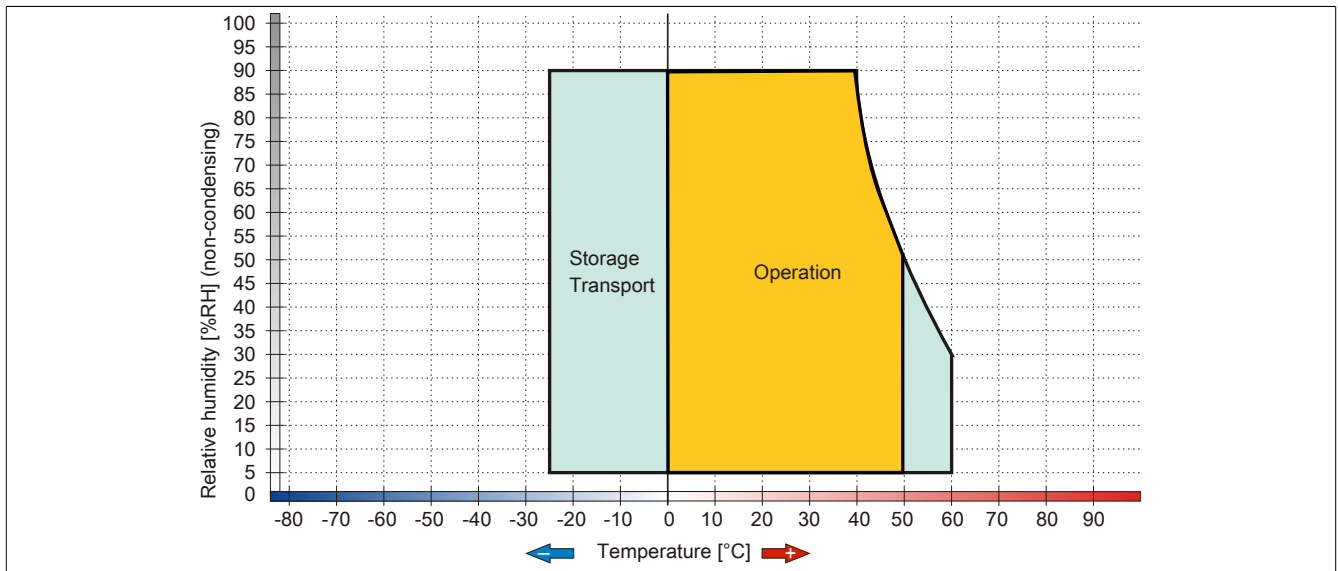
4.2.2.4 Technical data

Product ID	5AC800.EXT2-00
General information	
LEDs	No
Certification	
CE	Yes
cULus	Yes
GOST-R	Yes
Keys ¹⁾	
Function keys	20 with LED (yellow)
Soft keys	No
System keys	Numeric keys, cursor block
Illuminated ring keys	No
E-stop	No
Key switches	No
LED brightness	
Yellow	60 mcd
Electrical characteristics	
Power consumption	Max. 1 W
E-stop circuit loop resistance	Max. 1 Ω
Operating conditions	
EN 60529 protection	All sides: IP65, dust and sprayed water protection
Environmental conditions	
Temperature	
Operation	0 to 50°C
Storage	-25 to 60°C
Transport	-25 to 60°C
Vibration	
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g
Storage	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Transport	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Shock	
Operation	15 g, 11 ms
Storage	30 g, 15 ms
Transport	30 g, 15 ms
Altitude ²⁾	
Operation	Max. 3000 m
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt)
Front ³⁾	
Frame	Naturally anodized aluminum
Design	Gray
Panel overlay	
Light background	Similar to Pantone 427CV
Color slide-in labels	Similar to Pantone white, to Pantone 429CV
Dimensions	
Width	135 mm
Height	330 mm
Depth	34.9 mm
Weight	1100 g

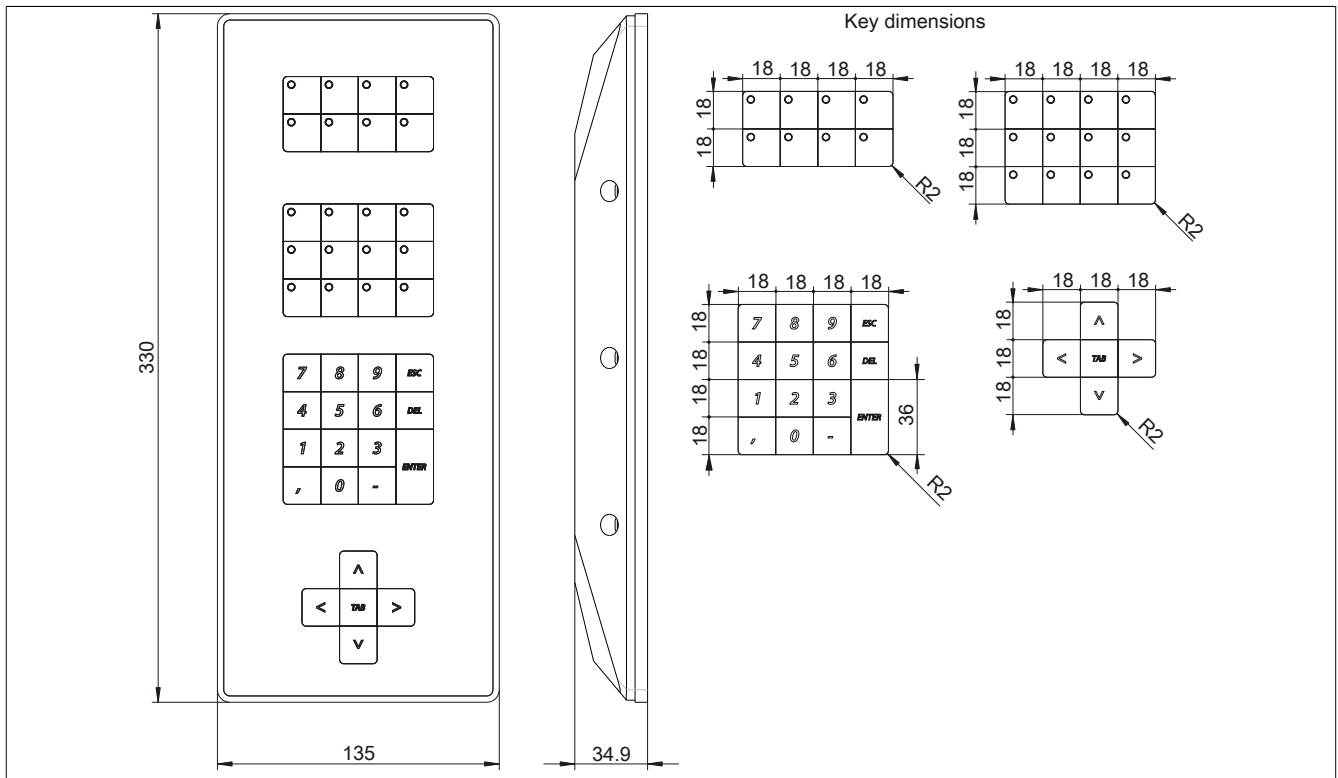
Table 18: 5AC800.EXT2-00 - Technical data

- 1) Key and LED functions can be configured with the B&R Key Editor, which is available in the Downloads sections of the B&R website (www.br-automation.com). This software is also included on the B&R HMI Driver & Utilities DVD (model number 5SWHMI.0000-00).
- 2) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

4.2.2.5 Temperature humidity diagram



4.2.2.6 Dimensions



4.2.3 5AC800.EXT2-01

4.2.3.1 General information

The keyboard expansion is equipped with 20 function keys and 20 system keys and can be mounted on the right side of the Automation Panel 800.

- AP800 keypad extension (right)
- 20 function keys
- 20 system keys
- IP65 protection

4.2.3.2 Order data

Model number	Short description	Figure
	Keyboard attachments	
5AC800.EXT2-01	Keypad extension for the right side of the Automation Panel 800; 20 function keys and 20 system keys; IP65 protection	
	Optional accessories	
	Accessories	
5AC800.EXTX-00	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT2-00 and 5AC800.EXT2-01; for 3 devices	

Table 19: 5AC800.EXT2-01 - Order data

4.2.3.3 Keys and interfaces

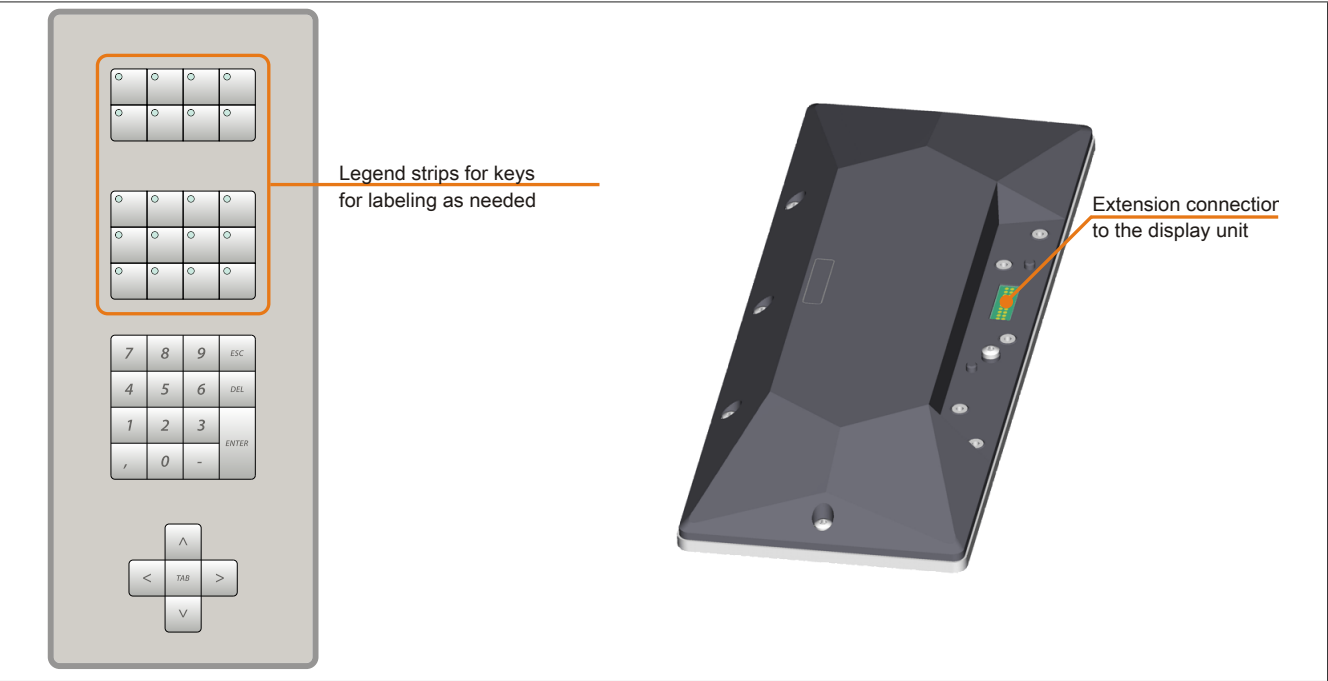


Figure 30: 5AC800.EXT2-01 - Keys and interfaces

4.2.3.4 Technical data

Product ID	5AC800.EXT2-01
General information	
LEDs	No
Certification	
CE	Yes
cULus	Yes
GOST-R	Yes
Keys ¹⁾	
Function keys	20 with LED (yellow)
Soft keys	No
System keys	Numeric keys, cursor block
Illuminated ring keys	No
E-stop	No
Key switches	No
LED brightness	
Yellow	60 mcd
Electrical characteristics	
Power consumption	Max. 1 W
E-stop circuit loop resistance	Max. 1 Ω
Operating conditions	
EN 60529 protection	All sides: IP65, dust and sprayed water protection
Environmental conditions	
Temperature	
Operation	0 to 50°C
Storage	-25 to 60°C
Transport	-25 to 60°C
Vibration	
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g
Storage	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Transport	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Shock	
Operation	15 g, 11 ms
Storage	30 g, 15 ms
Transport	30 g, 15 ms
Altitude ²⁾	
Operation	Max. 3000 m
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt)
Front ³⁾	
Frame	Naturally anodized aluminum
Design	Gray
Panel overlay	
Light background	Similar to Pantone 427CV
Color slide-in labels	Similar to Pantone white, to Pantone 429CV
Dimensions	
Width	135 mm
Height	330 mm
Depth	34.9 mm
Weight	1100 g

Table 20: 5AC800.EXT2-01 - Technical data

- 1) Key and LED functions can be configured with the B&R Key Editor, which is available in the Downloads sections of the B&R website (www.br-automation.com). This software is also included on the B&R HMI Driver & Utilities DVD (model number 5SWHMI.0000-00).
- 2) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

4.2.3.5 Temperature humidity diagram

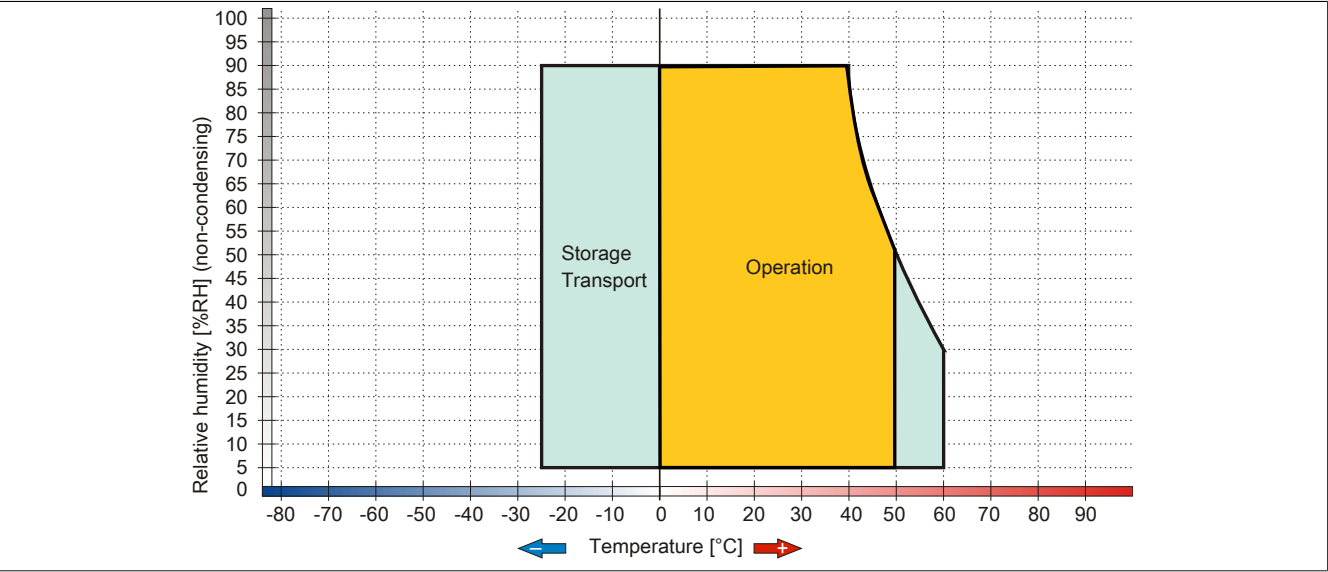


Figure 31: Keyboard extension - Temperature humidity diagram

4.2.3.6 Dimensions

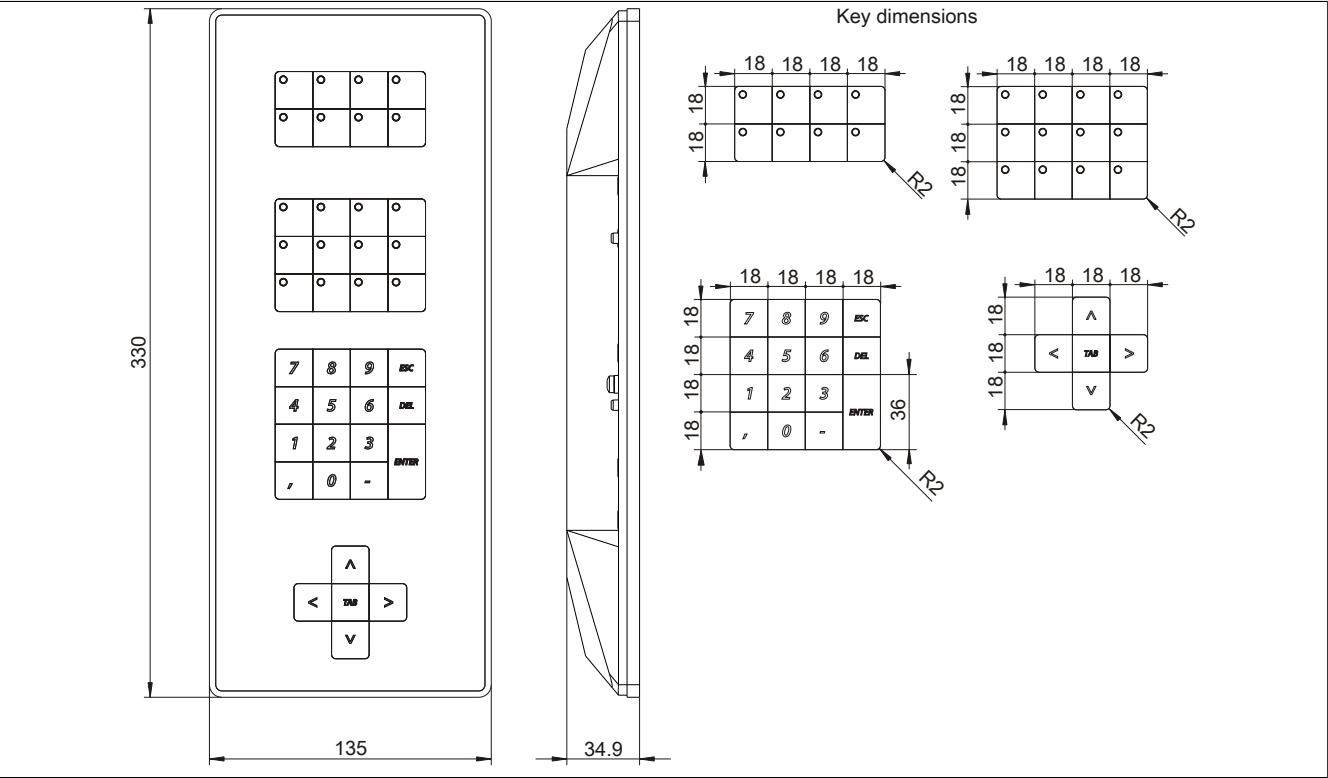


Figure 32: 5AC800.EXT2-01 - Dimensions

4.2.4 5AC800.EXT3-00

4.2.4.1 General information

The keyboard expansion is equipped with 16 function keys and 8 illuminated ring keys and can be mounted on the left side of the Automation Panel 800.

- AP800 keyboard expansion (left)
- 16 function keys
- 8 illuminated ring keys
- IP65 protection

4.2.4.2 Order data

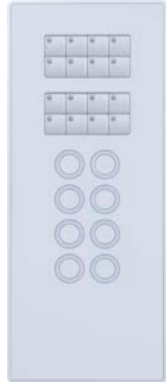
Model number	Short description	Figure
	Keyboard attachments	
5AC800.EXT3-00	Keypad extension for the left side of the Automation Panel 800; 16 function keys, 8 illuminated ring keys; IP65 protection	
	Optional accessories	
	Accessories	
5AC800.EXTX-01	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT3-00 and 5AC800.EXT3-01; for 2 devices	

Table 21: 5AC800.EXT3-00 - Order data

4.2.4.3 Keys and interfaces

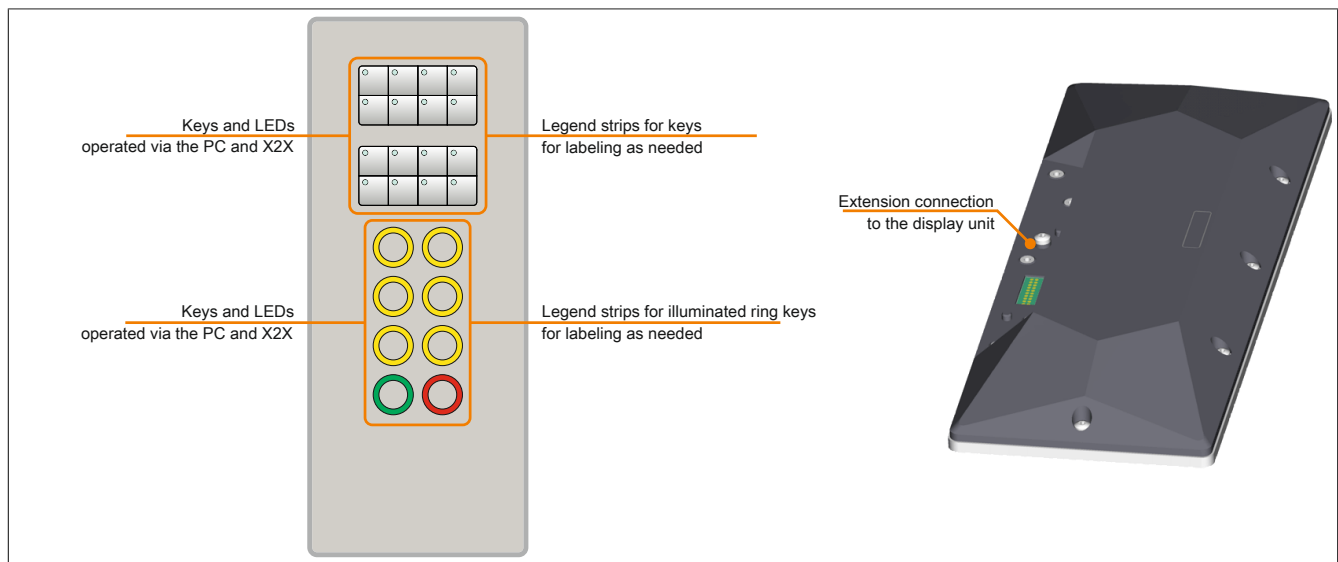


Figure 33: 5AC800.EXT3-00 - Keys and interfaces

4.2.4.4 Technical data

Product ID	5AC800.EXT3-00
General information	
LEDs	No
Certification	
CE	Yes
cULus	Yes
GOST-R	Yes
Keys ¹⁾	
Function keys	16 with LED (yellow)

Table 22: 5AC800.EXT3-00 - Technical data

Product ID	5AC800.EXT3-00
Soft keys	No
System keys	No
Illuminated ring keys	8
E-stop	No
Key switches	No
LED brightness	
Yellow	Typ. 60 mcd
Red	Typ. 54 mcd
Green	Typ. 35 mcd
Electrical characteristics	
Power consumption	Max. 7 W
E-stop circuit loop resistance	Max. 5 Ω
Operating conditions	
EN 60529 protection	All sides: IP65, dust and sprayed water protection
Environmental conditions	
Temperature	
Operation	0 to 50°C
Storage	-25 to 60°C
Transport	-25 to 60°C
Vibration	
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g
Storage	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Transport	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Shock	
Operation	15 g, 11 ms
Storage	30 g, 15 ms
Transport	30 g, 15 ms
Altitude ²⁾	
Operation	Max. 3000 m
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt)
Front ³⁾	
Frame	Naturally anodized aluminum
Design	Gray
Panel overlay	
Light background	Similar to Pantone 427CV
Color slide-in labels	Similar to Pantone white, to Pantone 429CV
Dimensions	
Width	135 mm
Height	330 mm
Depth	34.9 mm
Weight	1100 g

Table 22: 5AC800.EXT3-00 - Technical data

- 1) Key and LED functions can be configured with the B&R Key Editor, which is available in the Downloads sections of the B&R website (www.br-automation.com). This software is also included on the B&R HMI Driver & Utilities DVD (model number 5SWHMI.0000-00).
- 2) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

4.2.4.5 Temperature humidity diagram

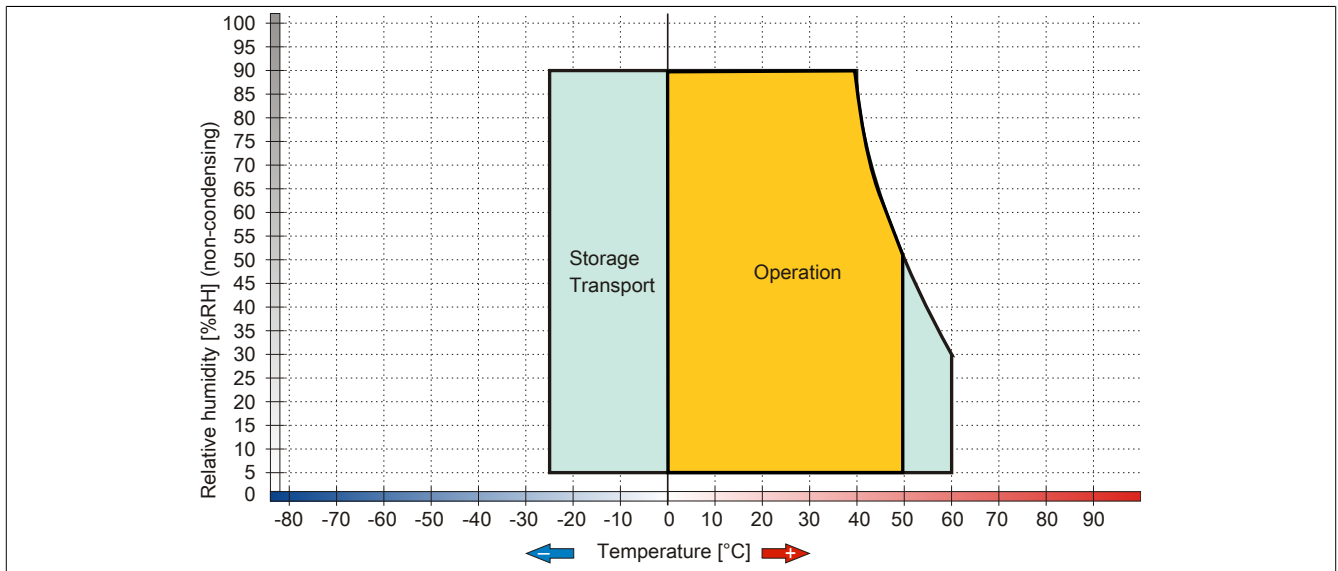


Figure 34: Keyboard extension - Temperature humidity diagram

4.2.4.6 Dimensions

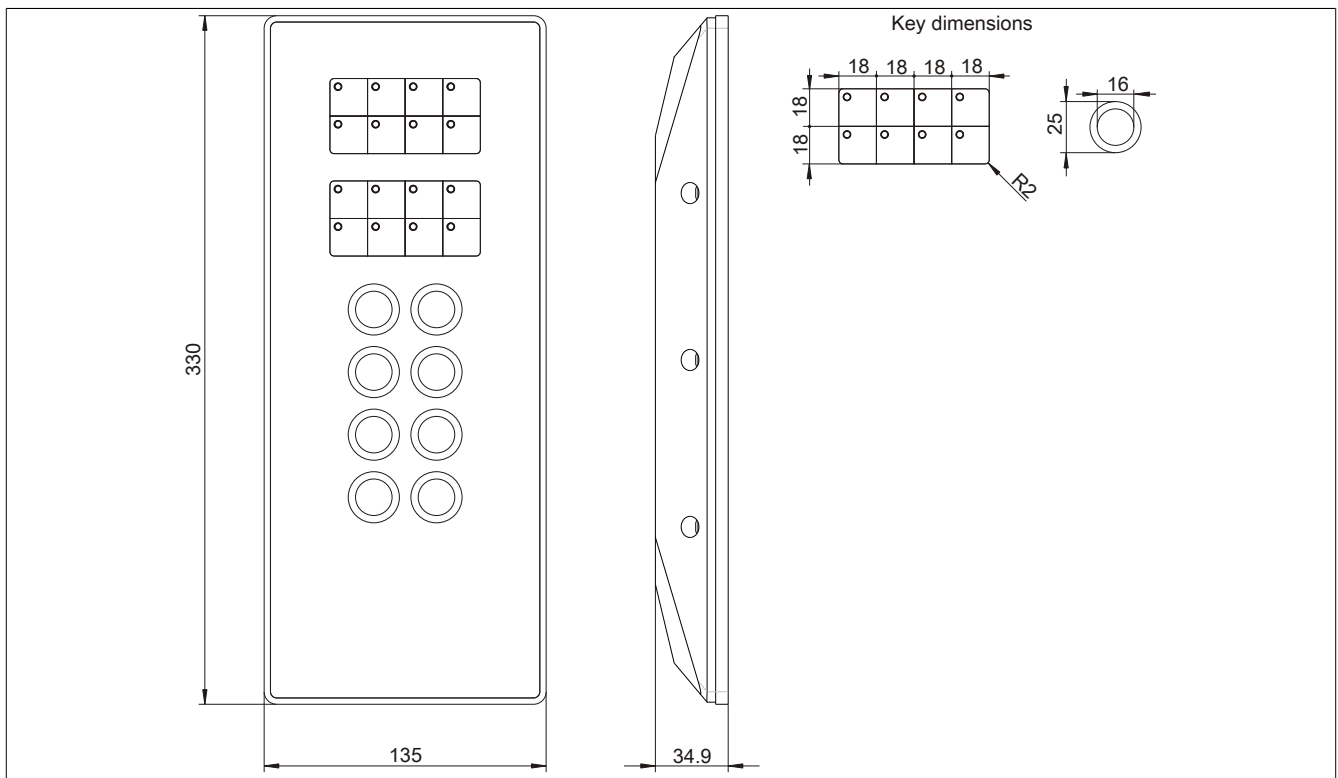


Figure 35: 5AC800.EXT3-00 - Dimensions

4.2.5 5AC800.EXT3-01

4.2.5.1 General information

The keyboard expansion is equipped with 16 function keys and 8 illuminated ring keys and can be mounted on the left side of the Automation Panel 800.

- AP800 keypad extension (right)
- 16 function keys
- 8 illuminated ring keys
- IP65 protection

4.2.5.2 Order data

Model number	Short description	Figure
	Keyboard attachments	
5AC800.EXT3-01	Keypad extension for the right side of the Automation Panel 800; 16 function keys, 8 illuminated ring keys; IP65 protection	
	Optional accessories	
	Accessories	
5AC800.EXTX-01	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT3-00 and 5AC800.EXT3-01; for 2 devices	

Table 23: 5AC800.EXT3-01 - Order data

4.2.5.3 Keys and interfaces

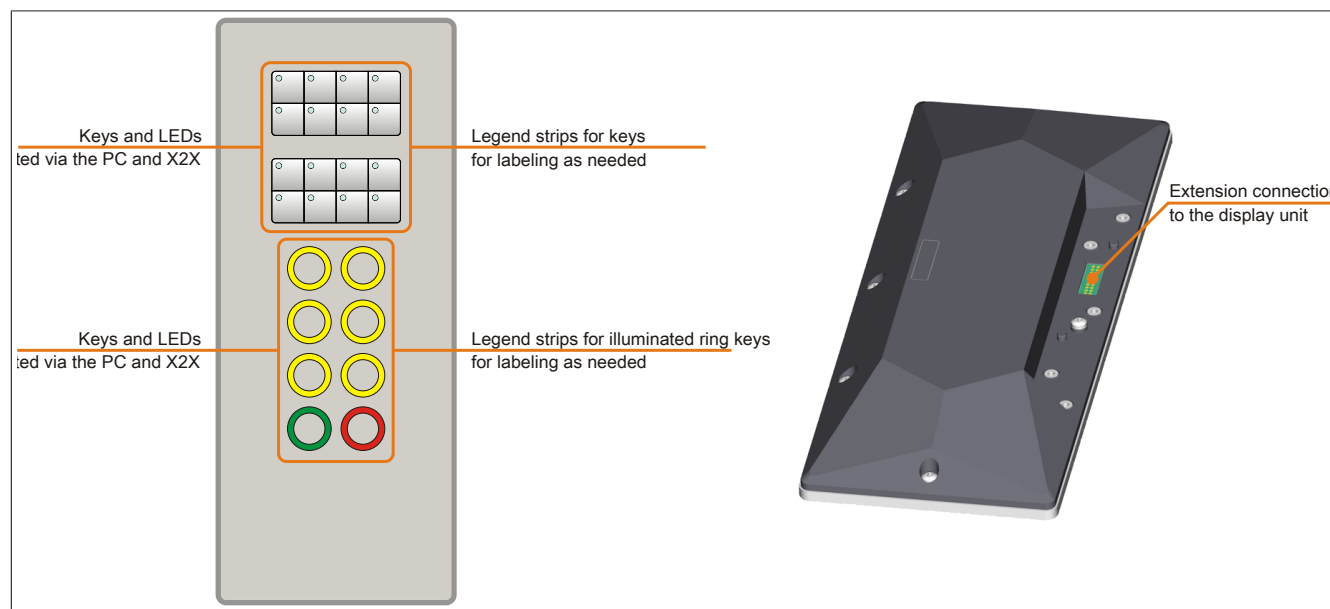


Figure 36: 5AC800.EXT3-01 - Keys and interfaces

4.2.5.4 Technical data

Product ID	5AC800.EXT3-01
General information	
LEDs	No
Certification	
CE	Yes
cULus	Yes
GOST-R	Yes

Table 24: 5AC800.EXT3-01 - Technical data

Product ID	5AC800.EXT3-01
Keys ¹⁾	
Function keys	16 with LED (yellow)
Soft keys	No
System keys	No
Illuminated ring keys	8
E-stop	No
Key switches	No
LED brightness	
Yellow	Typ. 60 mcd
Red	Typ. 54 mcd
Green	Typ. 35 mcd
Electrical characteristics	
Power consumption	Max. 7 W
E-stop circuit loop resistance	Max. 5 Ω
Operating conditions	
EN 60529 protection	All sides: IP65, dust and sprayed water protection
Environmental conditions	
Temperature	
Operation	0 to 50°C
Storage	-25 to 60°C
Transport	-25 to 60°C
Vibration	
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g
Storage	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Transport	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Shock	
Operation	15 g, 11 ms
Storage	30 g, 15 ms
Transport	30 g, 15 ms
Altitude ²⁾	
Operation	Max. 3000 m
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt)
Front ³⁾	
Frame	Naturally anodized aluminum
Design	Gray
Panel overlay	
Light background	Similar to Pantone 427CV
Color slide-in labels	Similar to Pantone white, to Pantone 429CV
Dimensions	
Width	135 mm
Height	330 mm
Depth	34.9 mm
Weight	1100 g

Table 24: 5AC800.EXT3-01 - Technical data

- 1) Key and LED functions can be configured with the B&R Key Editor, which is available in the Downloads sections of the B&R website (www.br-automation.com). This software is also included on the B&R HMI Driver & Utilities DVD (model number 5SWHMI.0000-00).
- 2) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

4.2.5.5 Temperature humidity diagram

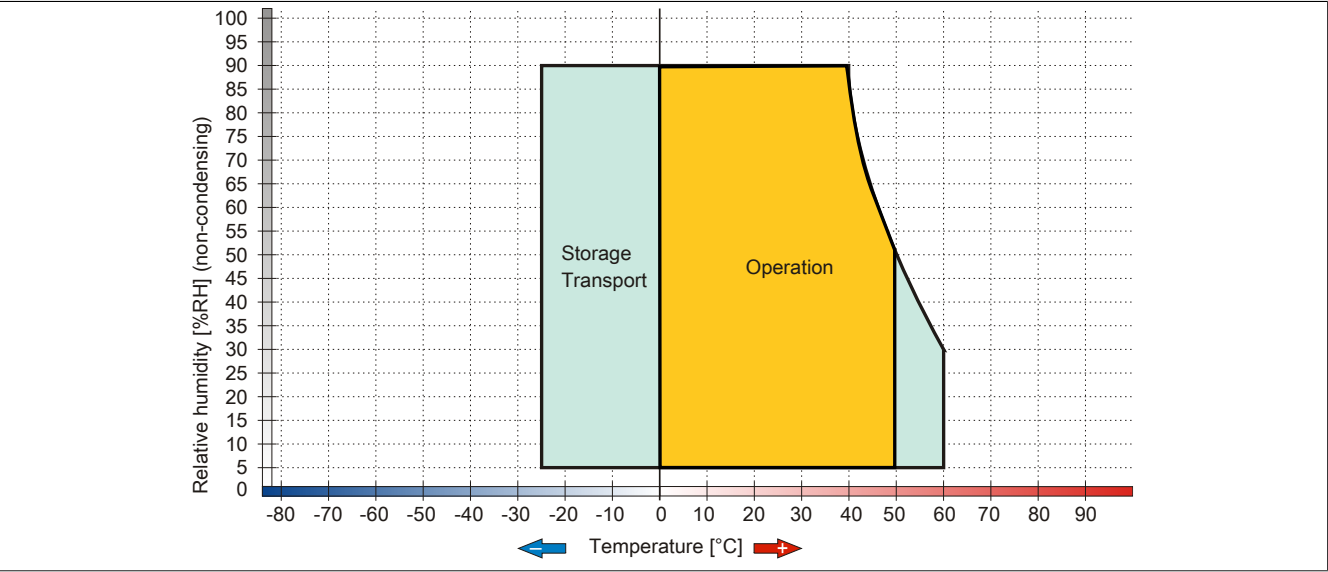


Figure 37: Keyboard extension - Temperature humidity diagram

4.2.5.6 Dimensions

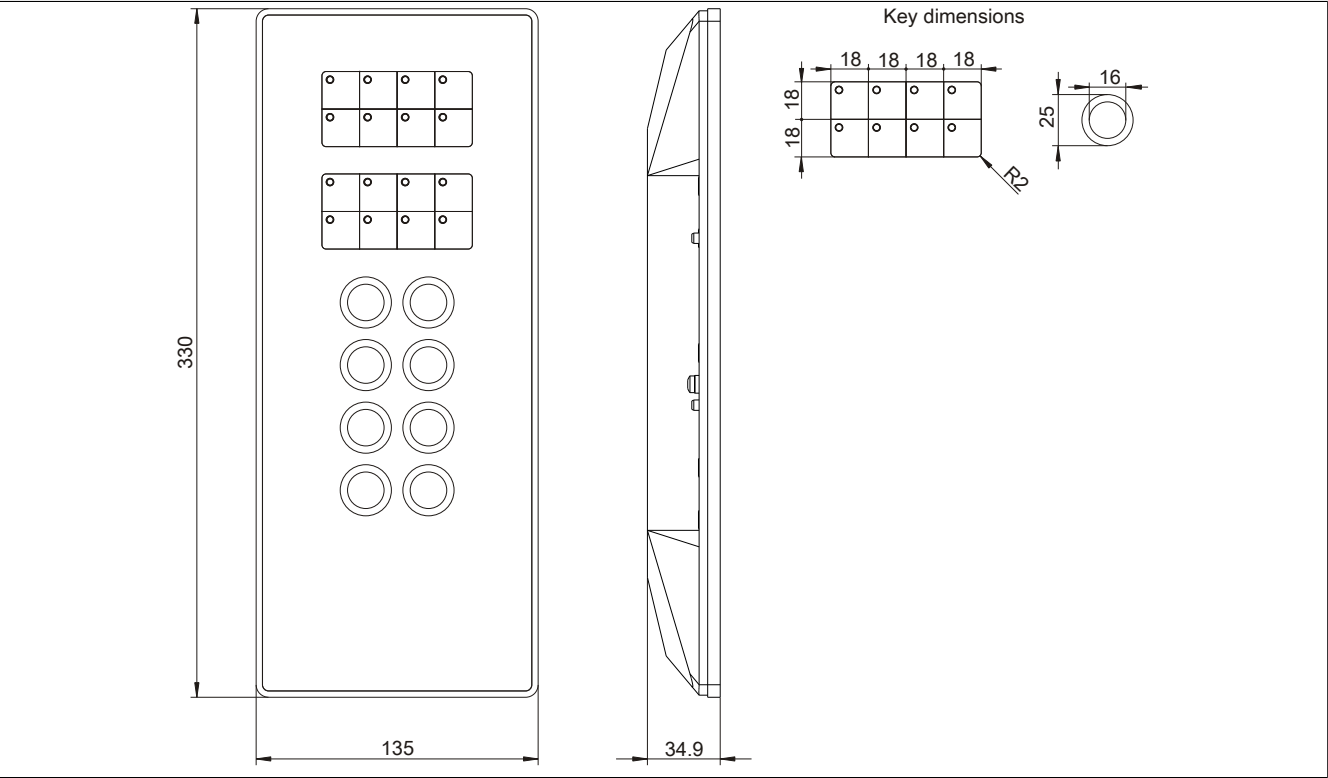


Figure 38: 5AC800.EXT3-01 - Dimensions

4.2.6 5AC800.EXT3-02

4.2.6.1 General information

The keyboard expansion is equipped with 4 function keys, 12 illuminated ring keys, 1 E-stop and 1 key switch and can be mounted on the left side of the Automation Panel 800.

- AP800 keypad extension (left)
- 4 function keys
- 12 illuminated ring keys
- E-stop switch
- Key switch
- IP65 protection

4.2.6.2 Order data

Model number	Short description	Figure
	Keyboard attachments	
5AC800.EXT3-02	Keypad extension for the left side of the Automation Panel 800; 4 function keys, 12 illuminated ring keys, E-stop, key switch, IP65 protection	
	Optional accessories	
	Accessories	
5AC800.EXTX-03	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT3-02 and 5AC800.EXT3-03; for 3 devices	

Table 25: 5AC800.EXT3-02 - Order data

4.2.6.3 Keys and interfaces

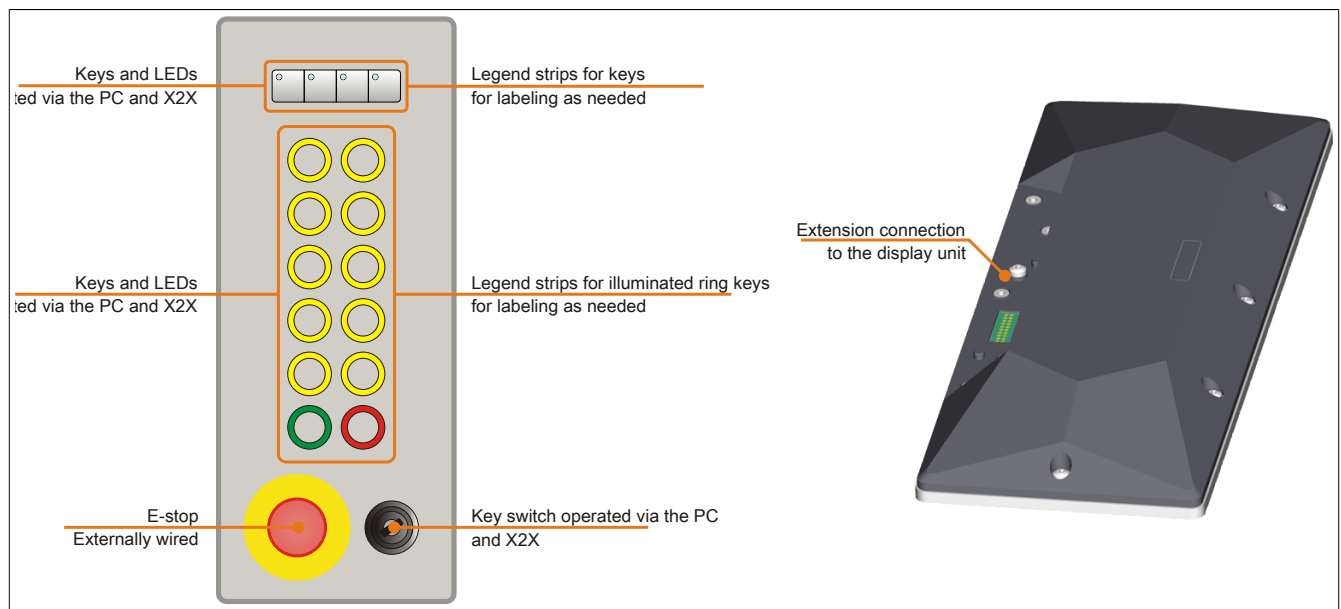


Figure 39: 5AC800.EXT3-02 - Keys and interfaces

4.2.6.4 Technical data

Product ID	5AC800.EXT3-02
General information	
LEDs	No
Certification	
CE	Yes
cULus	Yes
GOST-R	Yes
Keys ¹⁾	
Function keys	4 with LED (yellow)
Soft keys	No
System keys	No
Illuminated ring keys	12
E-stop	2 N.C. contacts, left position
Key switches	1 N.O. contact, right position
LED brightness	
Yellow	Typ. 60 mcd
Red	Typ. 54 mcd
Green	Typ. 35 mcd
Electrical characteristics	
Power consumption	Max. 8 W
E-stop circuit loop resistance	Max. 5.5 Ω
Operating conditions	
EN 60529 protection	All sides: IP65, dust and sprayed water protection
Environmental conditions	
Temperature	
Operation	0 to 50°C
Storage	-25 to 60°C
Transport	-25 to 60°C
Vibration	
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g
Storage	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Transport	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Shock	
Operation	15 g, 11 ms
Storage	30 g, 15 ms
Transport	30 g, 15 ms
Altitude ²⁾	
Operation	Max. 3000 m
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt)
Front ³⁾	
Frame	Naturally anodized aluminum
Design	Gray
Panel overlay	
Light background	Similar to Pantone 427CV
Color slide-in labels	Similar to Pantone white, to Pantone 429CV
Dimensions	
Width	135 mm
Height	330 mm
Depth	34.9 mm
Weight	1100 g

Table 26: 5AC800.EXT3-02 - Technical data

- 1) Key and LED functions can be configured with the B&R Key Editor, which is available in the Downloads sections of the B&R website (www.br-automation.com). This software is also included on the B&R HMI Driver & Utilities DVD (model number 5SWHMI.0000-00).
- 2) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

4.2.6.5 Temperature humidity diagram

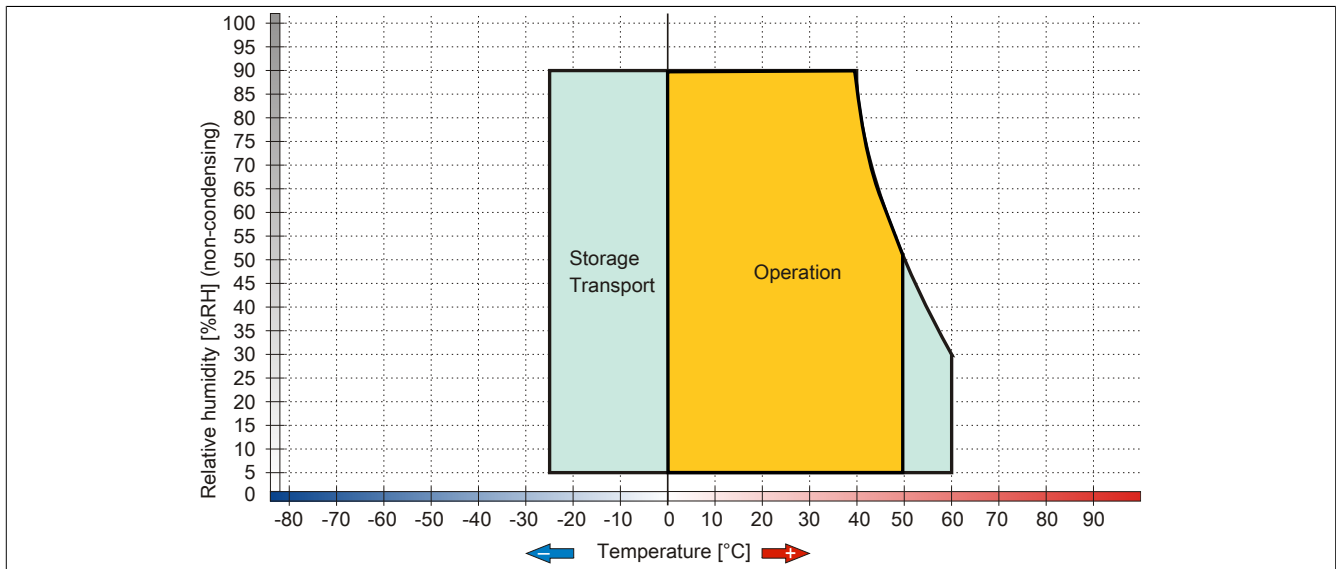


Figure 40: Keyboard extension - Temperature humidity diagram

4.2.6.6 Dimensions

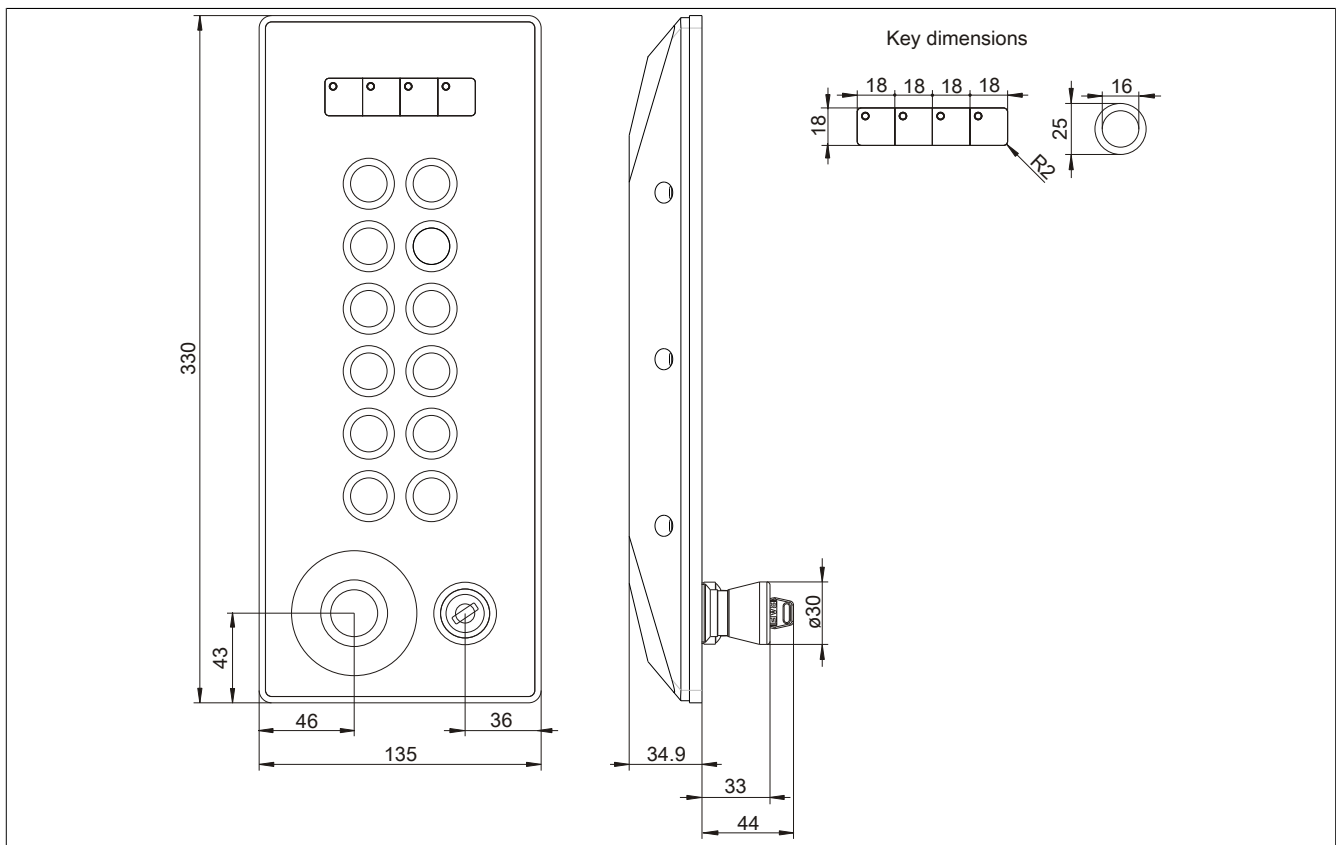


Figure 41: 5AC800.EXT3-02 - Dimensions

4.2.7 5AC800.EXT3-03

4.2.7.1 General information

The keyboard expansion is equipped with 4 function keys and 12 illuminated ring keys, 1 E-stop and 1 key switch and can be mounted on the right side of the Automation Panel 800.

- AP800 keyboard expansion (right)
- 4 function keys
- 12 illuminated ring keys
- E-stop switch
- Key switch
- IP65 protection

4.2.7.2 Order data

Model number	Short description	Figure
	Keyboard attachments	
5AC800.EXT3-03	Keypad extension for the right side of the Automation Panel 800; 4 function keys, 12 illuminated ring keys, E-stop, key switch, IP65 protection	
	Optional accessories	
	Accessories	
5AC800.EXTX-03	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT3-02 and 5AC800.EXT3-03; for 3 devices	

Table 27: 5AC800.EXT3-03 - Order data

4.2.7.3 Keys and interfaces

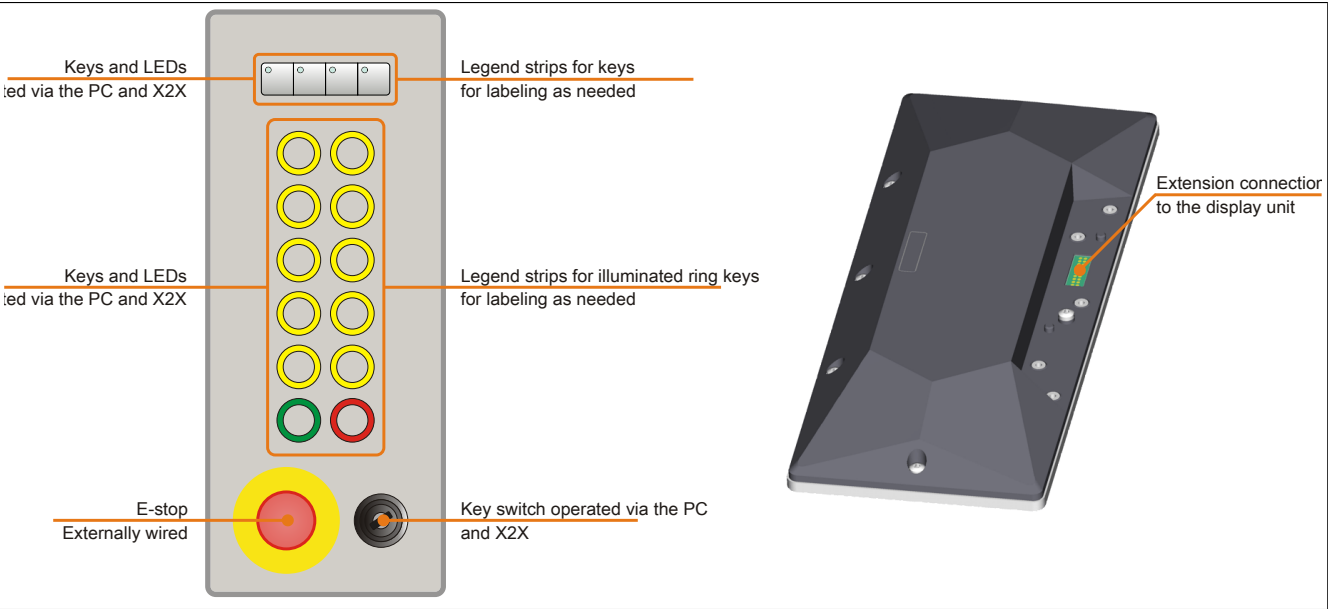


Figure 42: 5AC800.EXT3-03 - Keys and interfaces

4.2.7.4 Technical data

Product ID	5AC800.EXT3-03
General information	
LEDs	No
Certification	
CE	Yes
cULus	Yes
GOST-R	Yes
Keys ¹⁾	
Function keys	4 with LED (yellow)
Soft keys	No
System keys	No
Illuminated ring keys	12
E-stop	2 N.C. contacts, left position
Key switches	1 N.O. contact, right position
LED brightness	
Yellow	Typ. 60 mcd
Red	Typ. 54 mcd
Green	Typ. 35 mcd
Electrical characteristics	
Power consumption	Max. 8 W
E-stop circuit loop resistance	Max. 5.5 Ω
Operating conditions	
EN 60529 protection	All sides: IP65, dust and sprayed water protection
Environmental conditions	
Temperature	
Operation	0 to 50°C
Storage	-25 to 60°C
Transport	-25 to 60°C
Vibration	
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g
Storage	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Transport	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Shock	
Operation	15 g, 11 ms
Storage	30 g, 15 ms
Transport	30 g, 15 ms
Altitude ²⁾	
Operation	Max. 3000 m
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt)
Front ³⁾	
Frame	Naturally anodized aluminum
Design	Gray
Panel overlay	
Light background	Similar to Pantone 427CV
Color slide-in labels	Similar to Pantone white, to Pantone 429CV
Dimensions	
Width	135 mm
Height	330 mm
Depth	34.9 mm
Weight	1100 g

Table 28: 5AC800.EXT3-03 - Technical data

- 1) Key and LED functions can be configured with the B&R Key Editor, which is available in the Downloads sections of the B&R website (www.br-automation.com). This software is also included on the B&R HMI Driver & Utilities DVD (model number 5SWHMI.0000-00).
- 2) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

4.2.7.5 Temperature humidity diagram

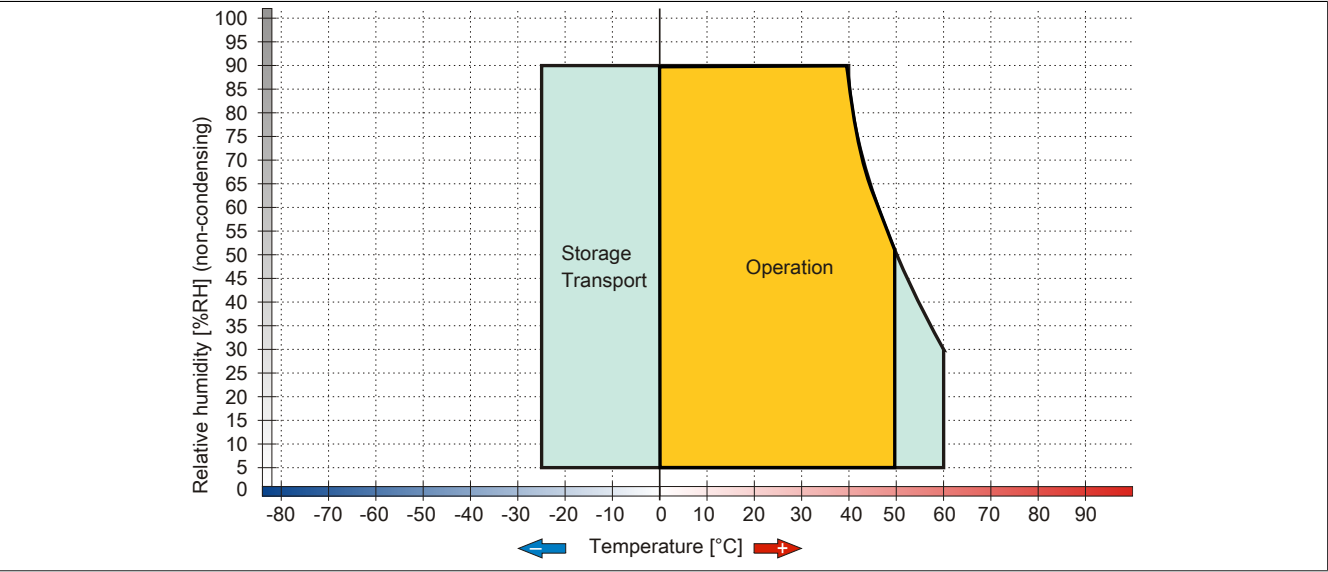


Figure 43: Keyboard extension - Temperature humidity diagram

4.2.7.6 Dimensions

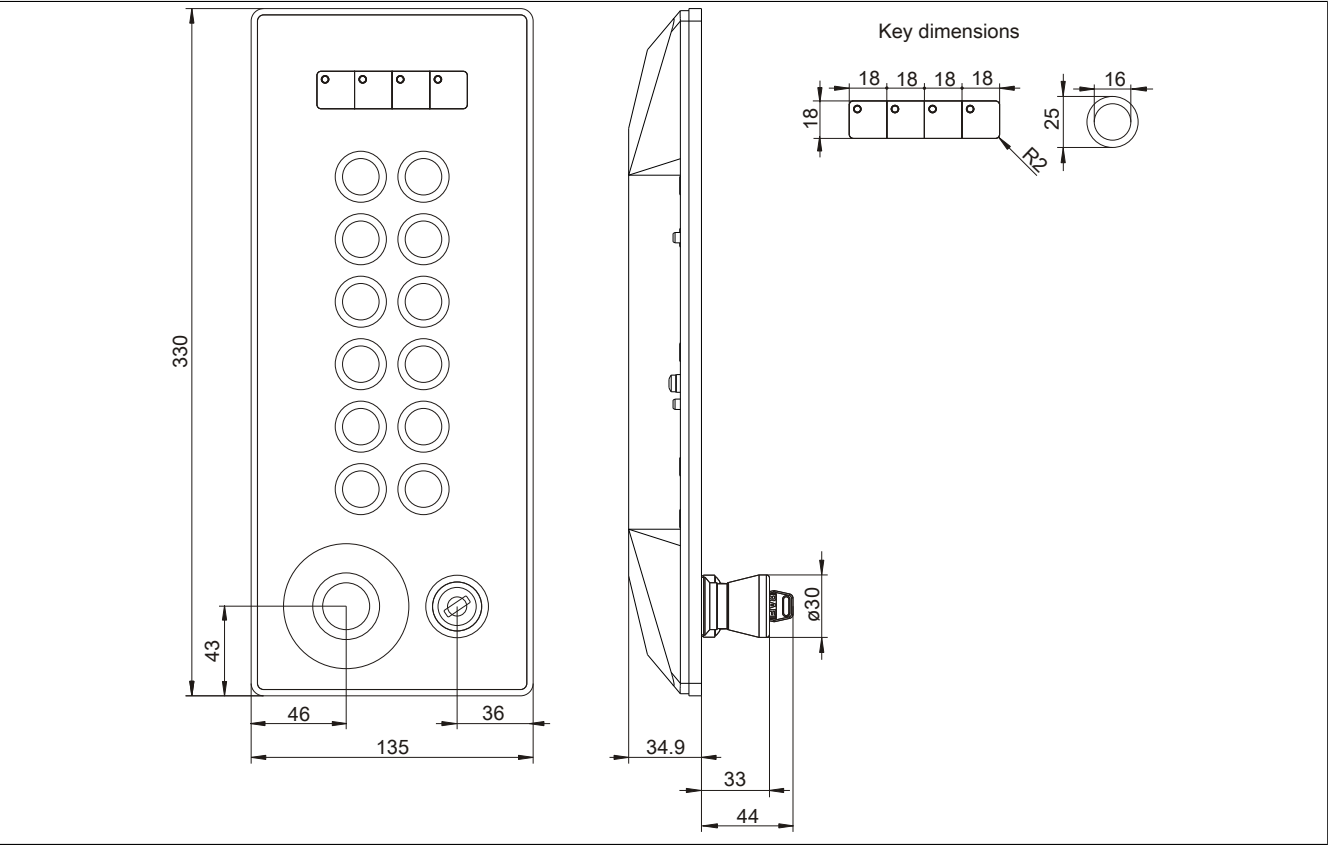


Figure 44: 5AC800.EXT3-03 - Dimensions

4.2.8 5AC800.EXT3-04

4.2.8.1 General information

The keyboard expansion is equipped with 12 function keys, 8 illuminated ring keys, 1 E-stop and 1 key switch and can be mounted on the left side of the Automation Panel 800.

- AP800 keypad extension (left)
- 12 function keys
- 8 illuminated ring keys
- E-stop switch
- Key switch
- IP65 protection

4.2.8.2 Order data

Model number	Short description	Figure
	Keyboard attachments	
5AC800.EXT3-04	Keypad extension for the left side of the Automation Panel 800; 12 function keys, 8 illuminated ring keys, E-stop, key switch, IP65 protection	
	Optional accessories	
	Accessories	
5AC800.EXTX-02	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT3-04 and 5AC800.EXT3-05; for 2 devices	

Table 29: 5AC800.EXT3-04 - Order data

4.2.8.3 Keys and interfaces

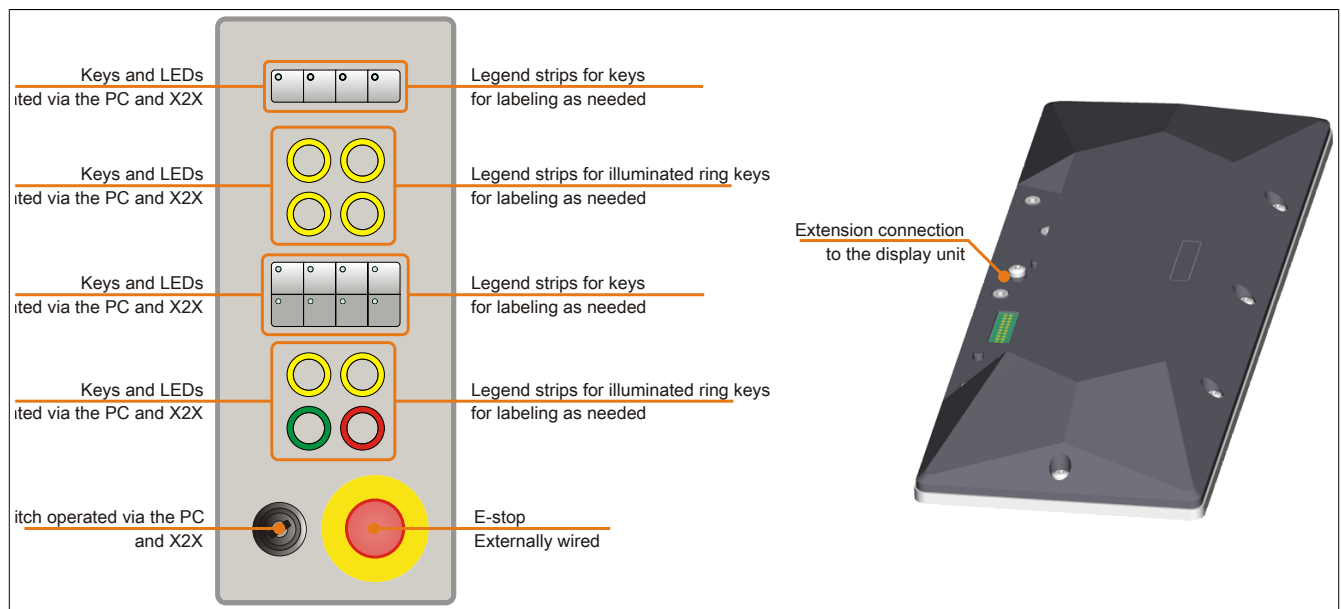


Figure 45: 5AC800.EXT3-04 - Keys and interfaces

4.2.8.4 Technical data

Product ID	5AC800.EXT3-04
General information	
LEDs	No
Certification	
CE	Yes
cULus	Yes
GOST-R	Yes
Keys ¹⁾	
Function keys	12 with LED (yellow)
Soft keys	No
System keys	No
Illuminated ring keys	8
E-stop	2 N.C. contacts, right position
Key switches	1 N.O. contact, left position
LED brightness	
Yellow	Typ. 60 mcd
Red	Typ. 54 mcd
Green	Typ. 35 mcd
Electrical characteristics	
Power consumption	Max. 7 W
E-stop circuit loop resistance	Max. 5.5 Ω
Operating conditions	
EN 60529 protection	All sides: IP65, dust and sprayed water protection
Environmental conditions	
Temperature	
Operation	0 to 50°C
Storage	-25 to 60°C
Transport	-25 to 60°C
Vibration	
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g
Storage	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Transport	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Shock	
Operation	15 g, 11 ms
Storage	30 g, 15 ms
Transport	30 g, 15 ms
Altitude ²⁾	
Operation	Max. 3000 m
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt)
Front ³⁾	
Frame	Naturally anodized aluminum
Design	Gray
Panel overlay	
Light background	Similar to Pantone 427CV
Color slide-in labels	Similar to Pantone white, to Pantone 429CV
Dimensions	
Width	135 mm
Height	330 mm
Depth	34.9 mm
Weight	1100 g

Table 30: 5AC800.EXT3-04 - Technical data

- 1) Key and LED functions can be configured with the B&R Key Editor, which is available in the Downloads sections of the B&R website (www.br-automation.com). This software is also included on the B&R HMI Driver & Utilities DVD (model number 5SWHMI.0000-00).
- 2) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

4.2.8.5 Temperature humidity diagram

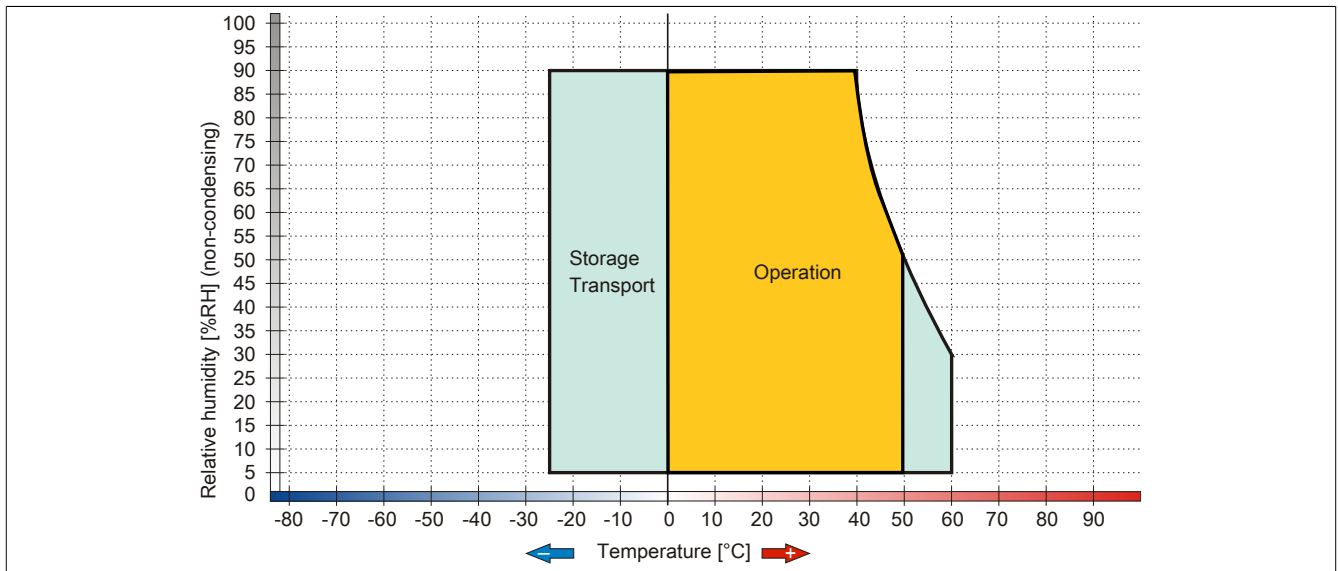


Figure 46: Keyboard extension - Temperature humidity diagram

4.2.8.6 Dimensions

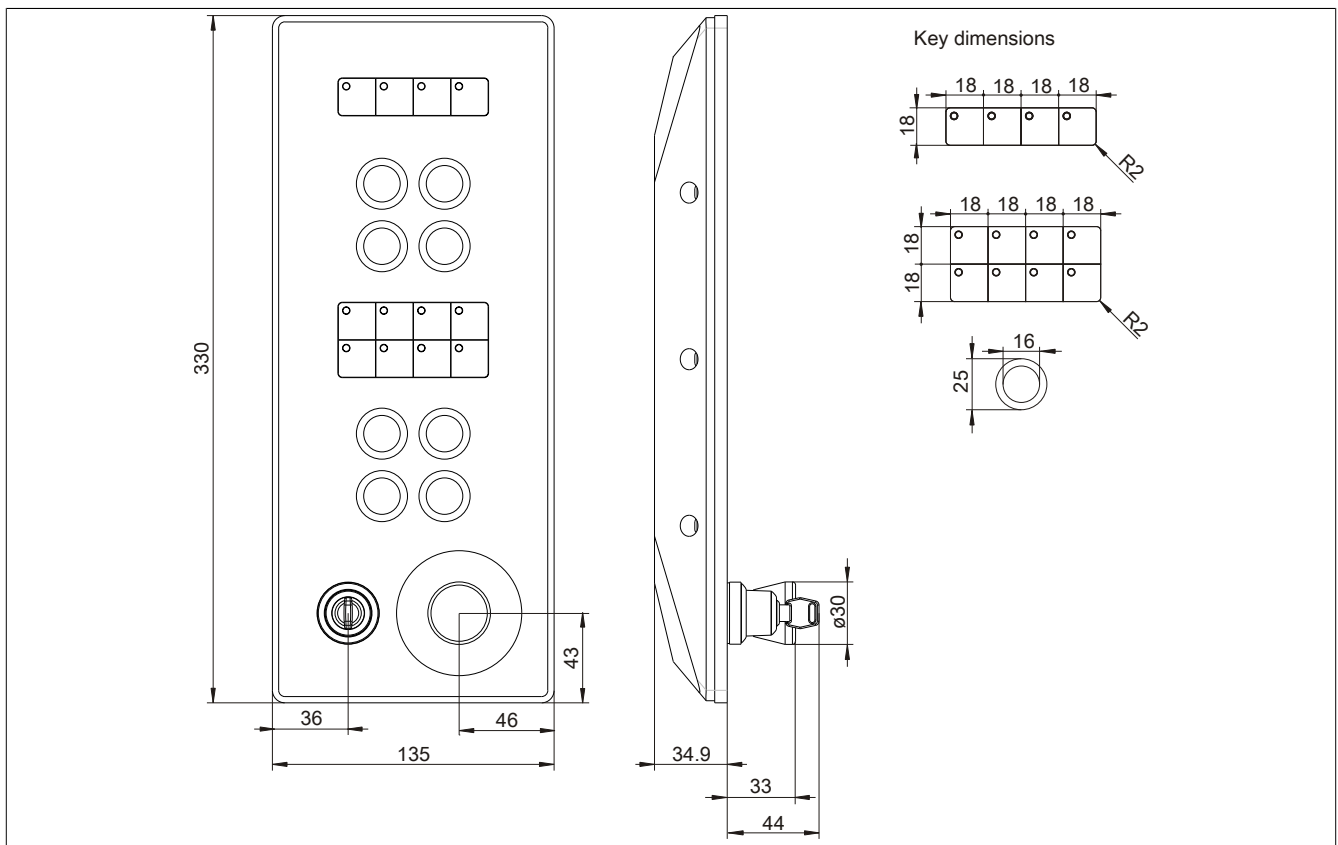


Figure 47: 5AC800.EXT3-04 - Dimensions

4.2.9 5AC800.EXT3-05

4.2.9.1 General information

The keyboard expansion is equipped with 12 function keys and 8 illuminated ring keys, 1 E-stop and 1 key switch and can be mounted on the right side of the Automation Panel 800.

- AP800 keyboard expansion (right)
- 12 function keys
- 8 illuminated ring keys
- E-stop switch
- Key switch
- IP65 protection

4.2.9.2 Order data

Model number	Short description	Figure
	Keyboard attachments	
5AC800.EXT3-05	Keypad extension for the right side of the Automation Panel 800; 12 function keys, 8 illuminated ring keys, E-stop, key switch, IP65 protection	
	Optional accessories	
	Accessories	
5AC800.EXTX-02	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT3-04 and 5AC800.EXT3-05; for 2 devices	

Table 31: 5AC800.EXT3-05 - Order data

4.2.9.3 Keys and interfaces

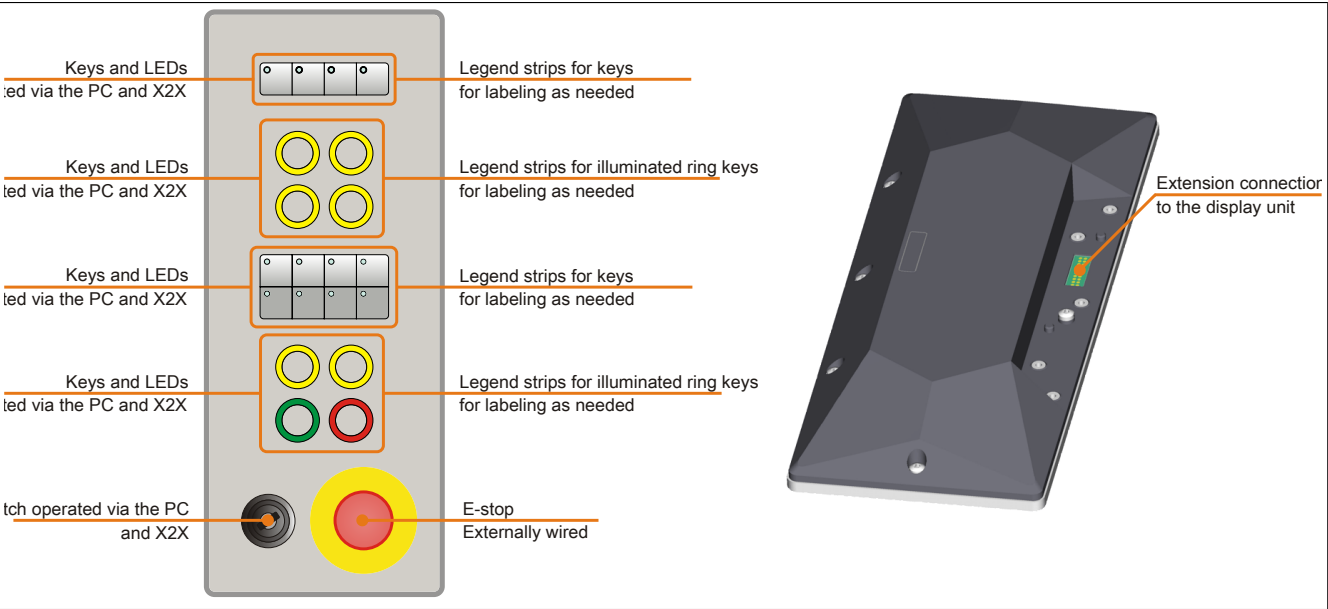


Figure 48: 5AC800.EXT3-05 - Keys and interfaces

4.2.9.4 Technical data

Product ID	5AC800.EXT3-05
General information	
LEDs	No
Certification	
CE	Yes
cULus	Yes
GOST-R	Yes
Keys ¹⁾	
Function keys	12 with LED (yellow)
Soft keys	No
System keys	No
Illuminated ring keys	8
E-stop	2 N.C. contacts, right position
Key switches	1 N.O. contact, left position
LED brightness	
Yellow	Typ. 60 mcd
Red	Typ. 54 mcd
Green	Typ. 35 mcd
Electrical characteristics	
Power consumption	Max. 7 W
E-stop circuit loop resistance	Max. 5.5 Ω
Operating conditions	
EN 60529 protection	All sides: IP65, dust and sprayed water protection
Environmental conditions	
Temperature	
Operation	0 to 50°C
Storage	-25 to 60°C
Transport	-25 to 60°C
Vibration	
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g
Storage	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Transport	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Shock	
Operation	15 g, 11 ms
Storage	30 g, 15 ms
Transport	30 g, 15 ms
Altitude ²⁾	
Operation	Max. 3000 m
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt)
Front ³⁾	
Frame	Naturally anodized aluminum
Design	Gray
Panel overlay	
Light background	Similar to Pantone 427CV
Color slide-in labels	Similar to Pantone white, to Pantone 429CV
Dimensions	
Width	135 mm
Height	330 mm
Depth	34.9 mm
Weight	1100 g

Table 32: 5AC800.EXT3-05 - Technical data

- 1) Key and LED functions can be configured with the B&R Key Editor, which is available in the Downloads sections of the B&R website (www.br-automation.com). This software is also included on the B&R HMI Driver & Utilities DVD (model number 5SWHMI.0000-00).
- 2) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 3) There may be visible deviations in the color and surface appearance depending on the process or batch.

4.2.9.5 Temperature humidity diagram

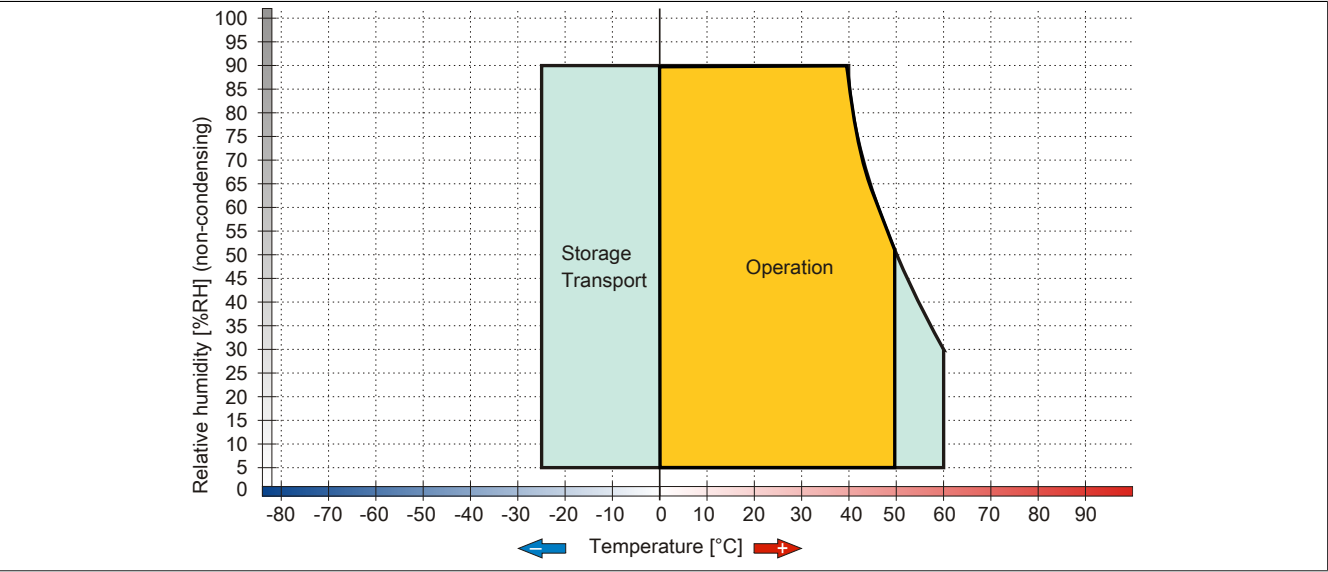


Figure 49: Keyboard extension - Temperature humidity diagram

4.2.9.6 Dimensions

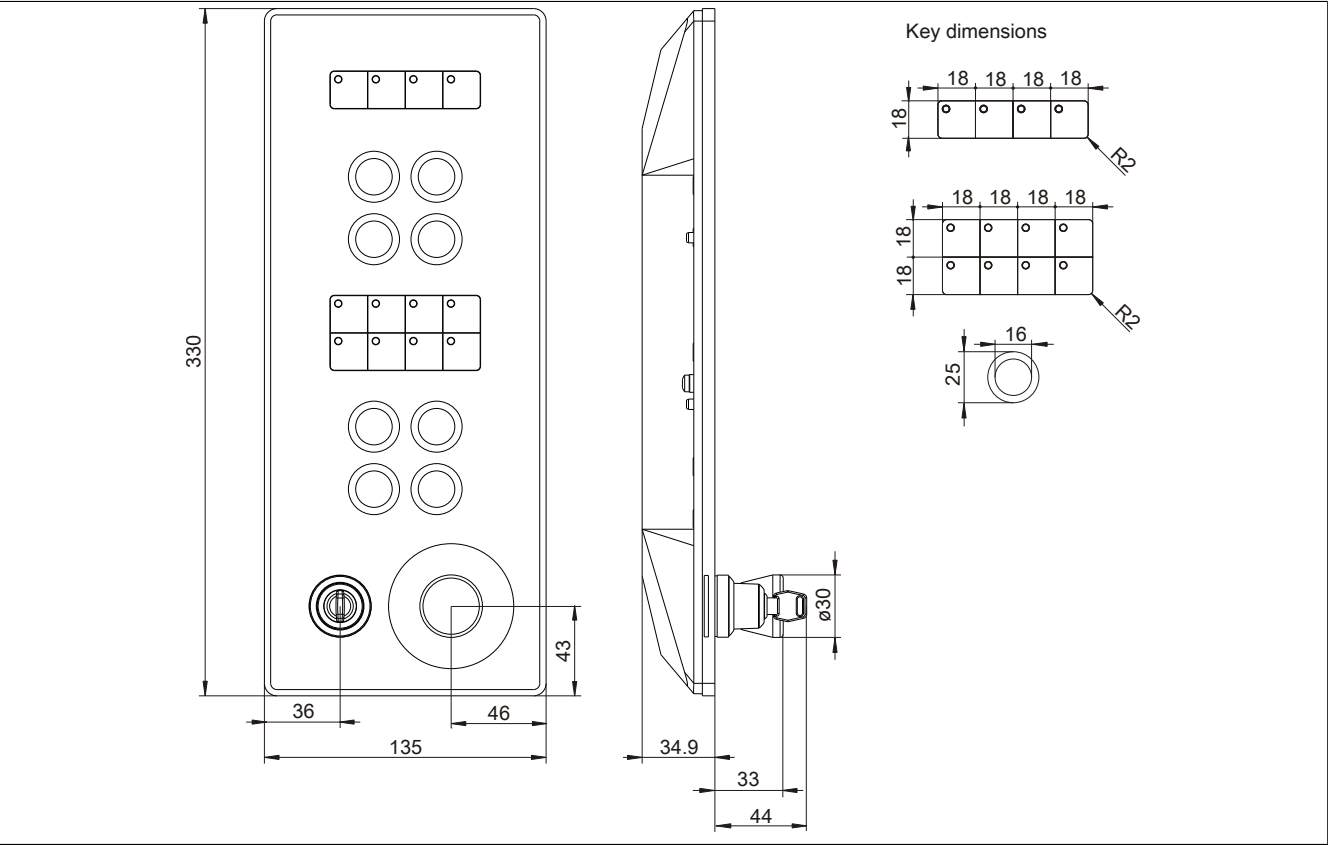


Figure 50: 5AC800.EXT3-05 - Dimensions

4.3 Extension connector / Flange

4.3.1 5AC800.COV1-00

4.3.1.1 General information

The extension cover serves to protect the extension unit connection slot on the Automation Panel 800.

An extension cover must be installed on each extension unit connection slot that is not being used on the AP800 display.

For more information regarding installation, see "Installing individual components" on page 73.

4.3.1.2 Order data

Model number	Short description	Figure
5AC800.COV1-00	Connectors Extension cover for the Automation Panel 800	

Table 33: 5AC800.COV1-00 - Order data

4.3.1.3 Technical data

Product ID	5AC800.COV1-00
General information	
Certification	
CE	Yes
GOST-R	Yes
Electrical characteristics	
E-stop circuit loop resistance	Max. 0.5 Ω
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt) ¹⁾
Dimensions	
Width	29 mm
Length	185 mm
Height	25 mm
Weight	100 g

Table 34: 5AC800.COV1-00 - Technical data

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

4.3.1.4 Dimensions

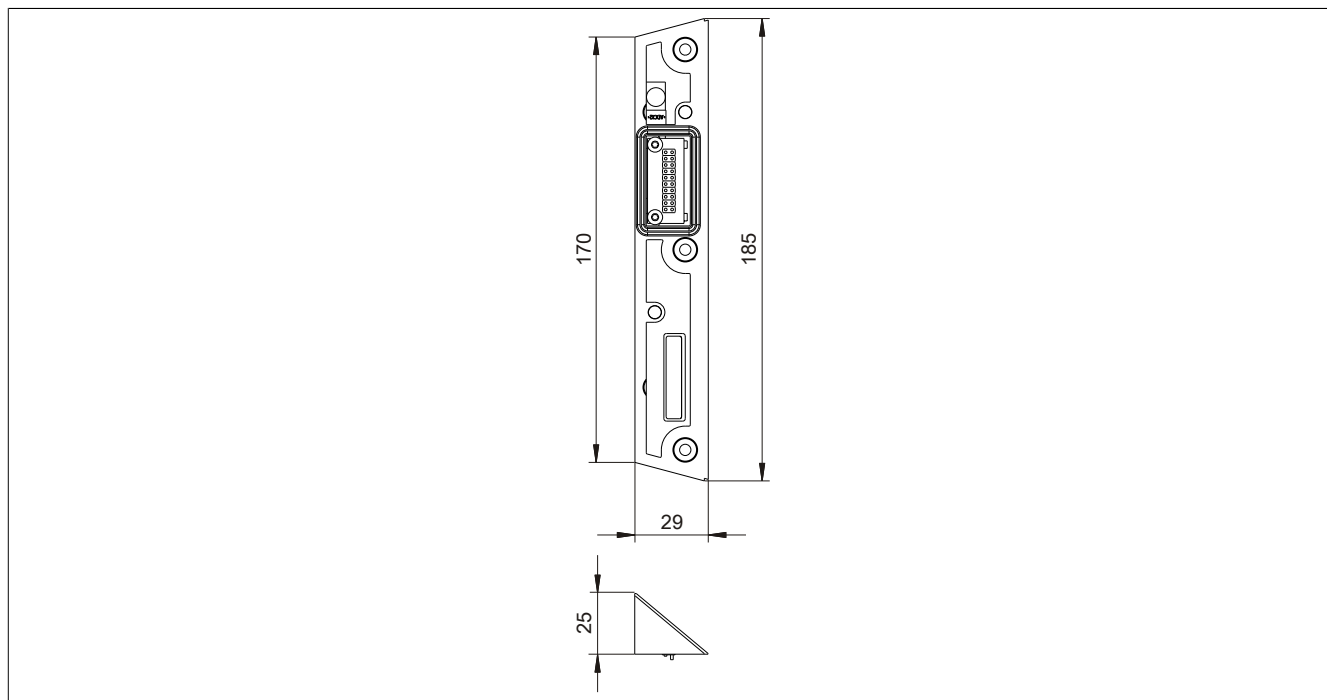


Figure 51: 5AC800.COV1-00 - Dimensions

4.3.2 5AC800.COV2-00

4.3.2.1 General information

The extension cover serves to protect the extension unit connection slot on the Automation Panel 800 and is equipped with a USB port.

An extension cover must be installed on each extension unit connection slot that is not being used on the AP800 display.

For more information regarding installation, see "Installing individual components" on page 73.

4.3.2.2 Order data

Model number	Short description	Figure
	Connectors	
5AC800.COV2-00	USB extension cover for the Automation Panel 800	

Table 35: 5AC800.COV2-00 - Order data

4.3.2.3 Technical data

Product ID	5AC800.COV2-00
General information	
Certification	
CE	Yes
GOST-R	Yes
Electrical characteristics	
E-stop circuit loop resistance	Max. 0.5 Ω
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt) ¹⁾
Dimensions	
Width	29 mm
Length	185 mm
Height	25 mm
Weight	100 g

Table 36: 5AC800.COV2-00 - Technical data

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

4.3.2.4 Dimensions

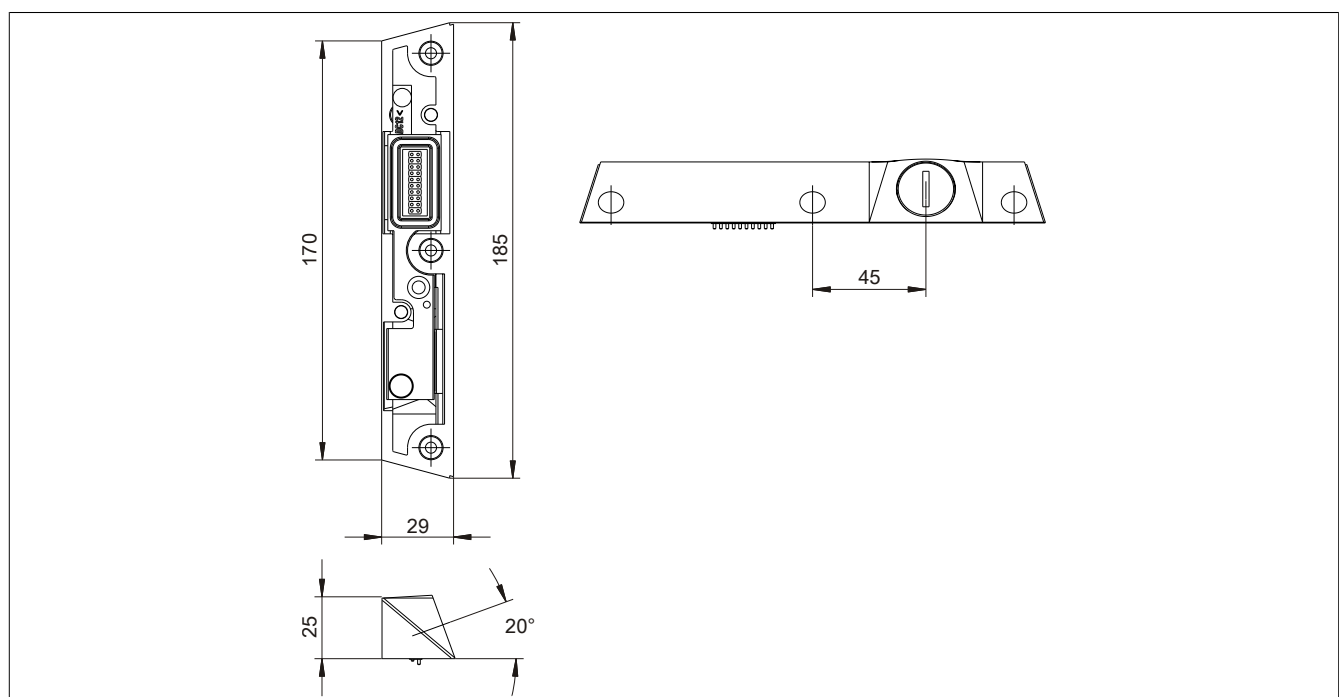


Figure 52: 5AC800.COV2-00 - Dimensions

4.3.3 5AC800.CON1-00

4.3.3.1 General information

This extension connector (straight design) is required to connect AP800 displays and extension units.

For more information regarding installation, see "Installing individual components" on page 73.

4.3.3.2 Order data

Model number	Short description	Figure
	Connectors	
5AC800.CON1-00	Straight connector for connecting keypad extensions to the Automation Panel 800	

Table 37: 5AC800.CON1-00 - Order data

4.3.3.3 Technical data

Product ID	5AC800.CON1-00
General information	
Certification	
CE	Yes
GOST-R	Yes
Electrical characteristics	
E-stop circuit loop resistance	Max. 1 Ω
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt) ¹⁾
Dimensions	
Width	67 mm
Length	185 mm
Height	25 mm
Weight	300 g

Table 38: 5AC800.CON1-00 - Technical data

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

4.3.3.4 Dimensions

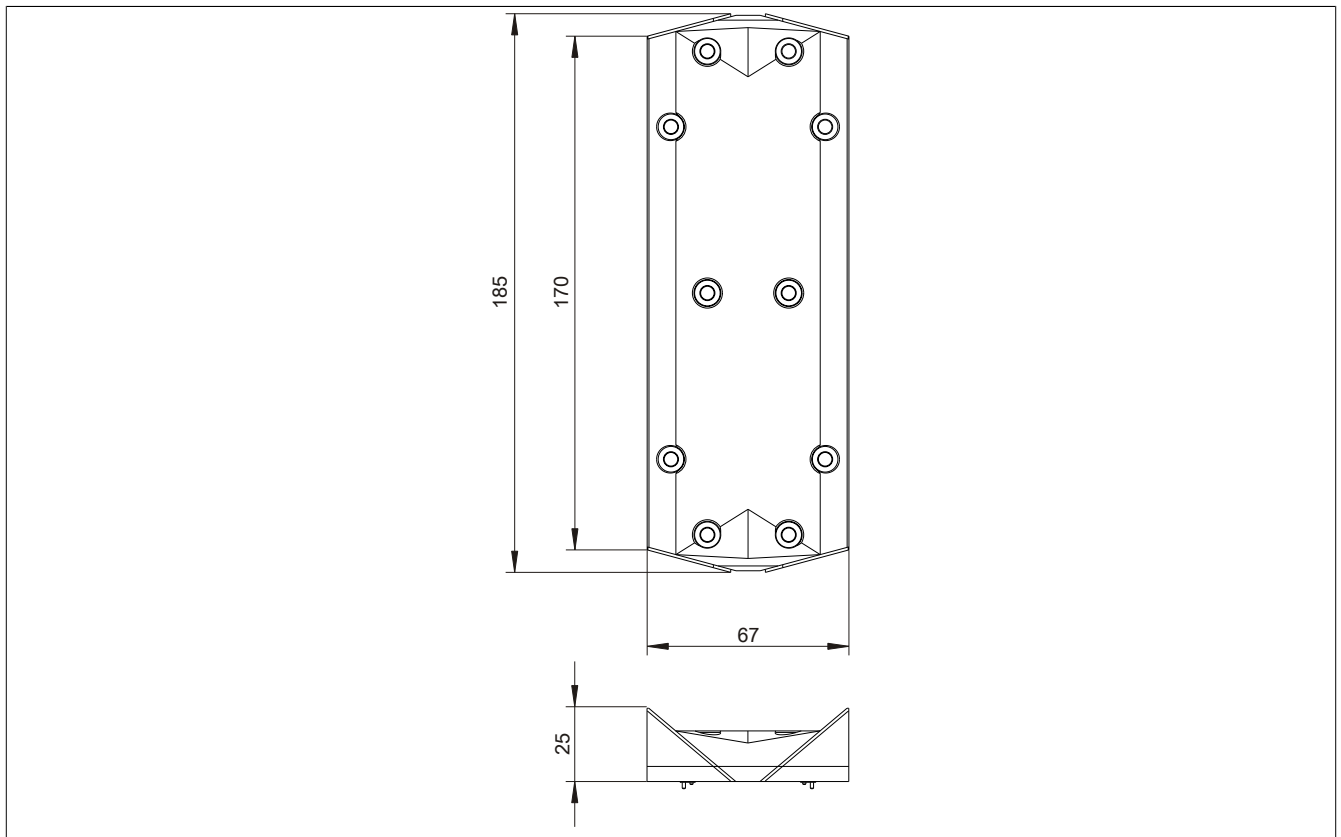


Figure 53: 5AC800.CON1-00 - Dimensions

4.3.4 5AC800.CON2-00

4.3.4.1 General information

This extension connector (60° design) is required to connect AP800 displays and extension units.

For more information regarding installation, see "Installing individual components" on page 73.

4.3.4.2 Order data

Model number	Short description	Figure
	Connectors	
5AC800.CON2-00	60° angled connector for connecting keypad extensions to the Automation Panel 800	

Table 39: 5AC800.CON2-00 - Order data

4.3.4.3 Technical data

Product ID	5AC800.CON2-00
General information	
Certification	
CE	Yes
GOST-R	Yes
Electrical characteristics	
E-stop circuit loop resistance	Max. 1 Ω
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt) ¹⁾
Dimensions	
Width	68.4 mm
Length	185 mm
Height	25 mm
Weight	500 g

Table 40: 5AC800.CON2-00 - Technical data

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

4.3.4.4 Dimensions

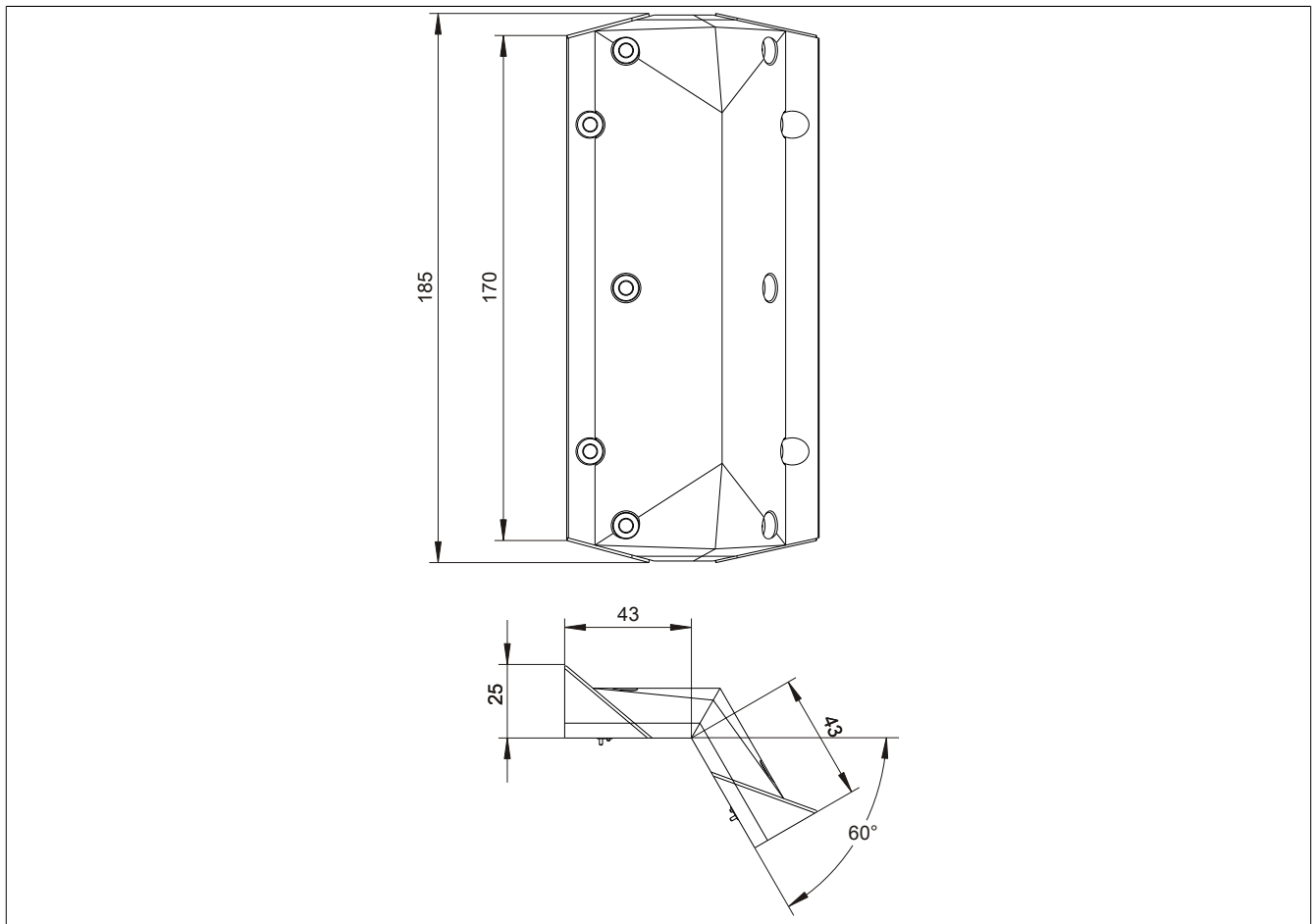


Figure 54: 5AC800.CON2-00 - Dimensions

4.3.5 5AC800.FLG1-00

4.3.5.1 General information

The extension flange is required for mounting on a support arm system.

For more information regarding installation, see "Installing individual components" on page 73.

4.3.5.2 Order data

Model number	Short description	Figure
	Flanges	
5AC800.FLG1-00	Flange for the Automation Panel 800 and standard support arm systems (e.g. Rittal CP-S)	

Table 41: 5AC800.FLG1-00 - Order data

4.3.5.3 Technical data

Product ID	5AC800.FLG1-00
General information	
Certification	
CE	Yes
GOST-R	Yes
Mechanical characteristics	
Housing	
Material	Aluminum (ADC12)
Paint	Similar to silver metallic (semi-matt) ¹⁾
Dimensions	
Width	140 mm
Height	140 mm
Depth	71 mm
Weight	600 g

Table 42: 5AC800.FLG1-00 - Technical data

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

4.3.5.4 Dimensions

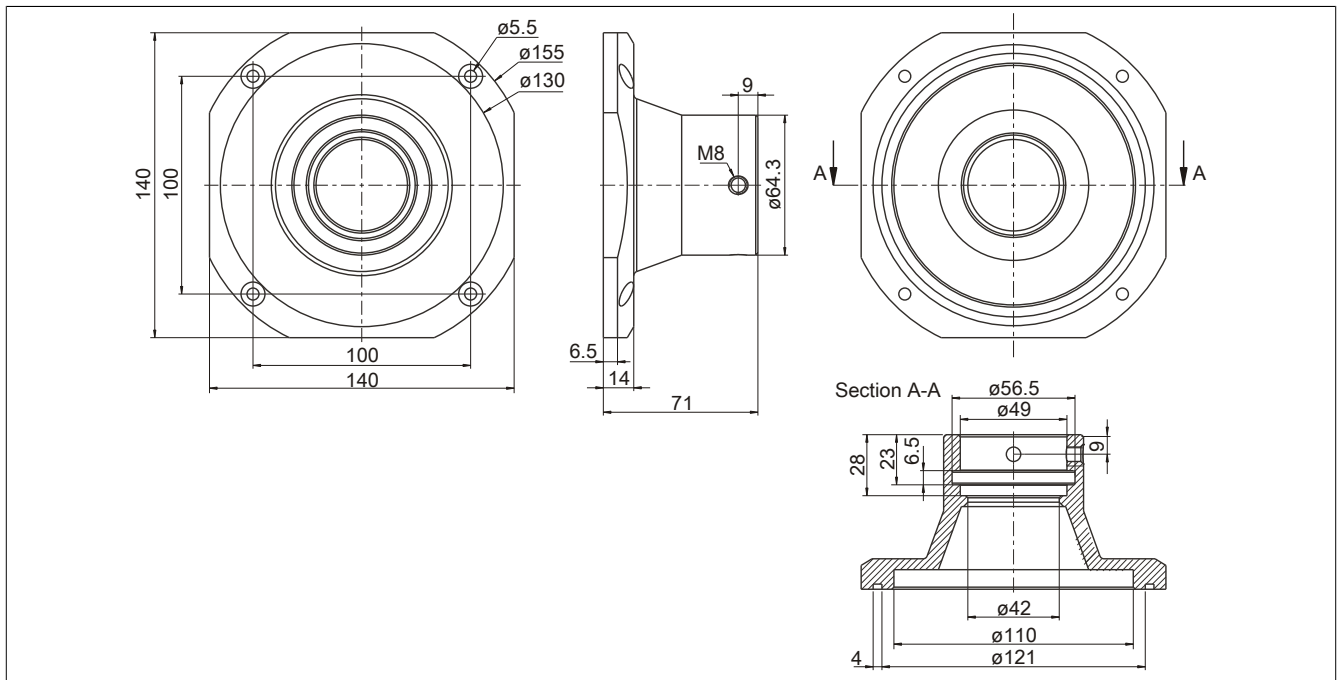


Figure 55: 5AC800.FLG1-00 - Dimensions

Chapter 3 • Commissioning

1 Installation

An Automation Panel 800 device is primarily installed on a swing arm system. An extension flange installed on the back of the display makes this possible (see see "5AC800.FLG1-00" on page 70 or "Installing individual components" on page 73).

The tubing of the support arm system cannot be bent immediately after the end of the flange; it must be straight for at least 50 mm so that the plugs can be connected. The bending radius of the cables must also be taken into consideration (see see "Cables" on page 108).

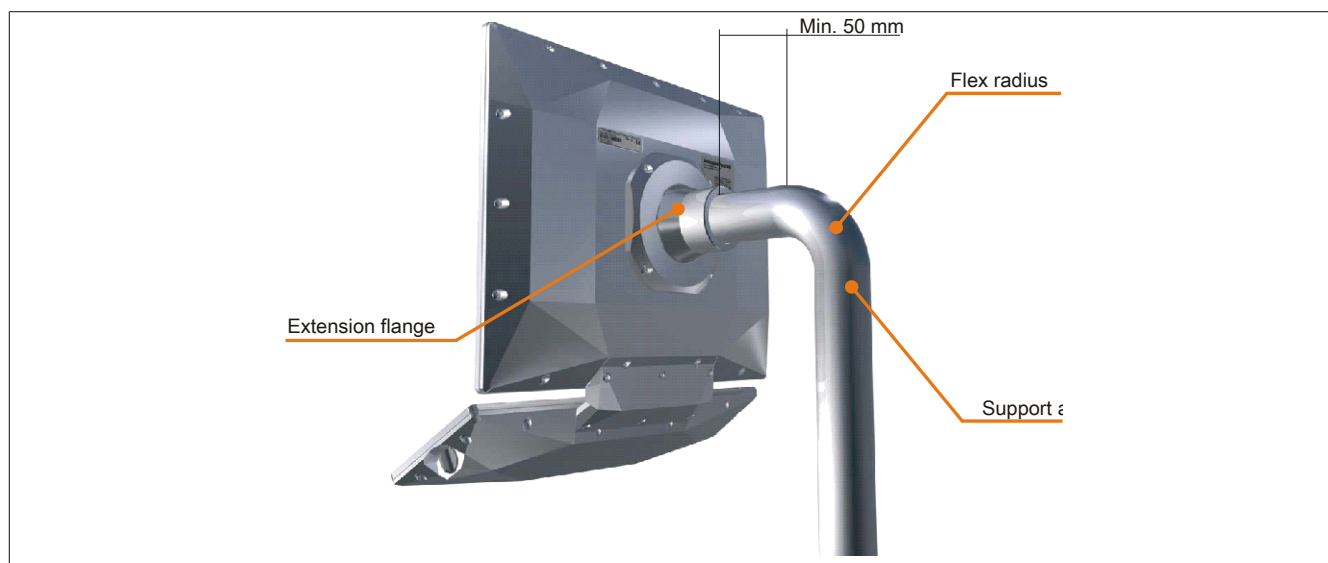


Figure 56: Support arm system mounting

The cables run through the tubing and the plugs are covered by the extension flange. The connectors must be connected to the respective sockets. Connectors and sockets are marked with a red dot to ensure that they are connected properly (see see "Pinout" on page 34).

1.1 Installing individual components

The extension flange (and depending on the configuration the extension connector and extension covers) are installed using the included Torx screws.

A size 20 Torx screwdriver is needed for this. The maximum torque of the Torx screws is 2 Nm - fasten the screws alternately and diagonally.

Information:

The contacts on the display, extension keyboard, on the extension units and on the extension connectors must be thoroughly cleaned before installation (e.g. with industrial alcohol). Otherwise, connectivity problems may occur.

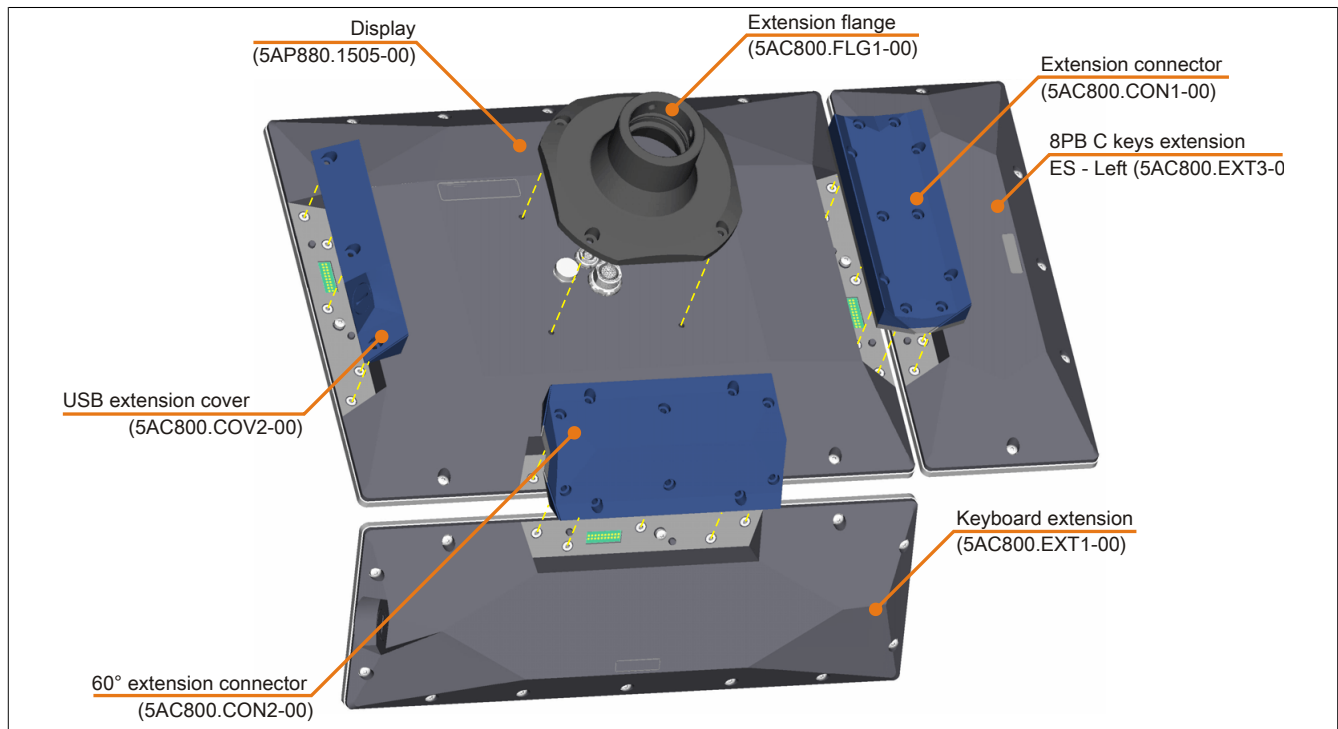


Figure 57: Configuration example - installing the components

2 Cable connections

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

Information:

The maximum torque for the locating screws is 0.5 Nm.

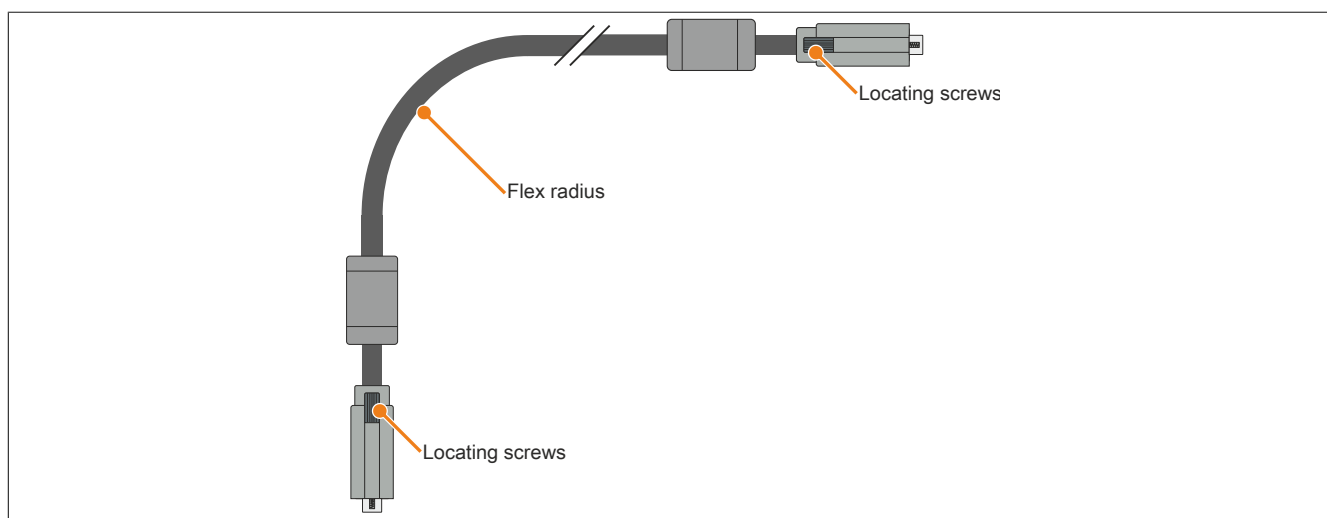


Figure 58: Flex radius - Cable connection (sample image)

Information:

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

3 Mounting orientation

The following diagrams show the approved mounting orientations for the Automation Panel 800.

3.1 Mounting orientation 0°

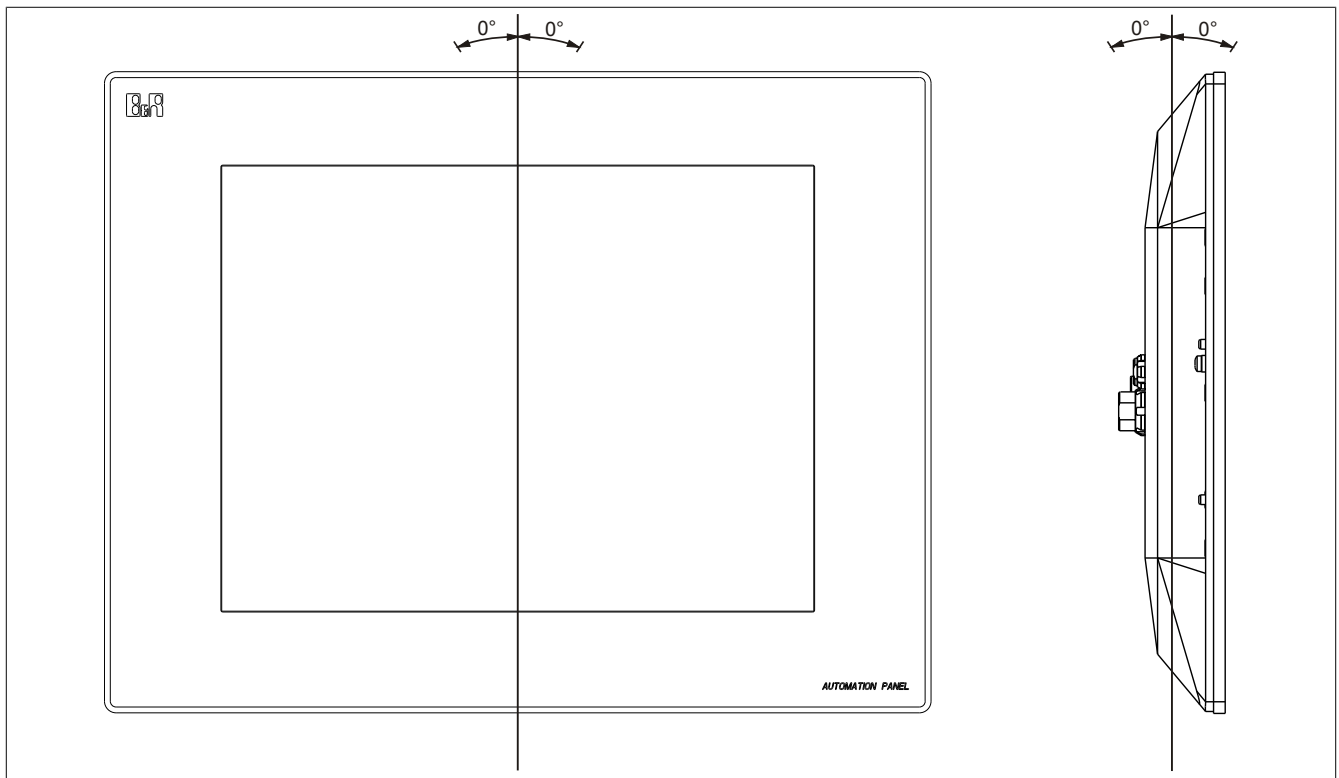


Figure 59: Mounting orientation 0°

3.2 Mounting orientation 45°

Warning!

Because of the changed thermal properties with some mounting orientations, e.g. $\pm 45^\circ$, the maximum ambient temperature of the Automation Panel 800 specified for 0° mounting orientation cannot be achieved during operation. The limit values that apply in this situation can be found in the technical data for the Automation Panel device.

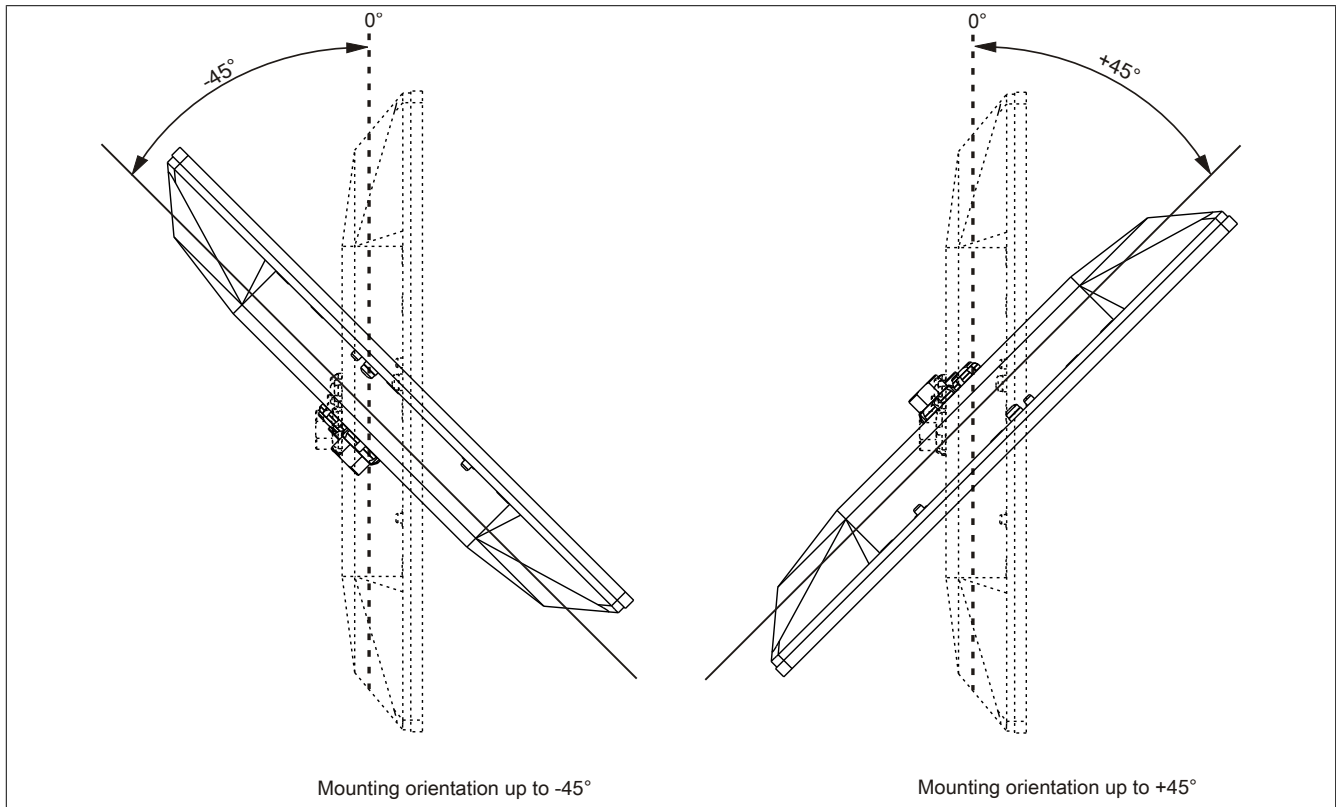


Figure 60: Mounting orientation -45° or $+45^\circ$.

4 X2X wiring diagram

Information:

Only power supplies provided by B&R can be used to supply the X2X Link bus connection.

The X2X Link bus connection uses an RS485 half-duplex point-to-point connection; transfer is unidirectional. X2X topology uses a point-to-point connection. A series connection is made to each extension unit connection slot from the X2X/E-stop cable connector on the main unit. The link has a specified direction for transferring data. The transfer rate is 12 MBd.

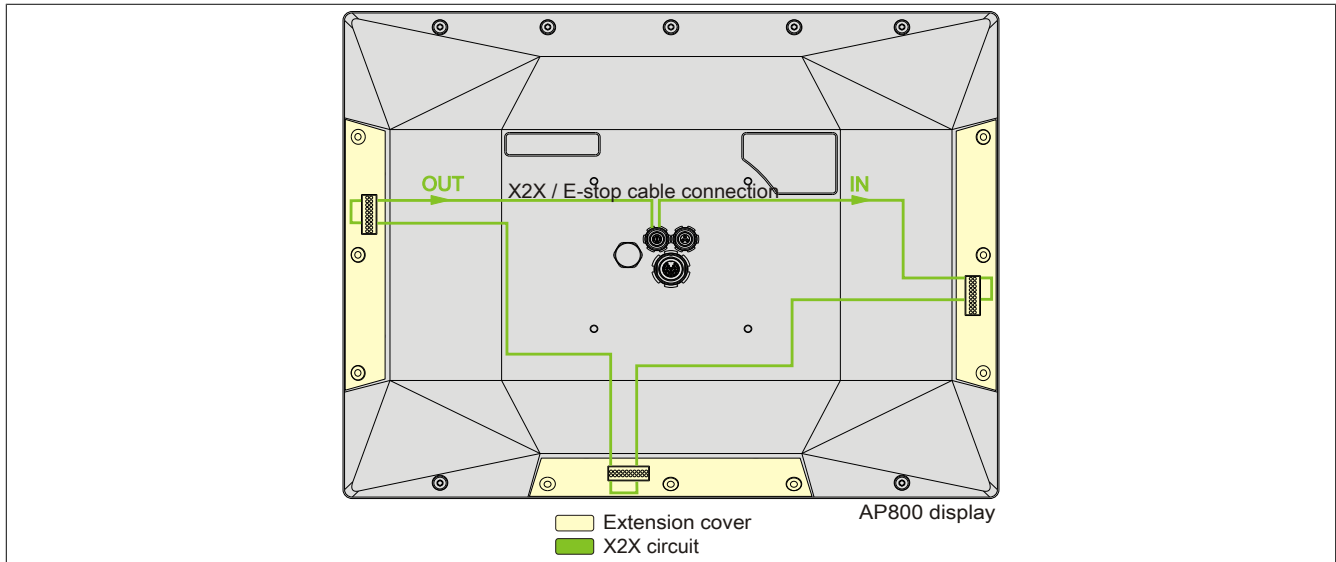


Figure 61: X2X circuit - rear view

The AP800 is always at the end of the bus connection, i.e.: The bus connection cannot be forwarded to any other X2X nodes after the AP800.

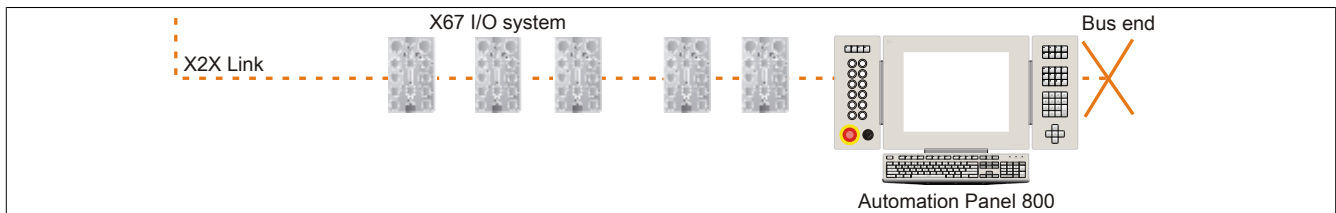


Figure 62: X2X Link topology

4.1 X2X functionality during PC failure

The Automation Panel 800 device is connected to the PC using an SDL connection. The supply and the X2X Link bus connection are both connected to the AP800 device independent of the SDL connection. For X2X functionality, the supply and the X2X Link bus connection are required. If this is the case, extension units that can be operated via the PC and X2X (C key extensions) can also be accessed and operated without a connection to the PC. That means the machine or system remains operational.

5 E-stop wiring diagram

Each extension unit can have its own E-stop button. To guarantee that the E-stop functions properly, a two-channel E-stop series connection is made to each extension unit connection slot from the X2X/E-stop cable connector on the main unit.

5.1 E-stop wiring diagram examples

The following wiring diagrams provide a more detailed explanation of various configurations.

- a) Example 1: Without extension unit
- b) Example 2: With extension unit, with E-stop button
- c) Example 3: With extension unit, without E-stop button

5.1.1 Without extension unit

An extension cover must be mounted on each extension unit connection slot that is not being used. The cover uses a spring contact on an intermediate circuit board to connect the E-stop series circuit and therefore guarantees that it functions properly.

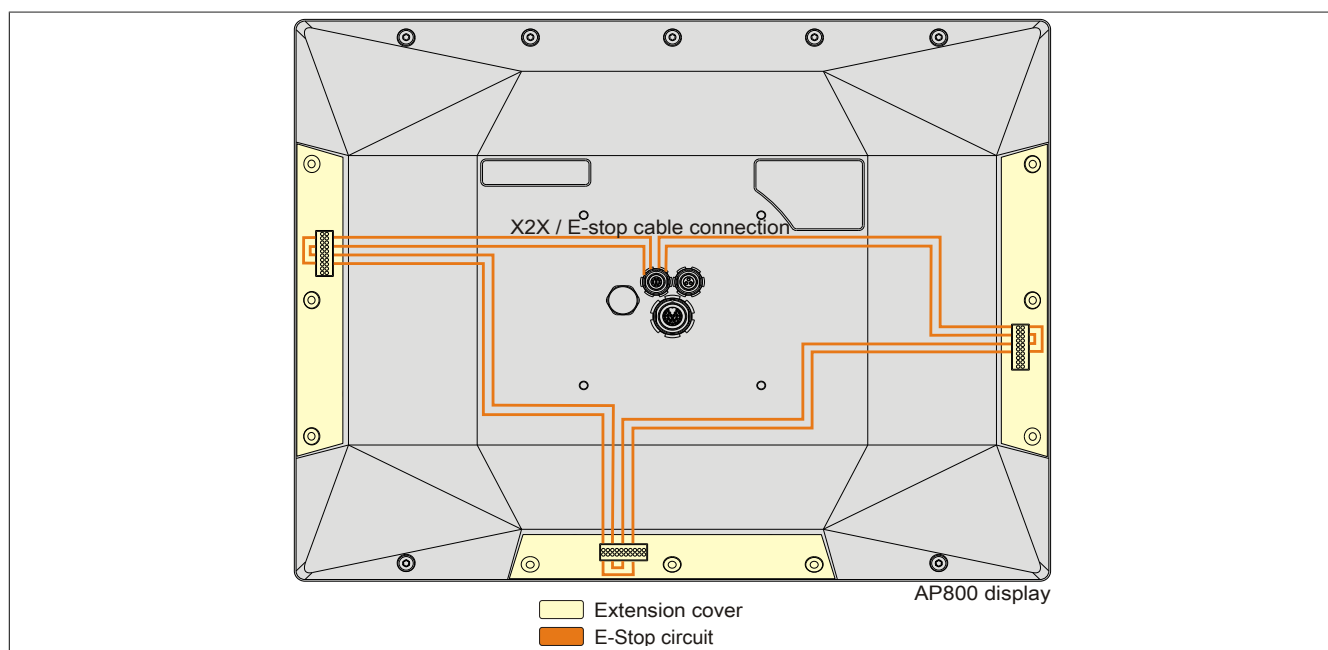


Figure 63: Example 1 - E-stop wiring diagram for the extension cover - rear view

5.1.2 Extension unit with E-stop

For an extension unit (in this case C key extension right) with an E-stop button, the connection from the AP800 display to the extension unit is made using an extension connector with spring contacts on an intermediate circuit board. The E-stop button is on the extension unit, and both N.C. contacts on the E-stop switching element (and therefore the E-stop series circuit) are closed when it is not activated.

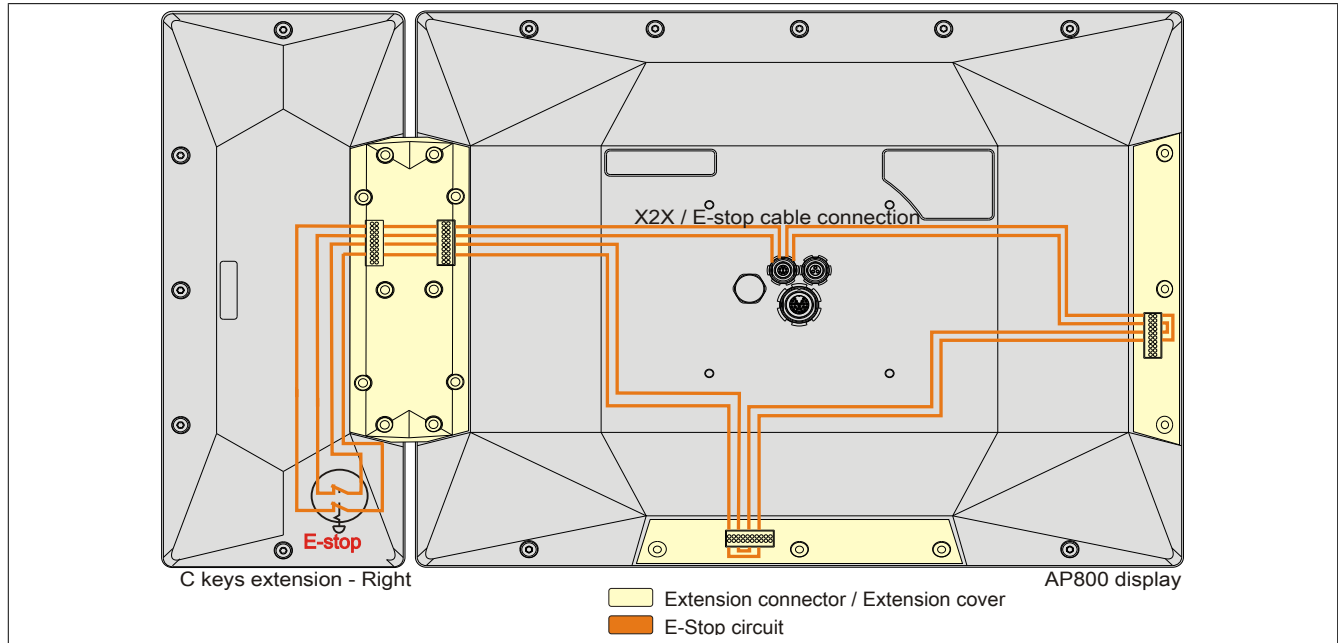


Figure 64: Example 2 - E-stop wiring diagram for the extension unit with E-stop - rear view

5.1.3 Extension unit without E-stop

For an extension unit (in this case extension keyboard) without an E-stop button, the connection from the AP800 display to the extension unit is made using an extension connector with two spring contacts on an intermediate circuit board. The E-stop contacts are connected so that the E-stop series circuit remains intact.

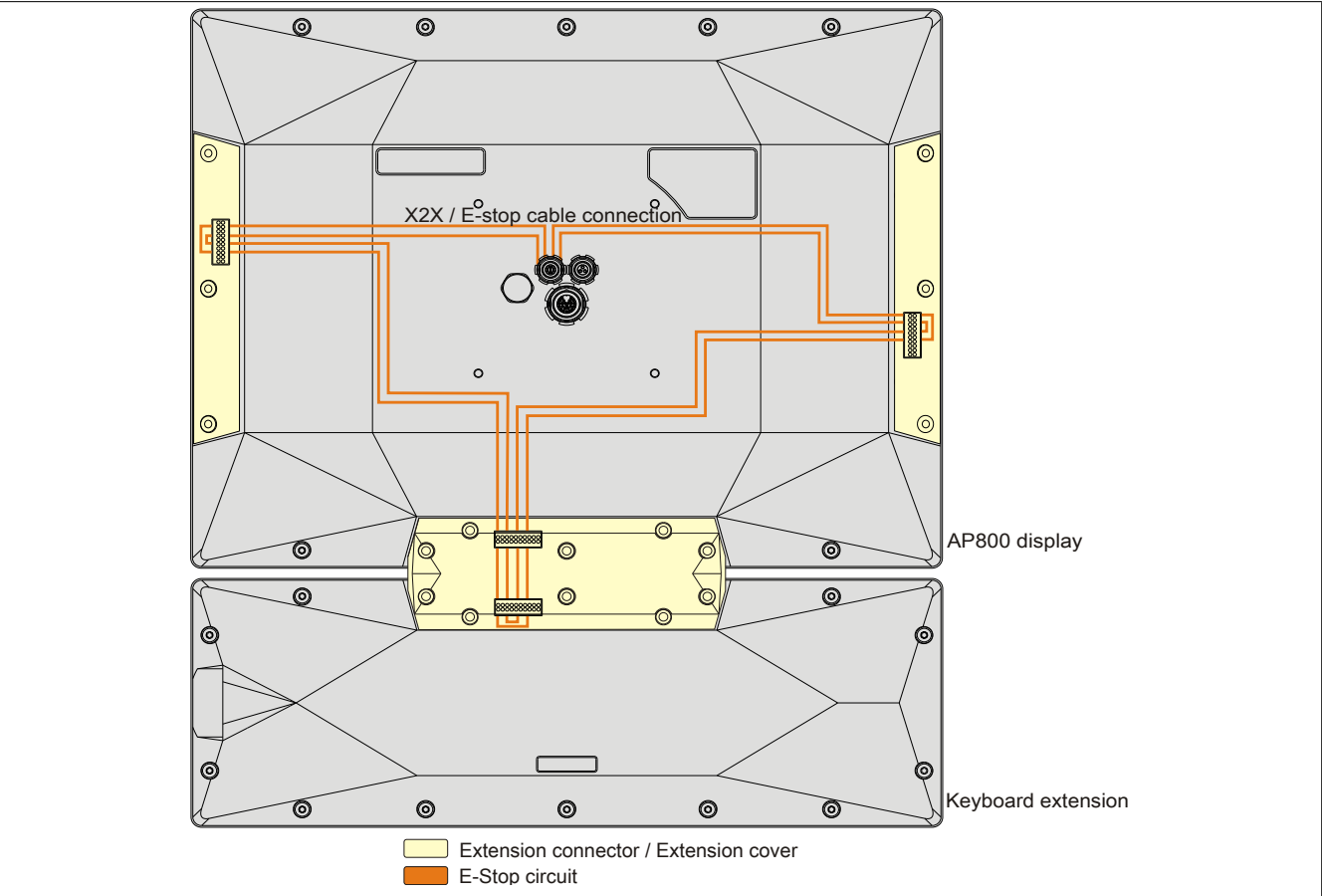


Figure 65: Example 3 - E-stop wiring diagram for the extension unit without E-stop - rear view

5.2 Current load

Warning!
Pay attention to the max. permitted current load of the E-stop circuit!

	Max. current load	Max. voltage
E-Stop circuit	0.4 A	32 VDC

Table 43: E-stop circuit current load

5.3 Loop resistance

The sum of the loop resistances of the individual components of both of the assembled E-stop circuits is a maximum of 25 ohms (measured on the Automation Panel 800 X2X/E-stop cable connector).

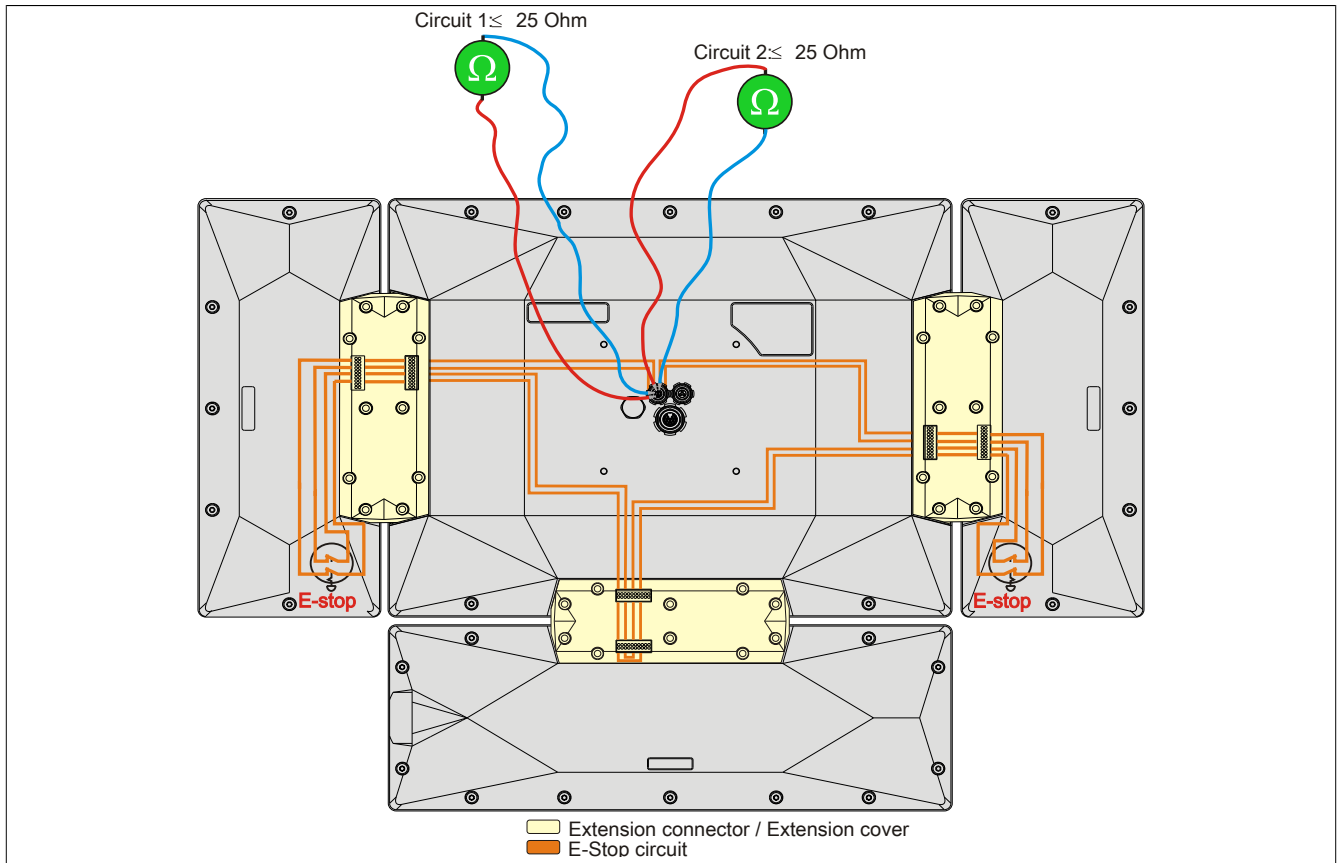


Figure 66: Loop resistance information

At a maximum cable length of 40 meters, the loop resistance of the X2X / E-stop cable (5CAX2X.0xxx-20) is 17.6.6 ohms.

The exact loop resistance value can be obtained using a loop resistance measuring device.

6 Connection examples

An overview of configuration options available for connecting an Automation Panel 800 with a B&R Industrial PC can be found in the user's manual for the PC being used.

Information:

Automation Panel 800 devices can be connected to all B&R devices that support SDL.

The following device families can be connected to the Automation Panel 800:

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Panel PC 700
- Panel PC 800
- Power Panel 500

6.1 Selecting display units

In order to connect an Automation Panel 800 and an Automation Panel 900 on the same line, the devices must have the same display type. The following table lists the AP900 devices that can be connected on the same line with an AP800 device.

Automation Panel 800	Automation Panel 900
5AP820.1505-00	5AP920.1505-01 5AP951.1505-01 5AP980.1505-01 5AP981.1505-01
5AP880.1505-00	5AP920.1505-01 5AP951.1505-01 5AP980.1505-01 5AP981.1505-01

Table 44: Selecting display units

6.2 Connecting an Automation Panel 800 to an Automation PC 810 via onboard SDL

Information:

The following example illustrates how connection examples are portrayed in the respective user's manuals. Device-specific hardware, firmware and software requirements are also listed in the user's manuals for supported devices.

An Automation Panel 800 is connected to the integrated SDL interface (onboard) via an SDL cable. USB devices can only be connected directly to the extension keyboard (without a hub).

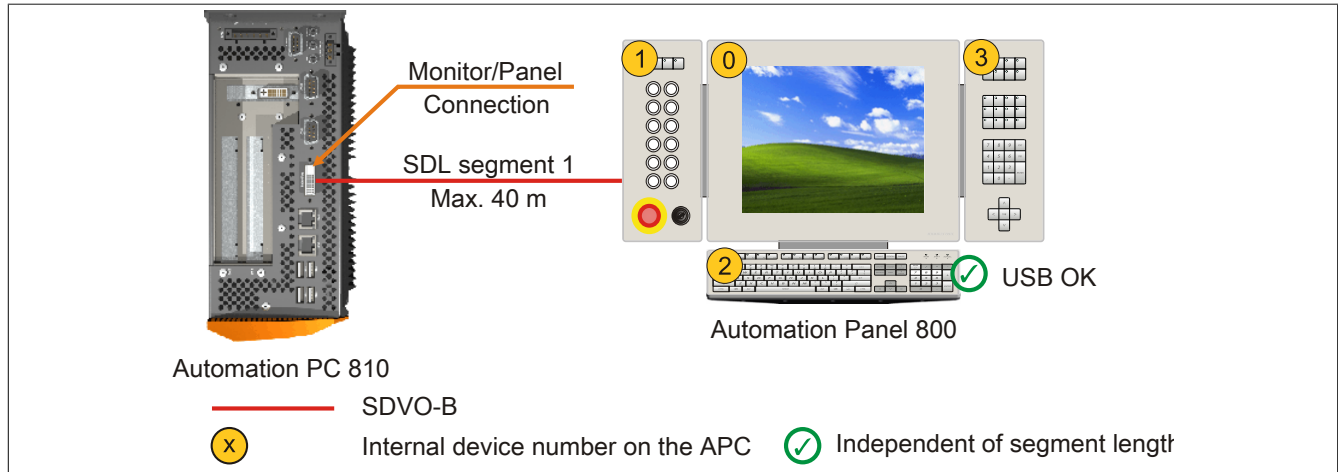


Figure 67: One Automation Panel 800 system via onboard SDL

6.2.1 Base system requirements

Requirements for the base system and information about possible limitations to the maximum resolution can be found in the user's manual for the B&R Industrial PC being used.

6.2.2 Cables

Select an Automation Panel 800 SDL cable from the following table.

Model number	Description	Length
5CASDL.0018-20	SDL cable flex for Automation Panel 800, 1.8 m.	1.8 m ±20 mm
5CASDL.0050-20	SDL cable flex for Automation Panel 800, 5 m.	5 m ±45 mm
5CASDL.0100-20	SDL cable flex for Automation Panel 800, 10 m.	10 m ±90 mm
5CASDL.0150-20	SDL cable flex for Automation Panel 800, 15 m.	15 m ±135 mm
5CASDL.0200-20	SDL cable flex for Automation Panel 800, 20 m.	20 m ±180 mm
5CASDL.0250-20	SDL cable flex for Automation Panel 800, 25 m.	25 m ±230 mm
5CASDL.0300-30	SDL cable flex for Automation Panel 800 with extender, 30 m.	30 m ±280 mm
5CASDL.0400-30	SDL cable flex for Automation Panel 800 with extender, 40 m.	40 m ±380 mm

Table 45: Cables for SDL configurations

Information:

Detailed technical data about cables is listed in the "Cables" on page 108 section.

6.2.2.1 Cable lengths and resolutions for SDL transmission

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

Cables	Resolution
Segment length [m]	XGA 1024 x 768
1.8	5CASDL.0018-20
5	5CASDL.0050-20
10	5CASDL.0100-20
15	5CASDL.0150-20

Table 46: Cable lengths and resolutions for SDL transmission

Cables	Resolution
	XGA 1024 x 768
Segment length [m]	
20	5CASDL.0200-20
25	5CASDL.0250-20
30	5CASDL.0300-30
40	5CASDL.0400-30

Table 46: Cable lengths and resolutions for SDL transmission

6.2.3 Settings in BIOS

No special BIOS settings are necessary for operation.

For detailed information, see the user's manual for the B&R Industrial PC being used.

Touch screen functionality

COM C must be enabled in BIOS in order to operate the panel touch screen connected to the monitor/panel interface ("Advanced - Baseboard/Panel features - Legacy devices").

6.3 Internal numbering of the extension units

An extension unit for an AP800 device is numbered like another device. The numbering of the extension units starts from the display unit and goes in the counter-clockwise direction; all extension unit slots that are not used are left out. The following graphic shows numbering examples.

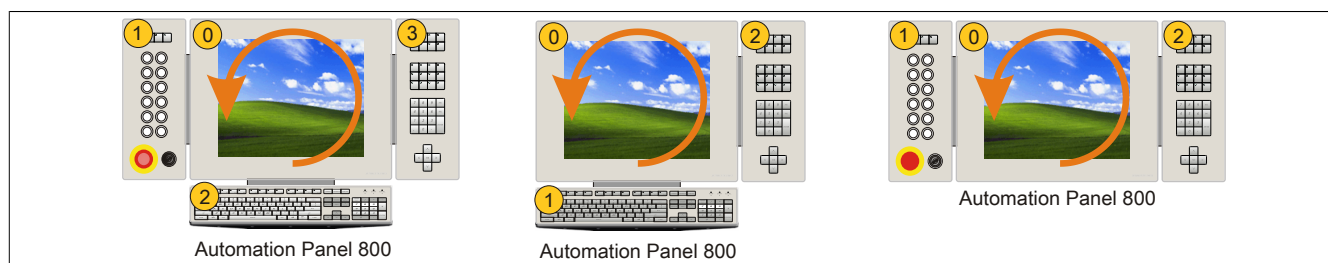


Figure 68: Numbering of extension units (examples)

Numbering of the keys and LEDs when connecting multiple devices in Visual Components is as follows:

Device 0: 0 - 127

Device 1: 128 - 255

Device 2: 256 - 383

Device 3: 384 - 511

7 Key and LED configurations

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

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

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

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

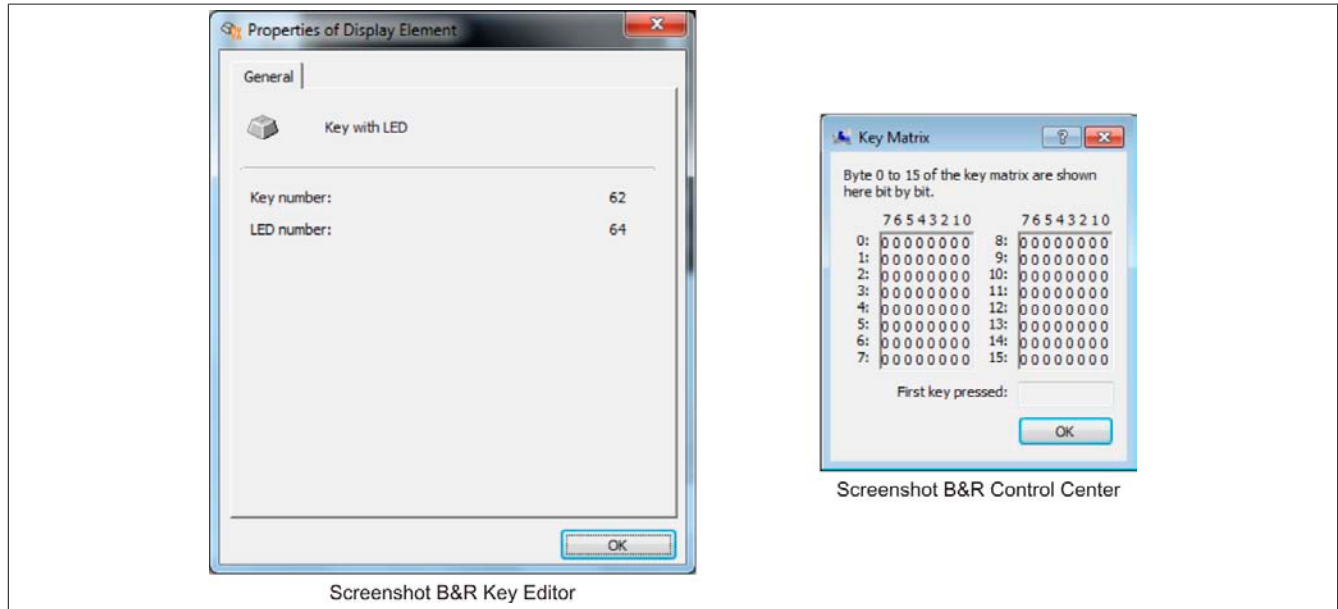


Figure 69: Beispiel - Hardwarenummer im B&R Key Editor bzw. im B&R Control Center

The following images show the positions of keys and LEDs in the matrix. They are shown as follows.

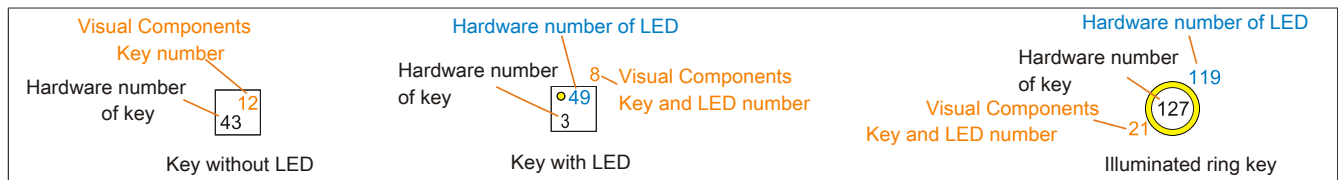


Figure 70: Keys and LEDs in the matrix

7.1 Display unit 5AP880.1505-00

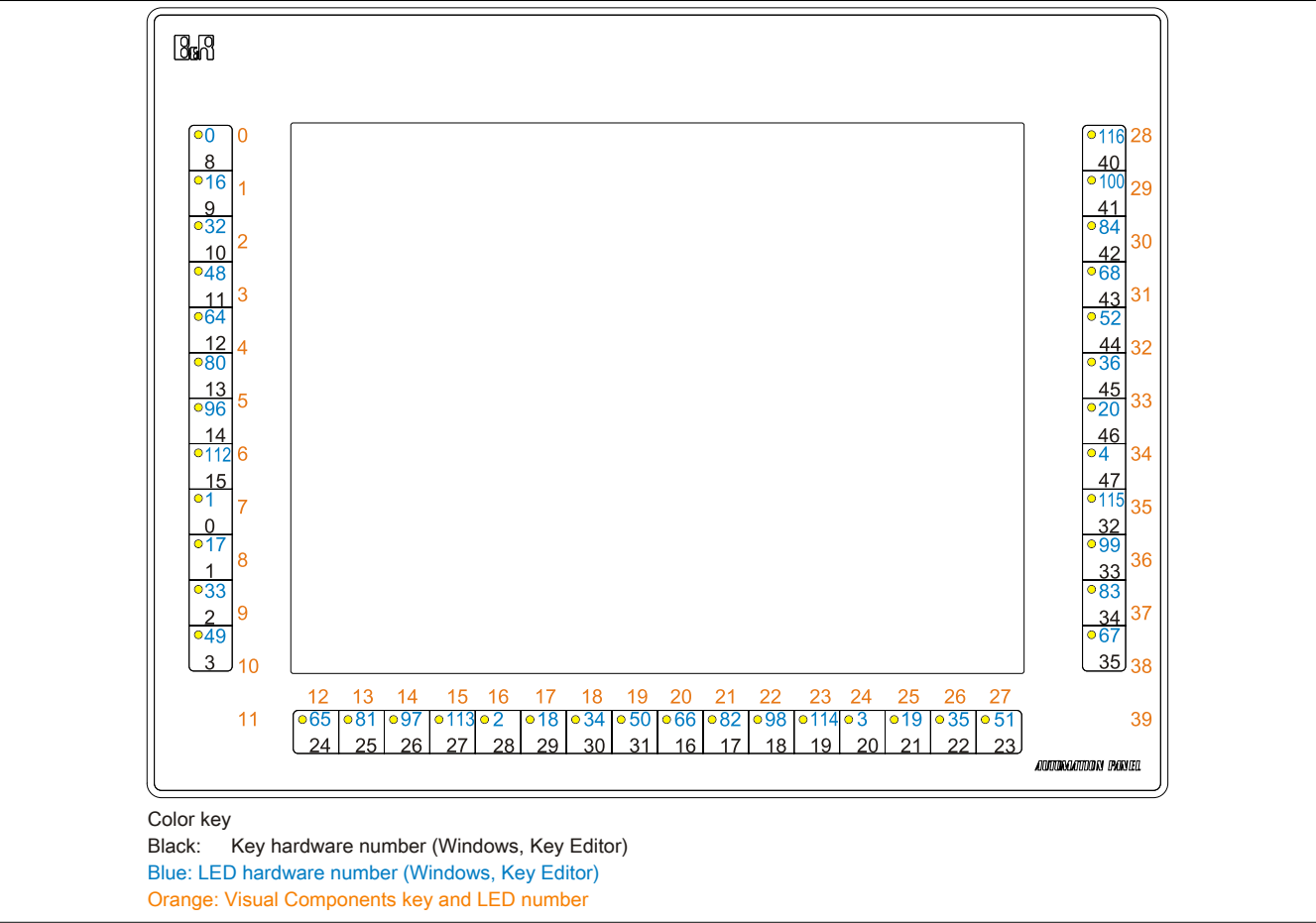


Figure 71: 5AP880.1505-00 - Hardware numbers

7.2 Extension keyboard 5AC800.EXT1-00

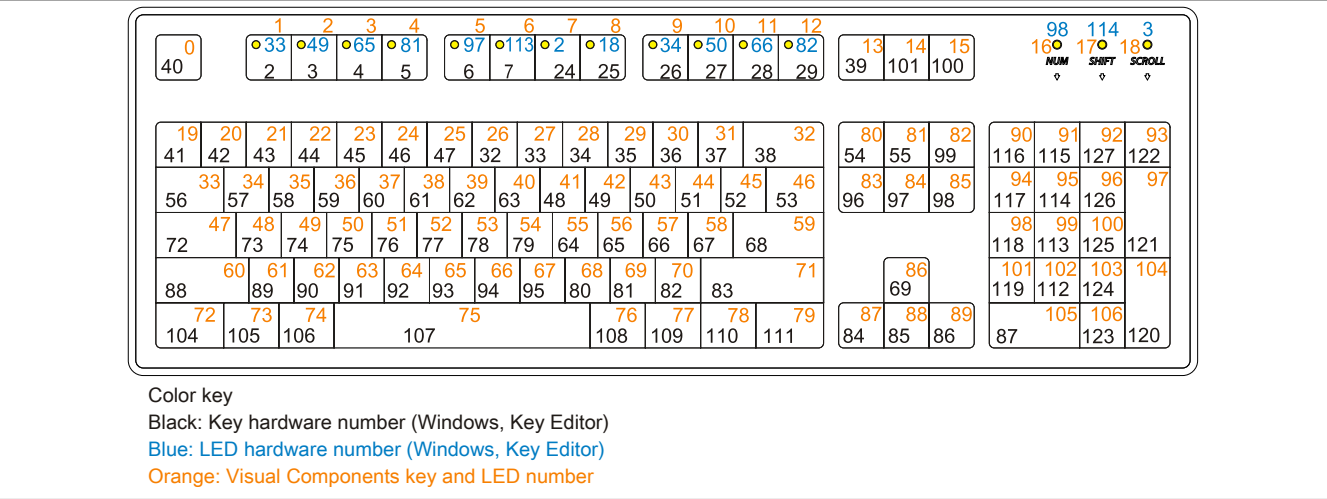


Figure 72: 5AC800.EXT1-00 - Hardware numbers

7.3 F key extension left 5AC800.EXT2-00 / right 5AC800.EXT2-01

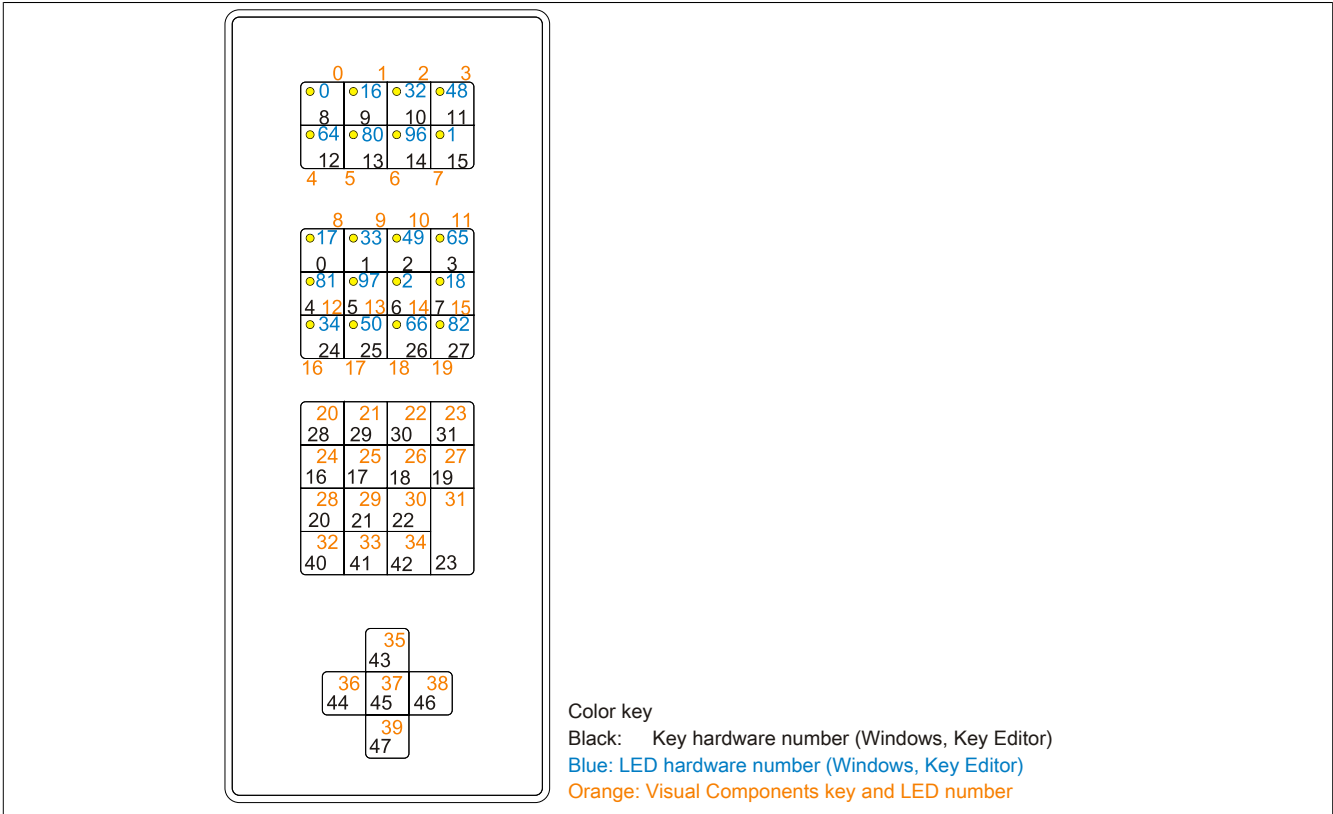


Figure 73: 5AC800.EXT2-00, 5AC800.EXT2-01 - Hardware numbers

7.4 5AC800.EXT3-00 8PB C key extension - Left / 5AC800.EXT3-01 8PB C key extension - Right

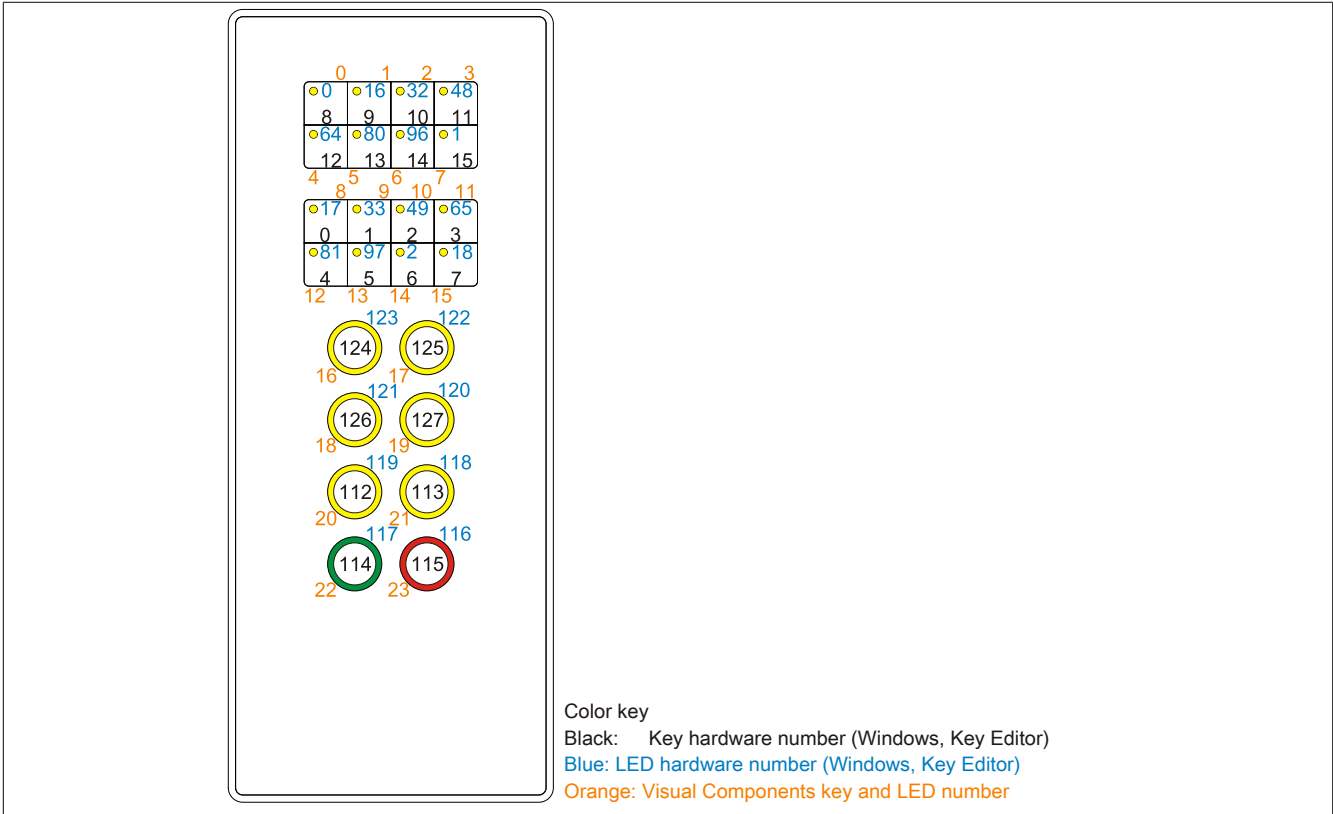


Figure 74: 5AC800.EXT3-00, 5AC800.EXT3-01 - Hardware numbers

7.5 5AC800.EXT3-02 12PB C key extension - Left / 5AC800.EXT3-03 8PB C key extension - Right

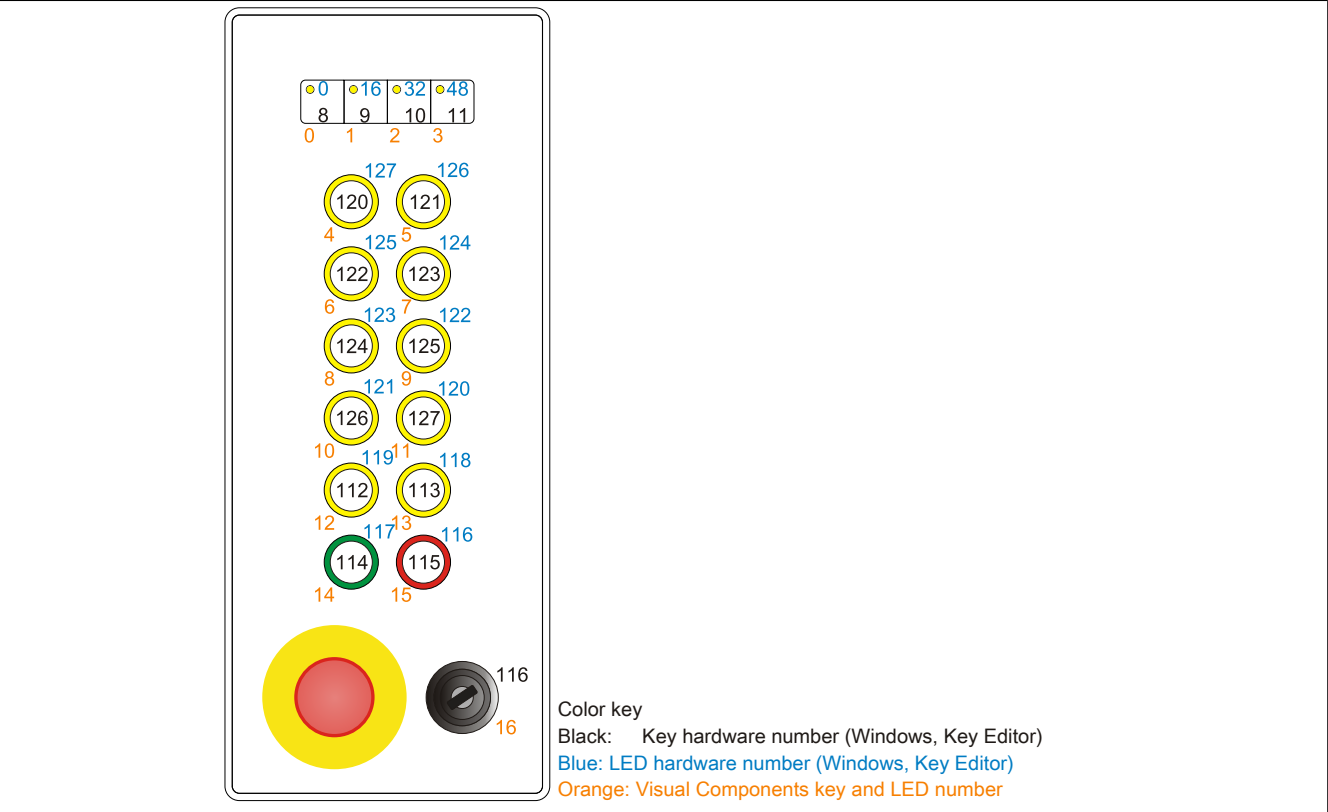


Figure 75: 5AC800.EXT3-02, 5AC800.EXT3-03 - Hardware numbers

7.6 5AC800.EXT3-04 8PB C key extension - Left / 5AC800.EXT3-05 8PB C key extension - Right

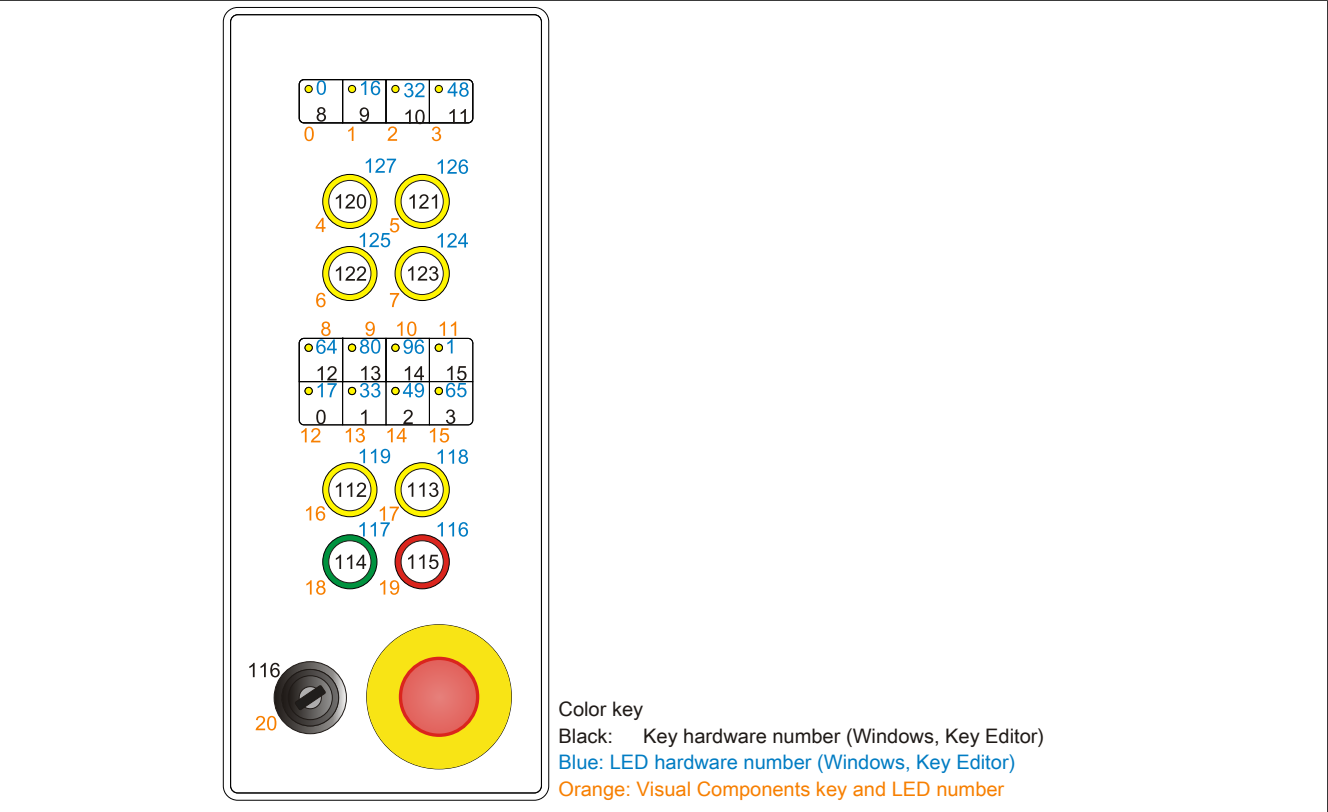


Figure 76: 5AC800.EXT3-04, 5AC800.EXT3-05 - Hardware numbers

8 Touch screen calibration

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

Regardless of this, the touch screen will have to be calibrated once during or following the installation of the touch screen driver.

8.1 Windows XP Professional

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

8.2 Windows XP Embedded

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

8.3 Windows Embedded Standard 2009

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

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

8.4 Windows Embedded Standard 7 Embedded / Premium

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

The touch screen driver must be installed manually if a touch controller was not detected during the Windows Embedded Standard 7 setup or if an Automation Panel 800/900/9x3/9xD has been connected after setup. The necessary driver is available in the Downloads section of the B&R website (www.br-automation.com).

8.5 Windows CE

Windows CE starts the touch screen calibration sequence during its first boot in its default configuration (i.e. delivered state).

8.6 Windows 7 Professional / Ultimate

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

8.7 Automation Runtime / Visual Components

The touch screen must be calibrated once for the customer application when commissioning the device and project.

9 Tips for extending the service life of the display

9.1 Backlight

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

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

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

9.2 Screen burn-in

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

There are basically two types:

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

9.2.1 What causes screen burn-in?

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

9.2.2 How can screen burn-in be avoided?

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

10 Pixel errors

Information:

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

Chapter 4 • Software

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

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

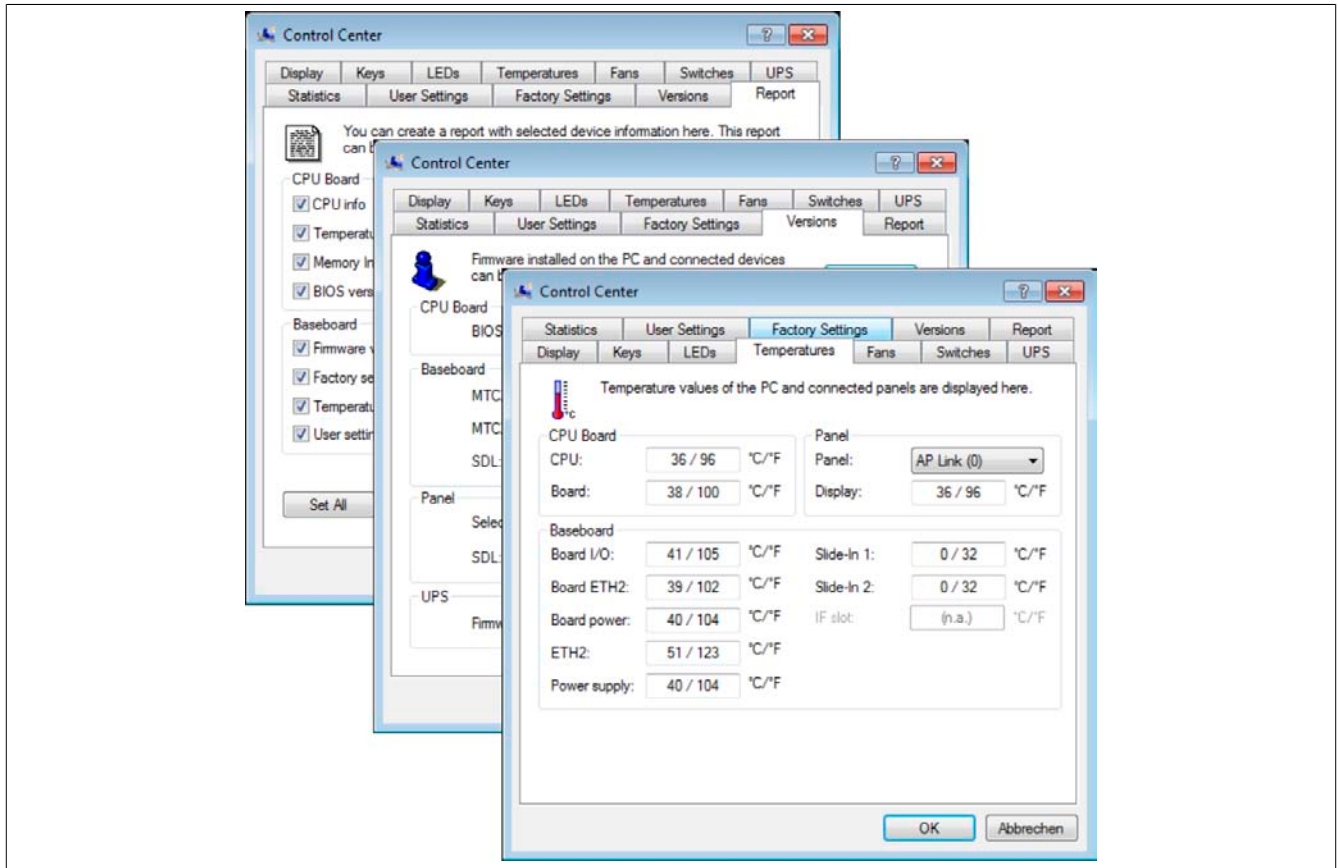


Figure 77: ADI Control Center screenshots - Examples

Information:

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

1.1 Functions

Information:

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

- Changing display-specific parameters
- Reading device-specific keys
- Updating the key configuration
- Enabling device-specific LEDs on a membrane keypad
- Reading and calibrating control devices (e.g. key switches, handwheels, joysticks, potentiometers)
- Reading temperatures, fan speeds, statistical data and switch settings
- Reading operating hours (power-on hours)

- Reading user and factory settings
- Reading software versions
- Updating and backing up BIOS and firmware
- Creating reports about the current system (support assistance)
- Setting the SDL equalizer value when adjusting SDL cables
- Changing the user serial ID

Supports the following systems:

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

1.2 Installation

A detailed description of the Control Center can be found in the integrated help system. The B&R Automation Device Interface (ADI) driver (also contains Control Center) is available in the Downloads section of the B&R website (www.br-automation.com).

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

Information:

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

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

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

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

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

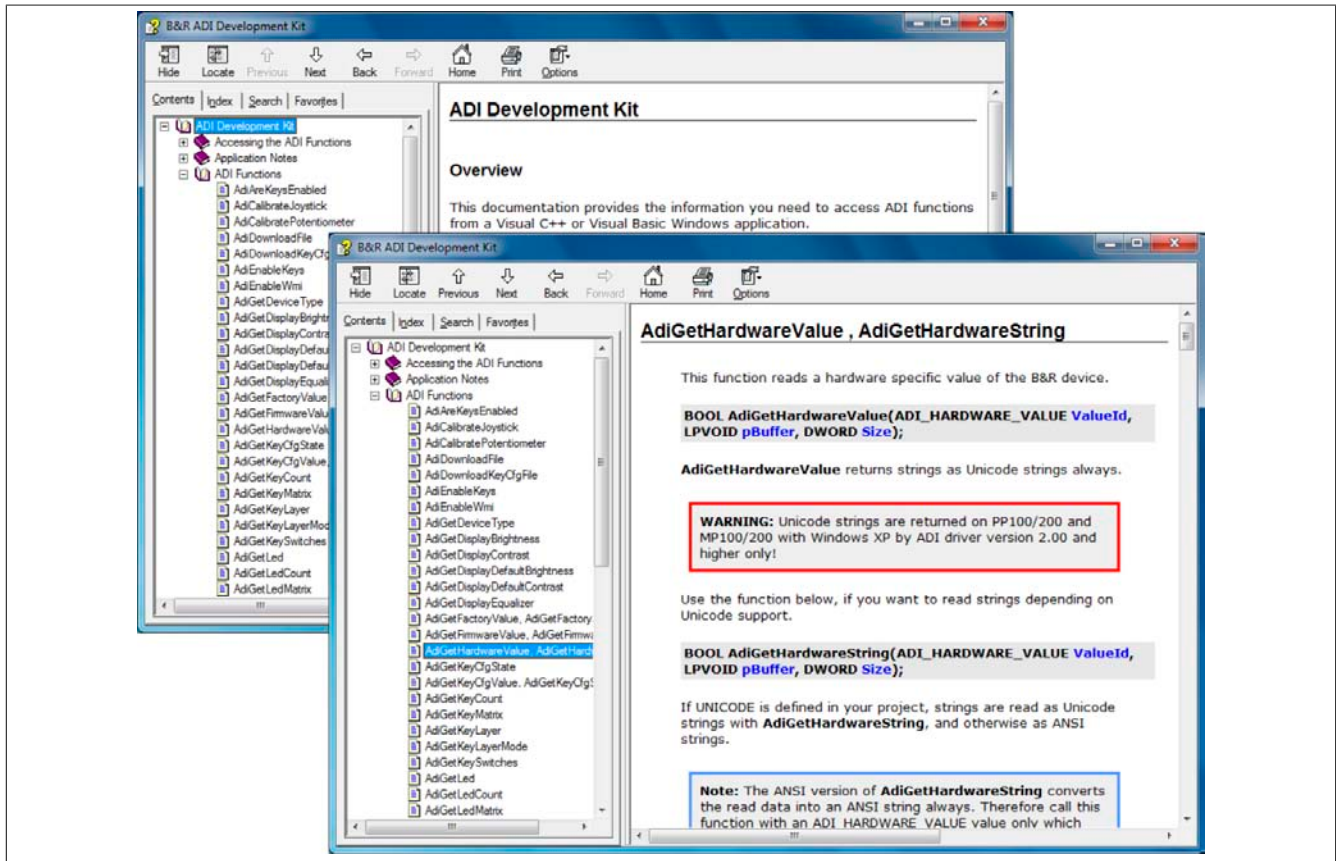


Figure 78: ADI Development Kit Screenshots (Version 3.70)

Features:

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

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

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

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

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

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

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

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

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

Supported programming languages:

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

System requirements

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

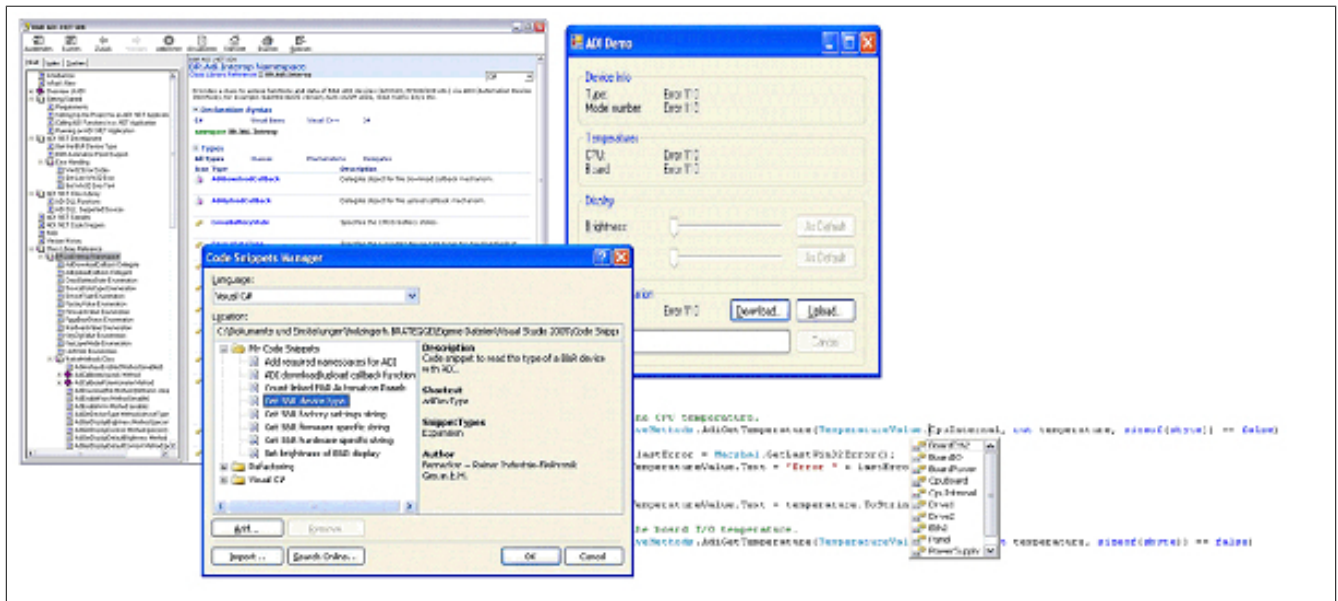


Figure 79: ADI .NET SDK screenshots (version 2.10)

Features (version 2.10 and higher)

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

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

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

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

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

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

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

4 B&R Key Editor

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

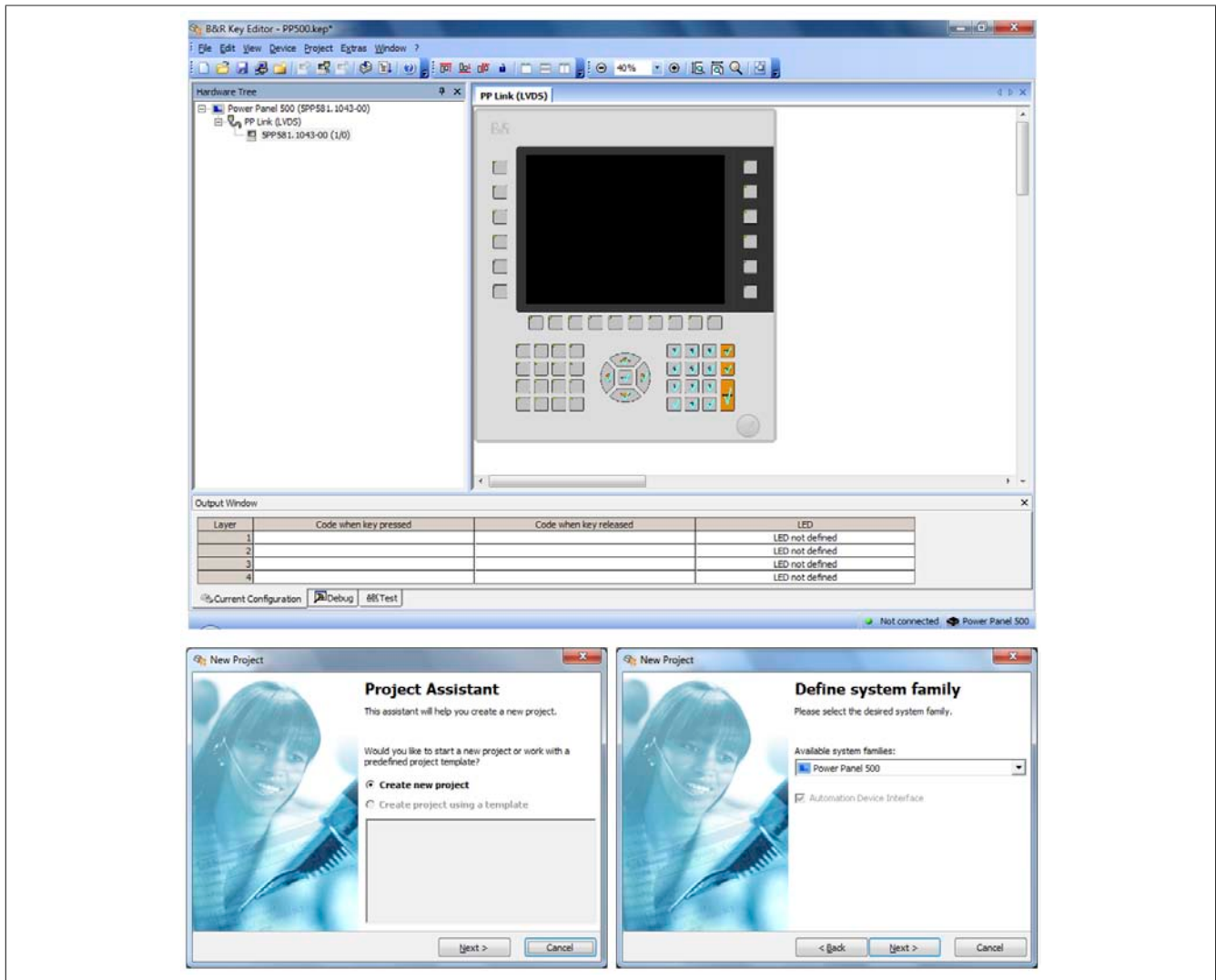


Figure 80: B&R Key Editor screenshots (version 3.50)

Features:

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

The following systems are supported (version 3.50):

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

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

A detailed guide for configuring keys and LEDs can be found in the B&R Key Editor's help system. The B&R Key Editor is available at no cost in the Downloads section of the B&R website (www.br-automation.com). It can also be found on the B&R HMI Drivers & Utilities DVD (model number 5SWHMI.0000-00).

Chapter 5 • Standards and certifications

1 Standards and guidelines

1.1 CE mark



This mark certifies that all harmonized EN standards for the applicable directives have been met for B&R products.

1.2 EMC directive

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

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

1.3 Low voltage directive

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

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

1.4 Machine directive

Machine directive "2006/42/EC" requirements are satisfied through compliance with the following harmonized standards for E-stop buttons, stop buttons and devices for enabling control:

EN ISO 13849-1:2008	Safety of machinery - Safety-related controller components - Part 1: General design principles
EN ISO 13850:2008	Safety of machinery - Emergency stop - Principles for design
EN 60204-1:2006	Machine safety - electrical equipment on machines - Part 1: General requirements

2 Certifications

Danger!

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

B&R products and services comply with applicable standards. This includes international standards from organizations such as ISO, IEC and CENELEC, as well as national standards from organizations such as UL, CSA, FCC, VDE, ÖVE, etc. We are committed to ensuring the reliability of our products in an industrial environment.

Unless otherwise specified, the following certifications apply:

2.1 UL certification



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

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

2.2 GOST-R



Products with this mark have been certified by an accredited certification body and have been approved for import to the Russian Federation.

3 SDL flex cable test description

3.1 Torsion

3.1.1 Test structure

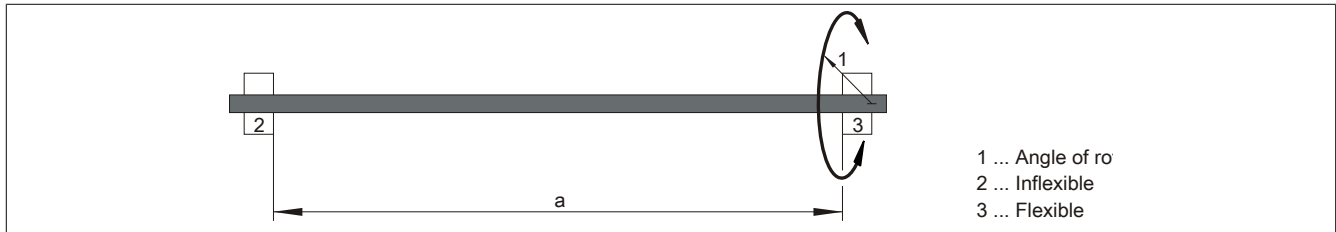


Figure 81: Test structure - Torsion

3.1.2 Test conditions

- Distance a: 450 mm
- Angle of rotation: $\pm 85^\circ$
- Speed: 50 cycles/minute
- Note: The cable was clamped down twice in the machine.

3.1.3 Individual tests

- Visible pixel errors: The minimum equalizer setting was determined at the beginning of the test. This is the value between 0-15 at which no more pixel errors are visible. Changes to the the equalizer setting caused by mechanical load are noted.
- Touch screen functionality
- USB mouse functionality
- Hot plugging functionality tested by disconnecting the USB cable
- After a test duration of 150,000 cycles, testing was concluded with a result of "OK".

3.2 Cable drag chain

3.2.1 Test structure

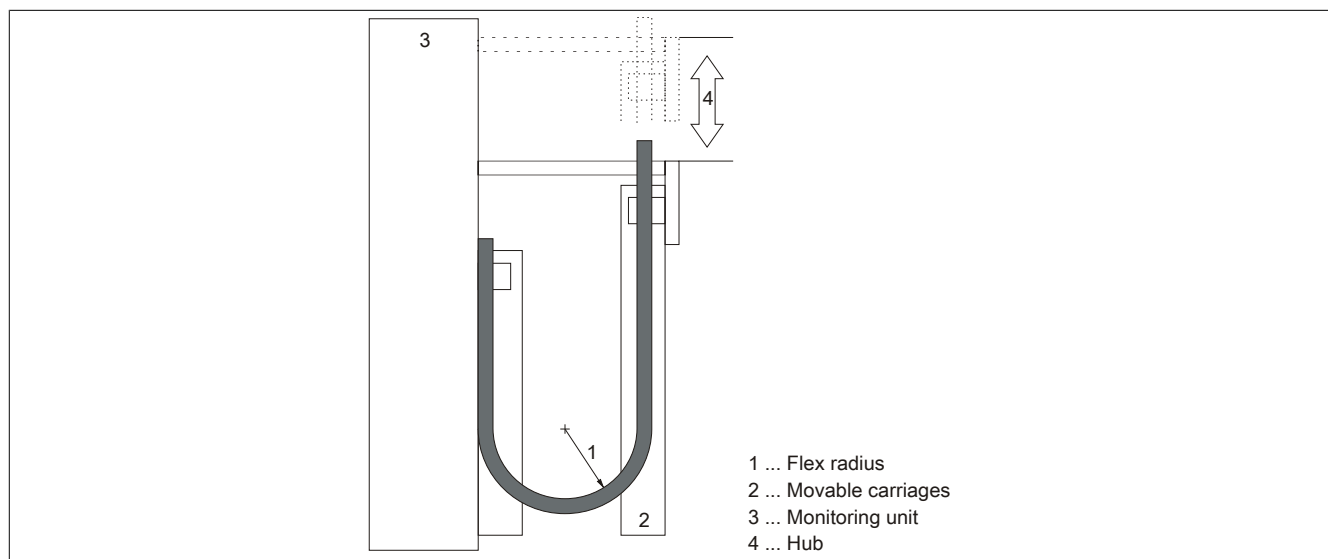


Figure 82: Test structure - Cable drag chain

3.2.2 Test conditions

- Flex radius: 180 mm (= 15 x cable diameter)
- Hub: 460 mm
- Speed: 4800 cycles / hour
- Note: The cable was clamped down twice in the machine.

3.2.3 Individual tests

- Visible pixel errors: The minimum equalizer setting was determined at the beginning of the test. This is the value between 0-15 at which no more pixel errors are visible. Changes to the the equalizer setting caused by mechanical load are noted.
- Touch screen functionality
- USB mouse functionality
- Hot plugging functionality tested by disconnecting the USB cable
- After a test duration of 300,000 cycles, testing was concluded with a result of "OK".

Chapter 6 • Accessories

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

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

1 USB flash drives

1.1 5MMUSB.2048-00

1.1.1 General information

USB flash drives are storage media that are easy to replace. Because of their fast data transfer (USB 2.0), USB flash drives are ideal for use as portable data storage. Without requiring additional drivers ("hot plugging", except in the case of Windows 98SE), the USB flash drive can immediately act as an additional drive where data can be read or written.

Information:

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

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

1.1.2 Order data

Model number	Short description	Figure
5MMUSB.2048-00	USB 2.0 flash drive, 2048 MB	

Table 47: 5MMUSB.2048-00 - Order data

1.1.3 Technical data

Information:

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

Product ID	5MMUSB.2048-00
General information	
Data retention	10 years
LEDs	1 LED (green) ¹⁾
MTBF	100,000 hours (at 25°C)
Type	USB 1.1, USB 2.0
Maintenance	None
Certification CE	Yes

Table 48: 5MMUSB.2048-00 - Technical data

Product ID	5MMUSB.2048-00
Interfaces	
USB	
Type	USB 1.1, USB 2.0
Connection	To any USB type A interface
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Sequential reading	Max. 8.7 MB/s
Sequential writing	Max. 1.7 MB/s
Support	
Operating systems	
Windows XP Professional	Yes
Windows XP Embedded	Yes
Windows ME	Yes
Windows 2000	Yes
Windows CE 5.0	Yes
Windows CE 4.2	Yes
Electrical characteristics	
Power consumption	650 μ A sleep mode, 150 mA read/write
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	10 to 90%, non-condensing
Storage	5 to 90%, non-condensing
Transport	5 to 90%, non-condensing
Vibration	
Operation	10 to 500 Hz: 2 g (19.6 m/s ² 0-peak), oscillation rate 1/minute
Storage	10 to 500 Hz: 2 g (19.6 m/s ² 0-peak), oscillation rate 1/minute
Transport	10 to 500 Hz: 2 g (19.6 m/s ² 0-peak), oscillation rate 1/minute
Shock	
Operation	Max. 40 g (392 m/s ² 0-peak) and 11 ms duration
Storage	Max. 80 g (784 m/s ² 0-peak) and 11 ms duration
Transport	Max. 80 g (784 m/s ² 0-peak) and 11 ms duration
Altitude	
Operation	Max. 3048 m
Storage	Max. 12192 m
Transport	Max. 12192 m
Mechanical characteristics	
Dimensions	
Width	19 mm
Length	52.2 mm
Height	7.9 mm

Table 48: 5MMUSB.2048-00 - Technical data

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

1.1.4 Temperature/Humidity diagram

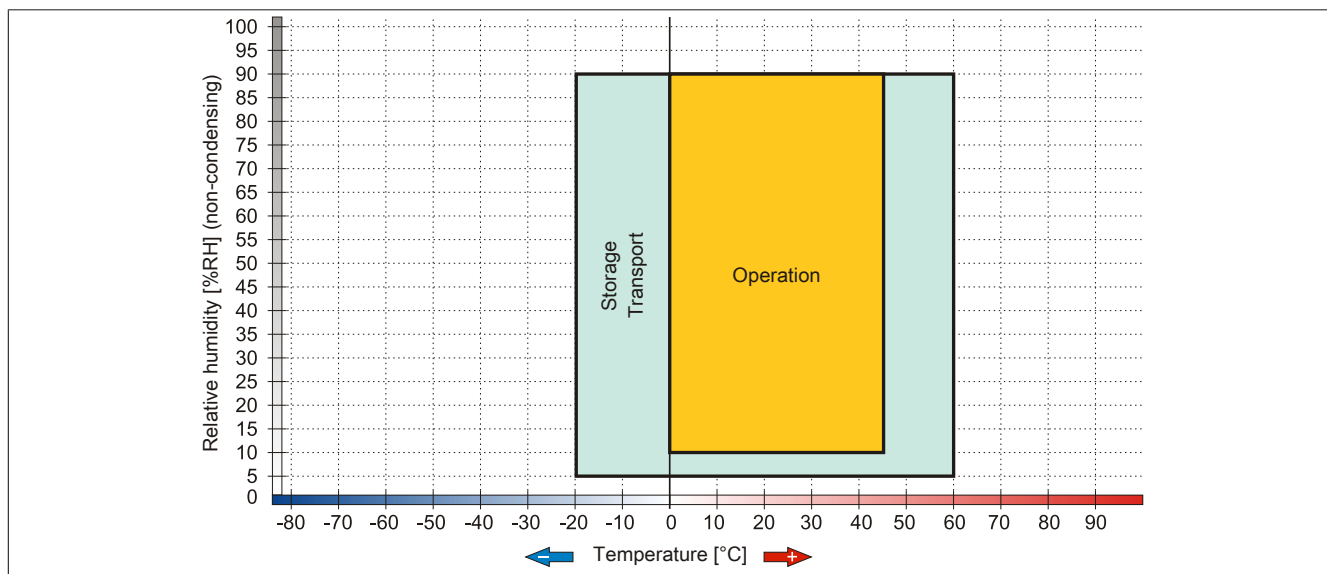


Figure 83: 5MMUSB.2048-00 - Temperature/Humidity diagram

1.2 5MMUSB.xxxx-01

1.2.1 General information

USB flash drives are storage media that are easy to replace. Because of their fast data transfer (USB 2.0), USB flash drives are ideal for use as portable data storage. Without requiring additional drivers ("hot plugging", except in the case of Windows 98SE), the USB flash drive can immediately act as an additional drive where data can be read or written.

Information:

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

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

1.2.2 Order data

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

Table 49: 5MMUSB.2048-01, 5MMUSB.4096-01 - Order data

1.2.3 Technical data

Product ID	5MMUSB.2048-01	5MMUSB.4096-01
General information		
Capacity	2 GB	4 GB
LEDs	1 LED (green) ¹⁾	
MTBF	>3,000,000 hours	
Type	USB 1.1, USB 2.0	
Maintenance	None	
Default file system	FAT16	FAT32
Certification		
CE	Yes	
GOST-R	Yes	
Interfaces		
USB		
Type	USB 1.1, USB 2.0	
Connection	To any USB type A interface	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)	
Sequential reading	Full speed max. 1 MB/s, High speed max. 32 MB/s	
Sequential writing	Full speed max. 0.9 MB/s, High speed max. 23 MB/s	
Endurance		
SLC flash	Yes	
Data retention	>10 years	
Data reliability	<1 unrecoverable error in 10 ¹⁴ bit read accesses	
Connection cycles	>1500	
Support		
Operating systems		
Windows 7	Yes	
Windows XP Professional	Yes	
Windows XP Embedded	Yes	
Windows ME	Yes	
Windows 2000	Yes	
Windows CE 5.0	Yes	
Windows CE 4.2	Yes	
Electrical characteristics		
Power consumption	Max. 500 uA sleep mode, max. 120 mA read/write	

Table 50: 5MMUSB.2048-01, 5MMUSB.4096-01 - Technical data

Product ID	5MMUSB.2048-01	5MMUSB.4096-01
Environmental conditions		
Temperature		
Operation	0 to 70°C	
Storage	-50 to 100°C	
Transport	-50 to 100°C	
Relative humidity		
Operation	85%, non-condensing	
Storage	85%, non-condensing	
Transport	85%, non-condensing	
Vibration		
Operation	20 to 2000 Hz: 20 g (peak)	
Storage	20 to 2000 Hz: 20 g (peak)	
Transport	20 to 2000 Hz: 20 g (peak)	
Shock		
Operation	Max. 1500 g (peak)	
Storage	Max. 1500 g (peak)	
Transport	Max. 1500 g (peak)	
Altitude		
Operation	Max. 3048 m	
Storage	Max. 12192 m	
Transport	Max. 12192 m	
Mechanical characteristics		
Dimensions		
Width	17.97 mm	
Length	67.85 mm	
Height	8.35 mm	

Table 50: 5MMUSB.2048-01, 5MMUSB.4096-01 - Technical data

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

1.2.4 Temperature/Humidity diagram

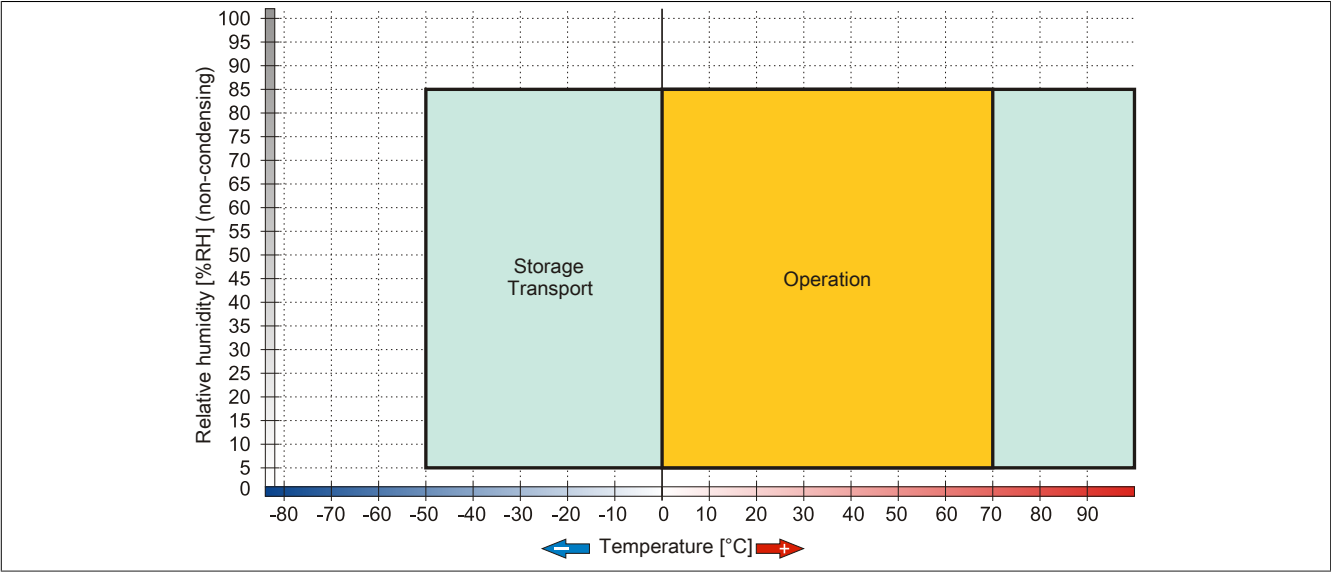


Figure 84: 5MMUSB.xxxx-01 - Temperature/Humidity diagram

2 Legend strip templates

2.1 General information

Automation Panel 800 devices with keys and the extension units are delivered with partially pre-labeled key legend strips (F1, F2, etc.). The key legend strip slots are accessible on the back of the Automation Panel 800 display and extension units (above and below).

Printable legend strips in A4 format for the extension units and in A3 format for display unit 5AP880.1505-00 can be ordered from B&R. They can be printed using a standard laser printer (b/w or color) in a temperature range from -40 to 125 °C. A template for printing legend strips in CorelDRAW versions 7, 9 and 10 is available for download from the B&R website www.br-automation.com. These print templates can also be found on the HMI Drivers & Utilities DVD (model number 5SWHMI.0000-00).

2.2 Order data

Model number	Short description	Figure
	Accessories	
5AC800.EXTX-00	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT2-00 and 5AC800.EXT2-01; for 3 devices	
5AC800.EXTX-01	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT3-00 and 5AC800.EXT3-01; for 2 devices	
5AC800.EXTX-02	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT3-04 and 5AC800.EXT3-05; for 2 devices	
5AC800.EXTX-03	Slide-in label template for Automation Panel 800 extensions 5AC800.EXT3-02 and 5AC800.EXT3-03; for 3 devices	
5AC800.150X-00	Slide-in label template 15" for Automation Panel 800 5AP880.1505-00; for 3 devices	

Table 51: 5AC800.EXTX-00, 5AC800.EXTX-01, 5AC800.EXTX-02, 5AC800.EXTX-03, 5AC800.150X-00 - Order data

3 Cables

3.1 5CAPWR.0xxx-20

3.1.1 General information

The 5CAPWR.0xxx-20 supply voltage cables are designed for use in both fixed and flexible installations (e.g. in support arm systems).

Caution!

Power must be turned off before plugging in and unplugging cables.

3.1.2 Order data

Model number	Short description	Figure
	Supply voltage cable	
5CAPWR.0018-20	Voltage supply cable for the Automation Panel 800, 1.8 m	
5CAPWR.0050-20	Voltage supply cable for the Automation Panel 800, 5 m	
5CAPWR.0100-20	Voltage supply cable for the Automation Panel 800, 10 m	
5CAPWR.0150-20	Voltage supply cable for the Automation Panel 800, 15 m	
5CAPWR.0200-20	Voltage supply cable for the Automation Panel 800, 20 m	
5CAPWR.0250-20	Voltage supply cable for the Automation Panel 800, 25 m	
5CAPWR.0300-20	Voltage supply cable for the Automation Panel 800, 30 m	
5CAPWR.0400-20	Voltage supply cable for the Automation Panel 800, 40 m	

Table 52: 5CAPWR.0018-20, 5CAPWR.0050-20, 5CAPWR.0100-20, 5CAPWR.0150-20, 5CAPWR.0200-20, 5CAPWR.0250-20, 5CAPWR.0300-20, 5CAPWR.0400-20 - Order data

3.1.3 Technical data

Product ID	5CAPWR. 0018-20	5CAPWR. 0050-20	5CAPWR. 0100-20	5CAPWR. 0150-20	5CAPWR. 0200-20	5CAPWR. 0250-20	5CAPWR. 0300-20	5CAPWR. 0400-20
General information								
Certification	Yes							
CE								
cULus								
GOST-R	Yes							
Cable construction								
Wire cross section	AWG 17							
Outer sheathing	Gray							
Color								
Connector								
Type	ODU 3-pin MINI-SNAP							
Connection cycles	2000							
Contacts	Gold-plated							
Electrical characteristics								
Operating voltage	Max. 500 V							
Current load	16 A at 25°C							
Conductor resistance	≤19.5 Ω/km							
AWG 17								
Insulation resistance	Min. 200 MΩ/km at 20°C							
Mechanical characteristics								
Dimensions	Max. 6.6 mm							
Length								
Diameter								
Flex radius	≥10x cable diameter (from circular connector - cable)							
Fixed installation								
Flexible installation								
Flexibility	Flexible							
Weight	Approx. 330 g	Approx. 430 g	Approx. 820 g	Approx. 1000 g	Approx. 1400 g	Approx. 1700 g	Approx. 2000 g	Approx. 2700 g

Table 53: 5CAPWR.0018-20, 5CAPWR.0050-20, 5CAPWR.0100-20, 5CAPWR.0150-20, 5CAPWR.0200-20, 5CAPWR.0250-20, 5CAPWR.0300-20, 5CAPWR.0400-20 - Technical data

3.1.4 Flex radius

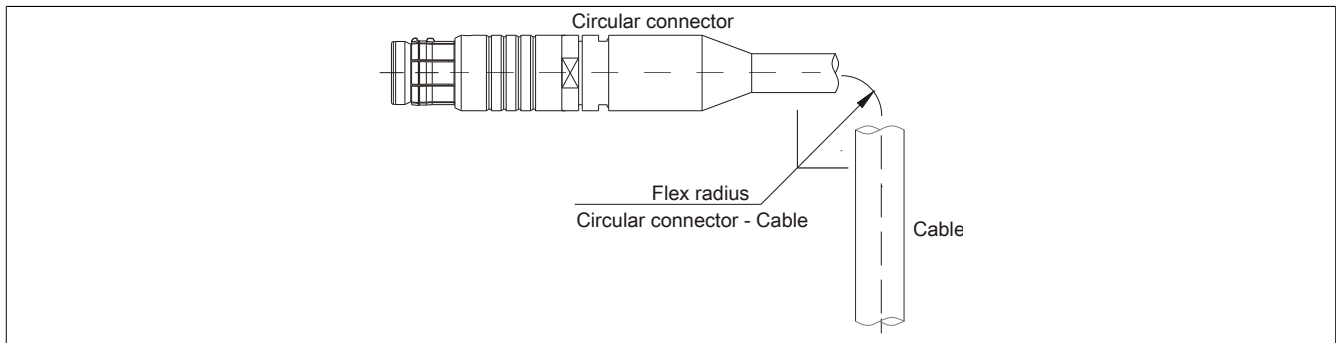


Figure 85: AP800 power cable - Flex radius

3.1.5 Dimensions

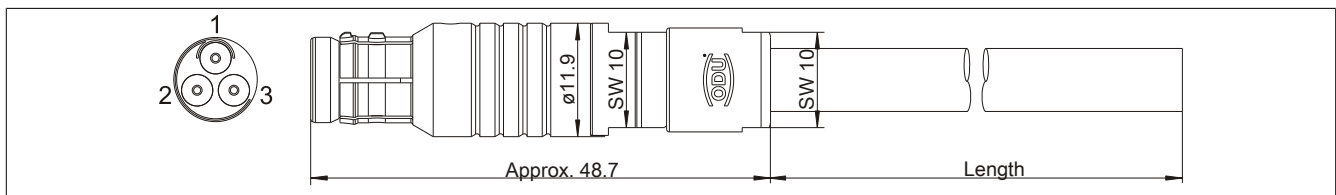
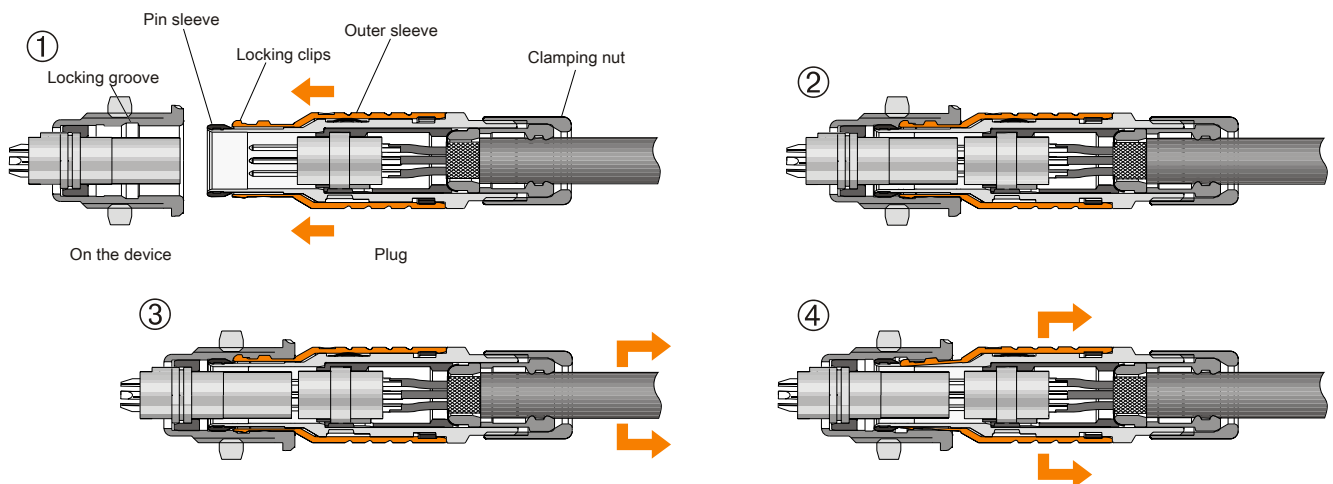


Figure 86: 5CAPWR.0xxx-20 - Dimensions

3.1.6 Push-Pull circular connector locking principle



- ① Unconnected push-pull circular connector
- ② Push-Pull circular connector installed on the device. Pulling on the cable or clamping nut shifts the pin sleeve under the locking clips to hold the connector tightly in place in the locking groove on the device. This prevents the plug and receptacle from separating.
- ③ Connected push-pull circular connector
- ④ Push-Pull circular connector removed from the device. Pushing and then pulling on the outer sleeve ejects the locking clips from the locking groove on the device, allowing the plug to be easily separated from the receptacle.

3.1.7 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications. If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly, however.

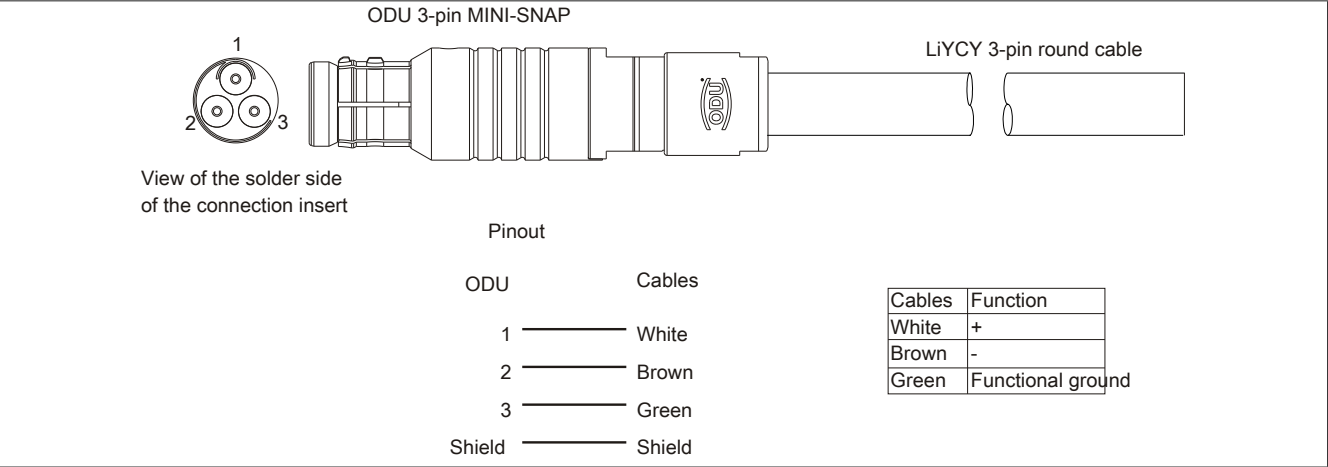


Figure 87: 5CAPWR.0xxx-20 - Pinout

3.2 5CASDL.0xxx-20

3.2.1 General information

5CASDL.0xxx-20 SDL flex cables are designed for use in both inflexible and flexible applications (e.g. swing arm systems).

Caution!

Power must be turned off before plugging in and unplugging cables.

3.2.2 Order data

Model number	Short description	Figure
	SDL flex cables	
5CASDL.0018-20	SDL flex cable for the Automation Panel 800, 1.8 m	
5CASDL.0050-20	SDL flex cable for the Automation Panel 800, 5 m	
5CASDL.0100-20	SDL flex cable for the Automation Panel 800, 10 m	
5CASDL.0150-20	SDL flex cable for the Automation Panel 800, 15 m	
5CASDL.0200-20	SDL flex cable for the Automation Panel 800, 20 m	
5CASDL.0250-20	SDL flex cable for the Automation Panel 800, 25 m	

Table 54: 5CASDL.0018-20, 5CASDL.0050-20, 5CASDL.0100-20, 5CASDL.0150-20, 5CASDL.0200-20, 5CASDL.0250-20 - Order data

3.2.3 Technical data

Product ID	5CASDL.0018-20	5CASDL.0050-20	5CASDL.0100-20	5CASDL.0150-20	5CASDL.0200-20	5CASDL.0250-20
General information						
Certification	Yes Yes Yes					
CE						
cULus						
GOST-R						
Cable construction						
Wire cross section	AWG 24 / AWG 26					
Features	Silicone- and halogen-free					
Shield	Individual cable pairs and entire cable					
Complete shielding	Aluminum-clad foil + tinned copper mesh					
Outer sheathing	Special semi-glossy TMPU Black (B&R) SDL cable (UL) AWM 20236 80°C 30V E63216					
Material						
Color						
Labeling						
Connector						
Type	ODU MINI-SNAP 24-pin / DVI-D (24+1), male					
Connection cycles	2000 / 200					
Contacts	Gold-plated					
Mechanical protection	Metal cover with crimped stress relief					
Locating screw tightening torque	Max. 0.5 Nm					
Electrical characteristics						
Operating voltage	≤30 V					
Test voltage	1 kV _{eff} 0.5 kV _{eff}					
Wire/Wire						
Wire/Shield						
Wave impedance	100 ±10 Ω					
Conductor resistance	≤95 Ω/km ≤145 Ω/km					
AWG 24						
AWG 26						
Insulation resistance	Min. 10 MΩ/km					
Operating conditions						
Approbation	UL AWM 20236 80°C 30 V					
Torsion load	100000 cycles (tested angle of rotation: ±85° speed: 50 cycles / minute)					
Oil and hydrolysis resistance	According to VDE 0282-10					
Environmental conditions						
Temperature	-20 to 80°C -20 to 80°C -5 to 60°C					
Storage						
Fixed installation						
Flexible installation						
Mechanical characteristics						
Dimensions	1.8 m ±20 mm 5 m ±45 mm 10 m ±90 mm 15 m ±135 mm 20 m ±180 mm 25 m ±230 mm Max. 12 mm					
Length						
Diameter						

Table 55: 5CASDL.0018-20, 5CASDL.0050-20, 5CASDL.0100-20, 5CASDL.0150-20, 5CASDL.0200-20, 5CASDL.0250-20 - Technical data

Product ID	5CASDL.0018-20	5CASDL.0050-20	5CASDL.0100-20	5CASDL.0150-20	5CASDL.0200-20	5CASDL.0250-20
Flex radius	$\geq 6 \times$ cable diameter (from connector - ferrite bead, circular connector - ferrite bead)					
Fixed installation	$\geq 15 \times$ cable diameter (from connector - ferrite bead, circular connector - ferrite bead)					
Flexible installation						
Flexibility	Flexible; valid for circular connector - ferrite bead (tested 300,000 cycles with 15x cable diameter, 4800 cycles / hour)					
Drag chain data						
Flex cycles	300,000					
Speed	4800 cycles/hour					
Flex radius	180 mm; 15x cable diameter					
Hub	460 mm					
Weight	Approx. 450 g	Approx. 1000 g	Approx. 2000 g	Approx. 3000 g	Approx. 4000 g	Approx. 5000 g
Tension						
During operation	≤ 50 N					
During installation	≤ 400 N					

Table 55: 5CASDL.0018-20, 5CASDL.0050-20, 5CASDL.0100-20, 5CASDL.0150-20, 5CASDL.0200-20, 5CASDL.0250-20 - Technical data

3.2.4 Flex radius

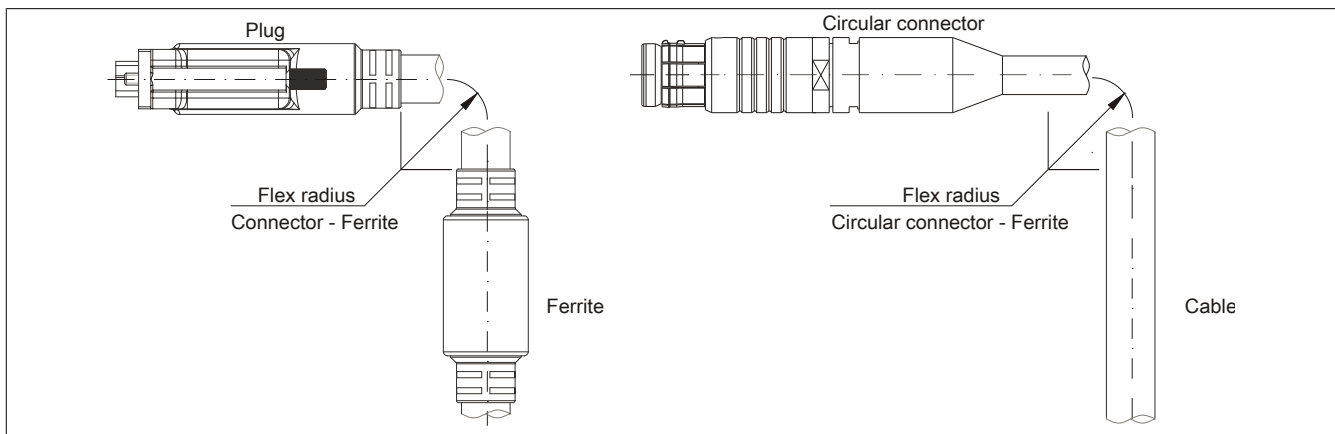


Figure 88: AP800 SDL cables - Flex radius

3.2.5 Dimensions

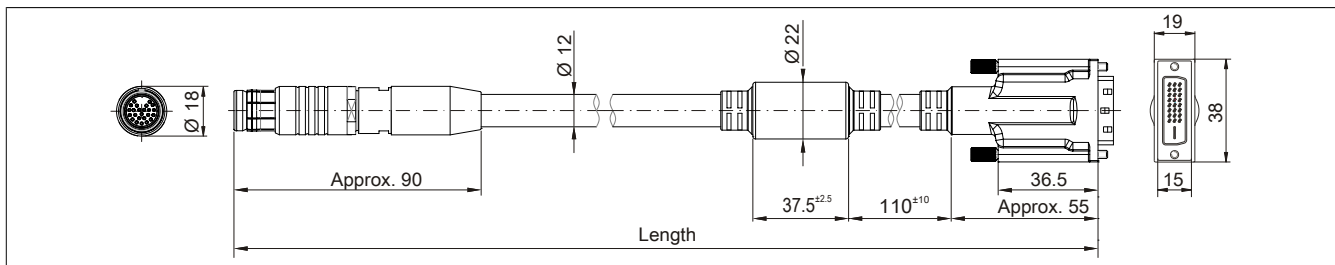
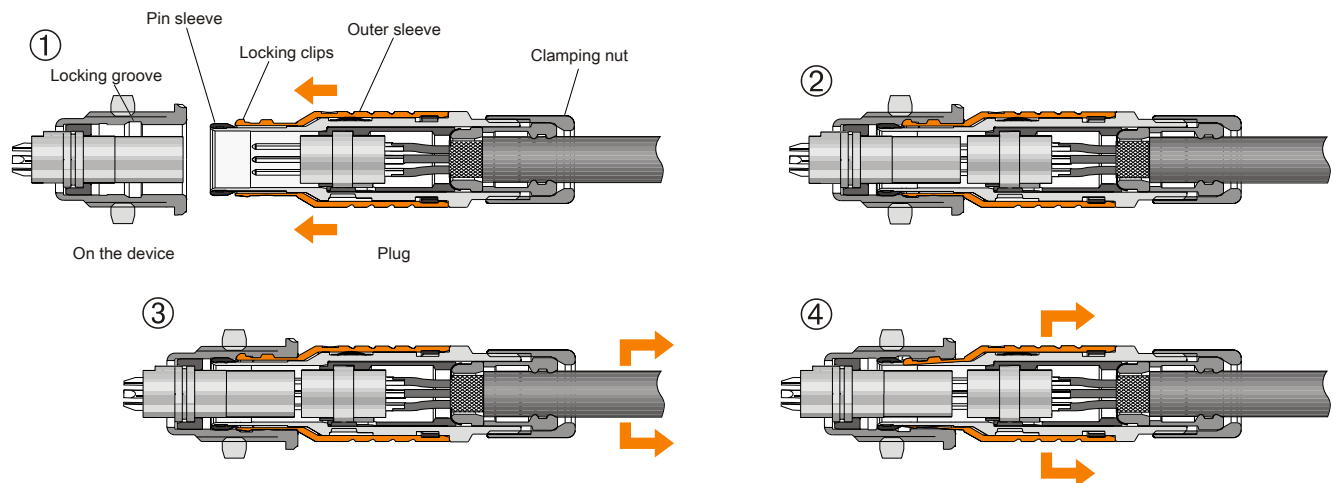


Figure 89: 5CASDL.0xxx-20 - Dimensions

3.2.6 Push-Pull circular connector locking principle



- ① Unconnected push-pull circular connector
- ② Push-Pull circular connector installed on the device. Pulling on the cable or clamping nut shifts the pin sleeve under the locking clips to hold the connector tightly in place in the locking groove on the device. This prevents the plug and receptacle from separating.
- ③ Connected push-pull circular connector
- ④ Push-Pull circular connector removed from the device. Pushing and then pulling on the outer sleeve ejects the locking clips from the locking groove on the device, allowing the plug to be easily separated from the receptacle.

3.2.7 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications.

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

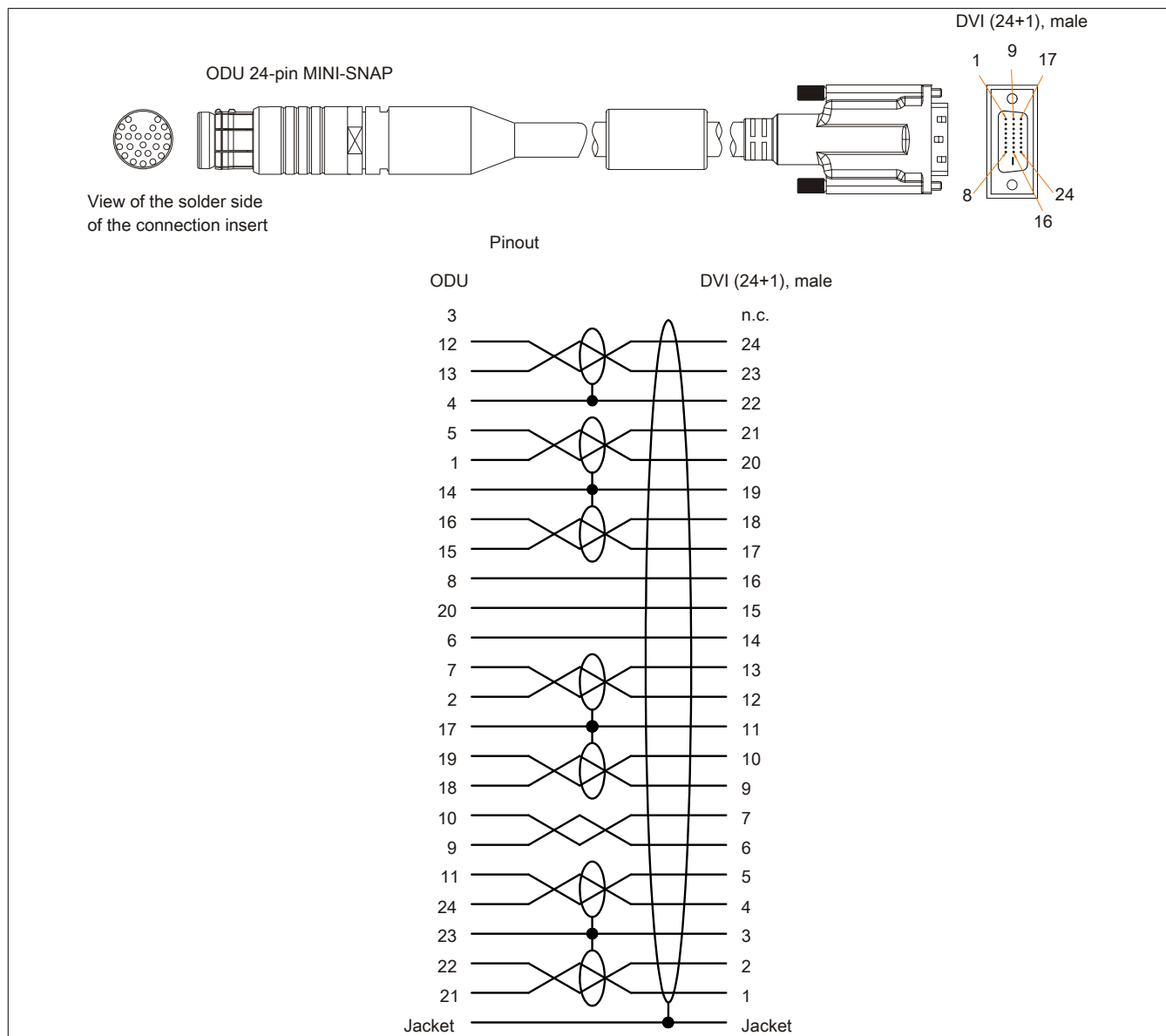


Figure 90: 5CASDL.0xxx-20 - Pinout

3.3 5CASDL.0x00-30

3.3.1 General information

5CASDL.0x00-30 SDL flex cables with extender are designed for use in both inflexible and flexible applications (e.g. swing arm systems).

Caution!

Power must be turned off before plugging in and unplugging cables.

3.3.2 Order data

Model number	Short description	Figure
	SDL flex cables	
5CASDL.0300-30	SDL flex cable with extender for the Automation Panel 800, 30 m	
5CASDL.0400-30	SDL flex cable with extender for the Automation Panel 800, 40 m	

Table 56: 5CASDL.0300-30, 5CASDL.0400-30 - Order data

3.3.3 Technical data

Product ID	5CASDL.0300-30	5CASDL.0400-30
General information		
Certification		
CE	Yes	
cULus	Yes	
GOST-R	Yes	
Cable construction		
Wire cross section	AWG 24 / AWG 26	
Features	Silicone- and halogen-free	
Shield	Individual cable pairs and entire cable	
Complete shielding	Aluminum-clad foil + tinned copper mesh	
Outer sheathing		
Material	Special semi-glossy TMPU	
Color	Black	
Labeling	(B&R) SDL cable (UL) AWM 20236 80°C 30V E63216	
Connector		
Type	ODU MINI-SNAP 24-pin / DVI-D (24+1), male	
Connection cycles	2000 / 200	
Contacts	Gold-plated	
Locating screw tightening torque	Max. 0.5 Nm	
Electrical characteristics		
Operating voltage	≤30 V	
Test voltage		
Wire/Wire	1 kV _{eff}	
Wire/Shield	0.5 kV _{eff}	
Wave impedance	100 ±10 Ω	
Conductor resistance		
AWG 24	≤95 Ω/km	
AWG 26	≤145 Ω/km	
Insulation resistance	Min. 10 MΩ/km	
Operating conditions		
Approbation	UL AWM 20236 80°C 30 V	
Torsion load	100000 cycles (tested angle of rotation: ±85° speed: 50 cycles / minute)	
Oil and hydrolysis resistance	According to VDE 0282-10	
Environmental conditions		
Temperature		
Storage	-20 to 80°C	
Fixed installation	-20 to 80°C	
Flexible installation	-5 to 60°C	
Mechanical characteristics		
Dimensions		
Length	30 m ±280 mm 40 m ±380 mm	
Diameter	Max. 12 mm	
Extender box		
Width	34 mm	
Length	125 mm	
Height	20 mm	
Flex radius		
Fixed installation	≥6x cable diameter (connector - ferrite bead, circular connector - extender) ≥10x cable diameter (ferrite bead - extender)	
Flexible installation	≥15x cable diameter (connector - ferrite bead)	

Table 57: 5CASDL.0300-30, 5CASDL.0400-30 - Technical data

Product ID	5CASDL.0300-30	5CASDL.0400-30
Flexibility	Flexible; valid for circular connector - ferrite bead (tested 300,000 cycles with 15x cable diameter, 4800 cycles / hour)	
Drag chain data		
Flex cycles	300,000	
Speed	4800 cycles/hour	
Flex radius	180 mm; 15x cable diameter	
Hub	460 mm	
Weight	Approx. 6250 g	Approx. 8250 g
Tension		
During operation	≤50 N	
During installation	≤400 N	

Table 57: 5CASDL.0300-30, 5CASDL.0400-30 - Technical data

3.3.4 Flex radius

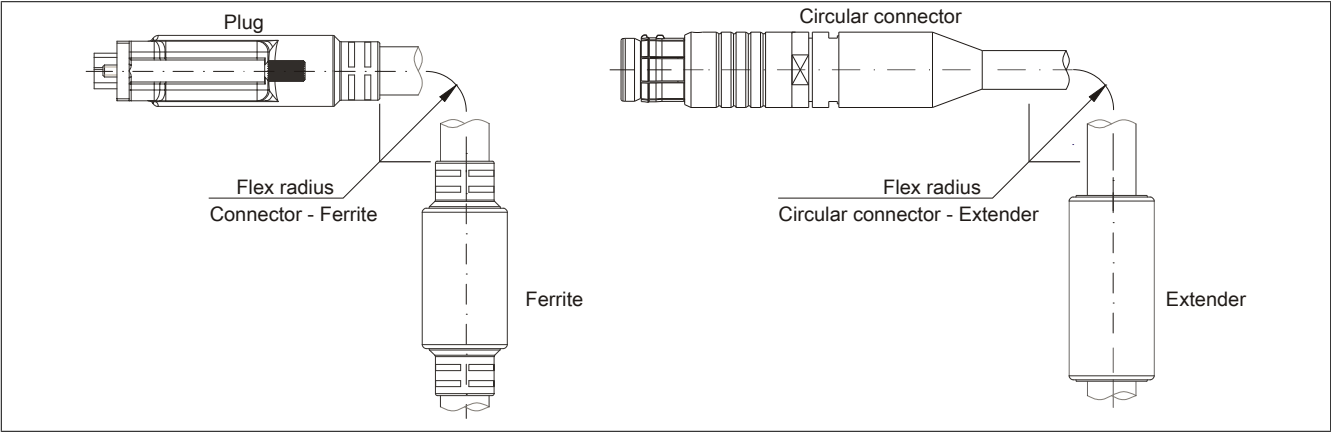


Figure 91: AP800 SDL cables with extender Flex radius

3.3.5 Dimensions

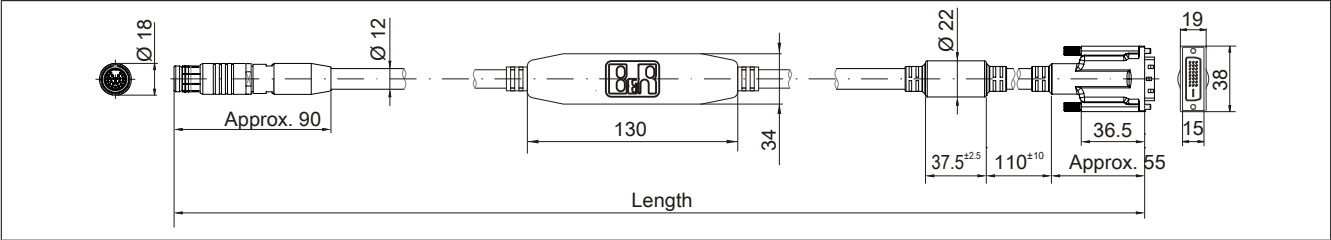
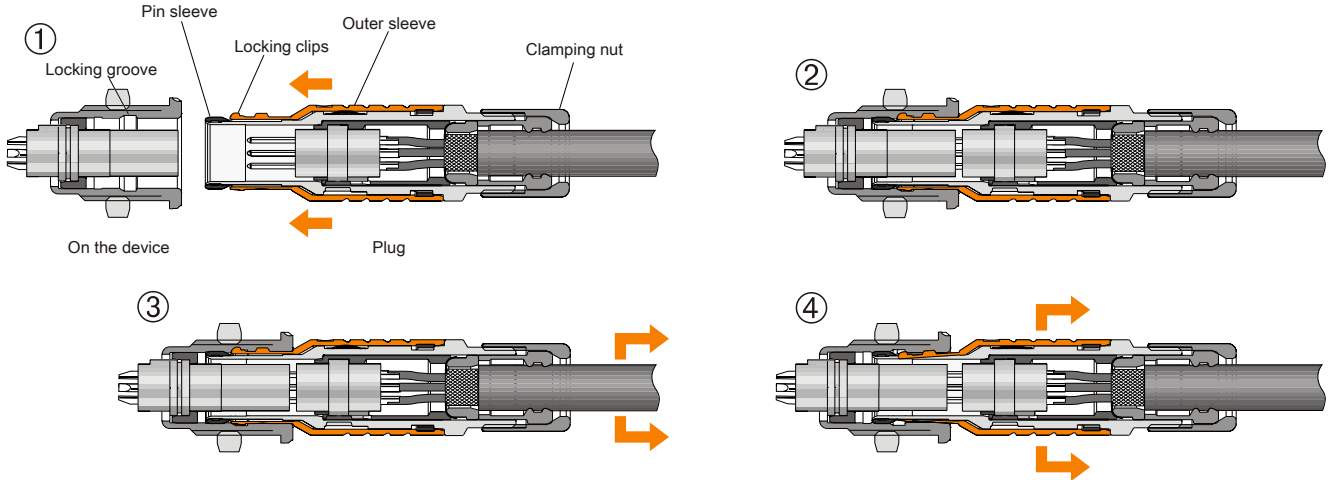


Figure 92: 5CASDL.0x00-30 - Dimensions

3.3.6 Push-Pull circular connector locking principle



- ① Unconnected push-pull circular connector
- ② Push-Pull circular connector installed on the device. Pulling on the cable or clamping nut shifts the pin sleeve under the locking clips to hold the connector tightly in place in the locking groove on the device. This prevents the plug and receptacle from separating.

- ③ Connected push-pull circular connector
- ④ Push-Pull circular connector removed from the device. Pushing and then pulling on the outer sleeve ejects the locking clips from the locking groove on the device, allowing the plug to be easily separated from the receptacle.

3.3.7 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications.

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

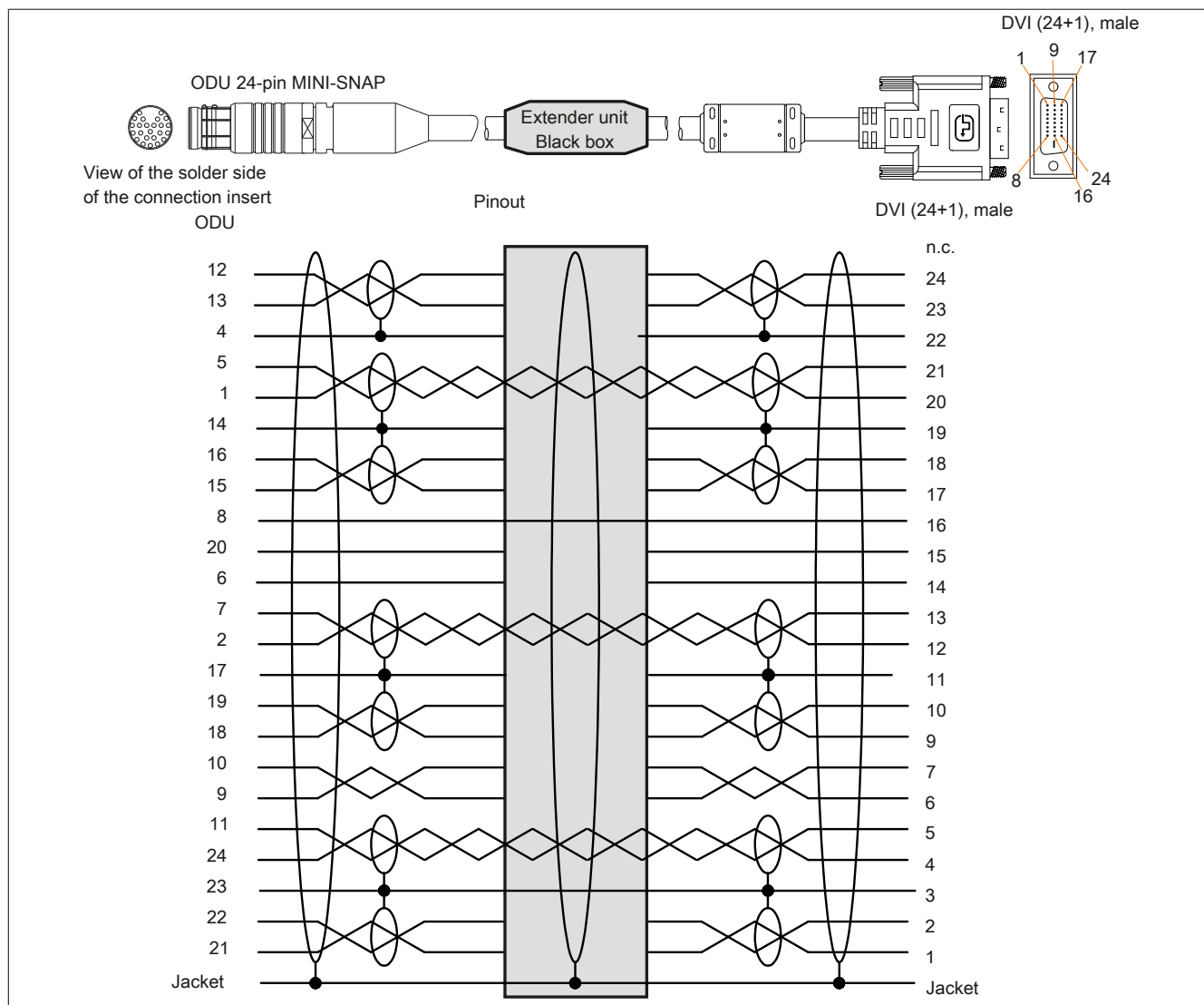


Figure 93: 5CASDL.0x00-30 - Pinout

3.4 5CAX2X.0xxx-20

3.4.1 General information

5CAX2X.0xxx-20 X2X Link cables are designed for use in both inflexible and flexible applications (e.g. swing arm systems).

Caution!

Power must be turned off before plugging in and unplugging cables.

3.4.2 Order data

Model number	Short description	Figure
	X2X Link cables	
5CAX2X.0018-20	X2X cable for the Automation Panel 800, 1.8 m	
5CAX2X.0050-20	X2X cable for the Automation Panel 800, 5 m	
5CAX2X.0100-20	X2X cable for the Automation Panel 800, 10 m	
5CAX2X.0150-20	X2X cable for the Automation Panel 800, 15 m	
5CAX2X.0200-20	X2X cable for the Automation Panel 800, 20 m	
5CAX2X.0250-20	X2X cable for the Automation Panel 800, 25 m	
5CAX2X.0300-20	X2X cable for the Automation Panel 800, 30 m	
5CAX2X.0400-20	X2X cable for the Automation Panel 800, 40 m	

Table 58: 5CAX2X.0018-20, 5CAX2X.0050-20, 5CAX2X.0100-20, 5CAX2X.0150-20, 5CAX2X.0200-20, 5CAX2X.0250-20, 5CAX2X.0300-20, 5CAX2X.0400-20 - Order data

3.4.3 Technical data

Product ID	5CAX2X. 0018-20	5CAX2X. 0050-20	5CAX2X. 0100-20	5CAX2X. 0150-20	5CAX2X. 0200-20	5CAX2X. 0250-20	5CAX2X. 0300-20	5CAX2X. 0400-20
General information								
Certification	Yes							
CE								
cULus								
GOST-R	Yes							
Cable construction								
Wire cross section	AWG 24 / DeviceNet data pair AWG 28 / 6 wires							
Features	Silicone- and halogen-free							
Shield	Individual cable pairs and entire cable							
Complete shielding	Aluminum-clad foil + tinned copper mesh							
Outer sheathing	Special semi-glossy TMPU Purple							
Material								
Color								
Connector								
Type	ODU 10-pin MINI-SNAP							
Connection cycles	2000							
Contacts	Gold-plated							
Electrical characteristics								
Operating voltage	Max. 30 V							
Test voltage	1 kV 0.5 kV							
Wire/Wire								
Wire/Shield								
Wave impedance	120 ±12 Ω							
Conductor resistance	≤89 Ω/km ≤220 Ω/km							
AWG 24								
AWG 28								
Insulation resistance	Min. 200 MΩ/km							
Operating conditions								
Approbation	UL AWM 20170 60°C 30 V							
Environmental conditions								
Temperature	-20 to 70°C -5 to 60°C							
Fixed installation								
Flexible installation								
Mechanical characteristics								
Dimensions								
Length	1.8 m ±20 mm	5 m ±45 mm	10 m ±90 mm	15 m ±135 mm	20 m ±180 mm	25 m ±230 mm	30 m ±280 mm	40 m ±380 mm
Diameter	6.8 ±0.2mm							

Table 59: 5CAX2X.0018-20, 5CAX2X.0050-20, 5CAX2X.0100-20, 5CAX2X.0150-20, 5CAX2X.0200-20, 5CAX2X.0250-20, 5CAX2X.0300-20, 5CAX2X.0400-20 - Technical data

Product ID	5CAX2X.0018-20	5CAX2X.0050-20	5CAX2X.0100-20	5CAX2X.0150-20	5CAX2X.0200-20	5CAX2X.0250-20	5CAX2X.0300-20	5CAX2X.0400-20
Flex radius	Fixed installation $\geq 10 \times$ cable diameter (from circular connector - cable) Flexible installation $\geq 15 \times$ cable diameter (from circular connector - cable)							
Flexibility	Flexible							
Weight	Approx. 150 g	Approx. 340 g	Approx. 650 g	Approx. 1000 g	Approx. 1300 g	Approx. 1600 g	Approx. 1800 g	Approx. 2600 g
Tension								
During operation	≤ 15 N							
During installation	≤ 100 N							

Table 59: 5CAX2X.0018-20, 5CAX2X.0050-20, 5CAX2X.0100-20, 5CAX2X.0150-20, 5CAX2X.0200-20, 5CAX2X.0250-20, 5CAX2X.0300-20, 5CAX2X.0400-20 - Technical data

3.4.4 Flex radius

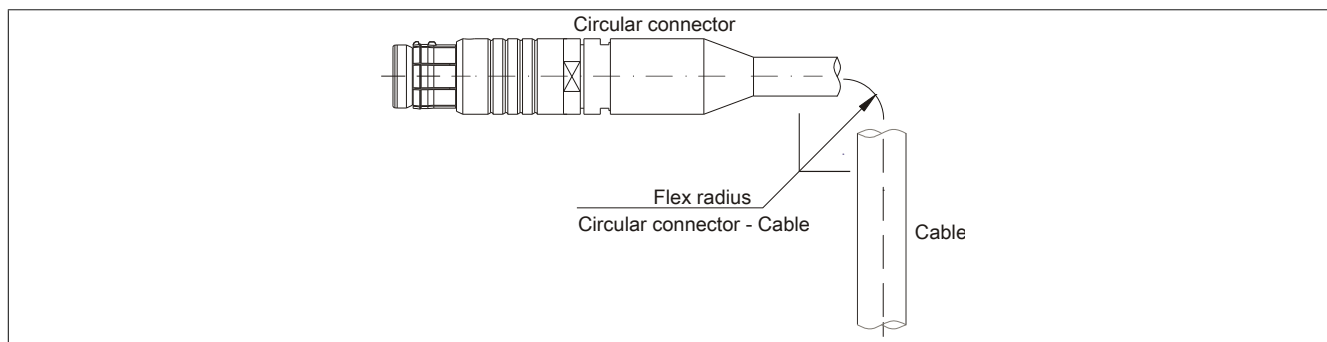


Figure 94: AP800 X2X cables - Flex radius

3.4.5 Dimensions

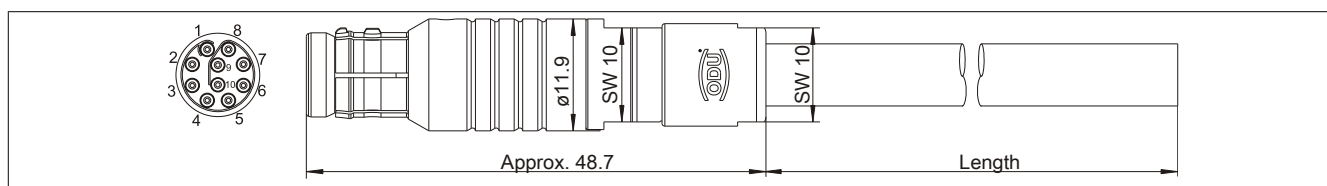
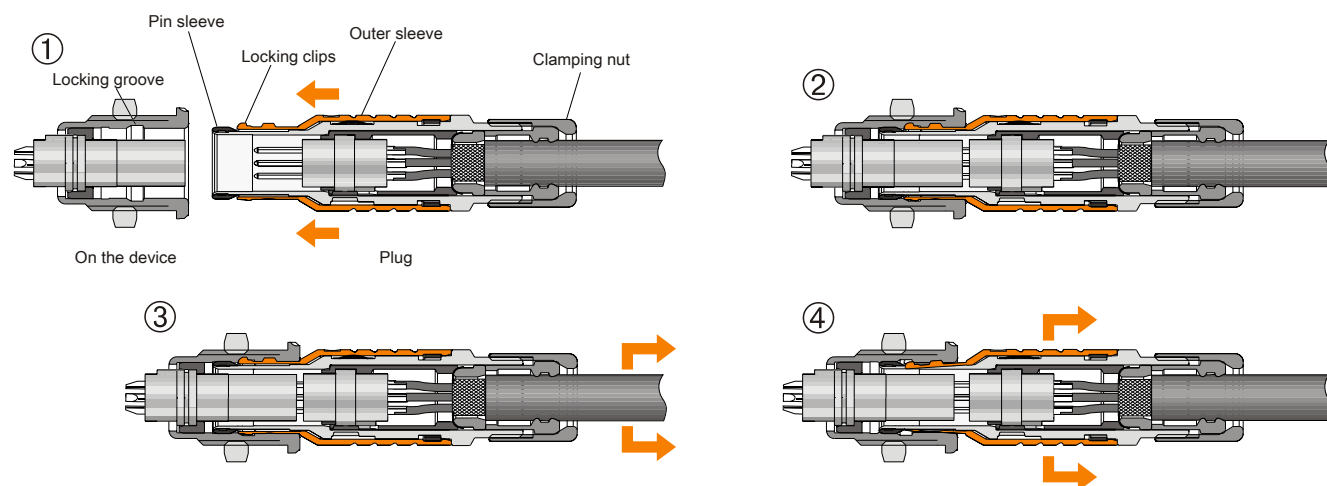


Figure 95: 5CAX2X.0xxx-20 - Dimensions

3.4.6 Push-Pull circular connector locking principle



- ① Unconnected push-pull circular connector
- ② Push-Pull circular connector installed on the device. Pulling on the cable or clamping nut shifts the pin sleeve under the locking clips to hold the connector tightly in place in the locking groove on the device. This prevents the plug and receptacle from separating.
- ③ Connected push-pull circular connector
- ④ Push-Pull circular connector removed from the device. Pushing and then pulling on the outer sleeve ejects the locking clips from the locking groove on the device, allowing the plug to be easily separated from the receptacle.

3.4.7 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications. If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly, however.

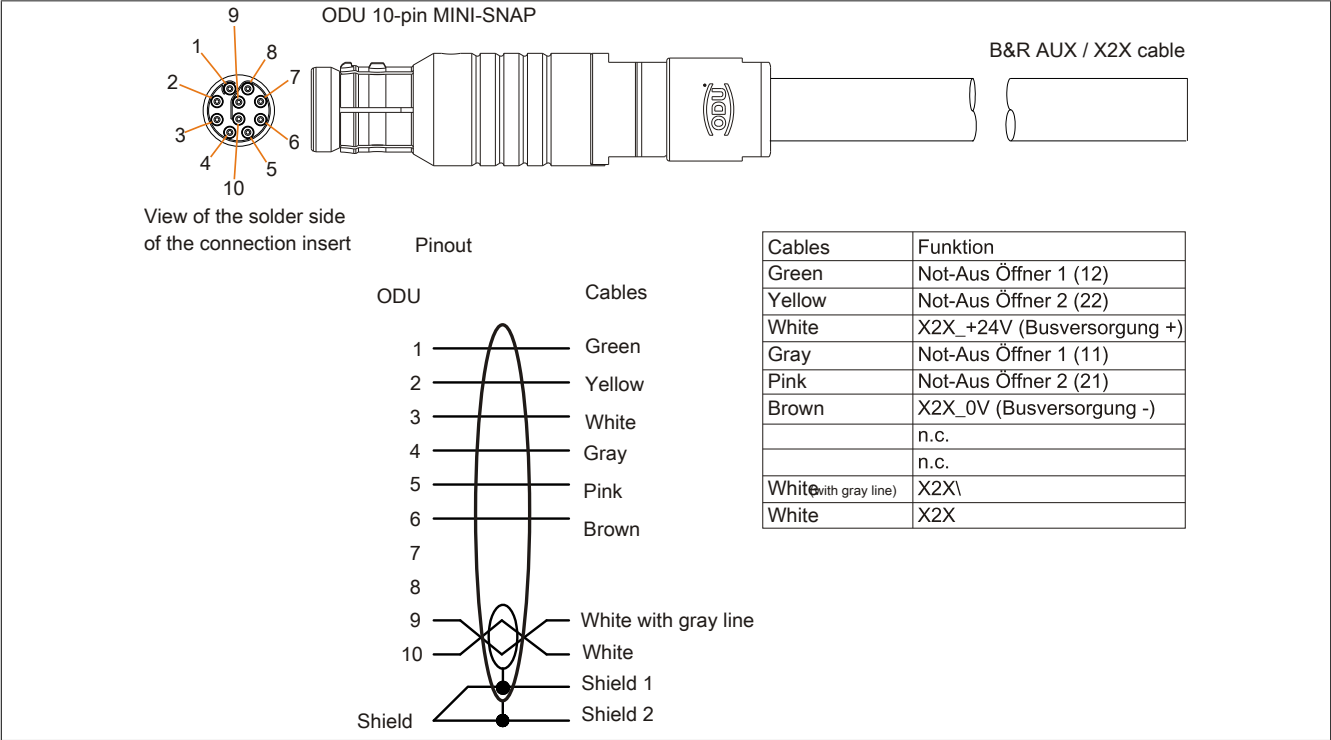


Figure 96: 5CAX2X.0xxx-20 - Pinout

4 HMI Drivers & Utilities DVD

4.1 5SWHMI.0000-00

4.1.1 General information

This DVD contains drivers, utilities, software upgrades and user's manuals for B&R panel system products (see the "Industrial PCs" or "Visualization and operation" section of the B&R website at www.br-automation.com).

When the DVD is created, its contents are identical to the files found in the Downloads section of the B&R website (Service / Material-related downloads).

4.1.2 Order data

Model number	Short description	Figure
	Other	
5SWHMI.0000-00	HMI Drivers & Utilities DVD	

Table 60: 5SWHMI.0000-00 - Order data

4.1.3 Contents (V2.20)

BIOS product upgrades

- Automation PC 620 / Panel PC 700 CPU board 815E and 855GME BIOS
- Automation PC 620 / Panel PC 700 CPU board X855GME BIOS
- Automation PC 620 / Panel PC 700 CPU board 945GME BIOS
- Automation PC 620 / Panel PC 700 CPU board 945GME N270 BIOS
- Automation PC 680
- Automation PC 810 / Automation PC 820 / Panel PC 800 B945GME BIOS
- Automation PC 810 / Panel PC 800 945GME N270 CPU board BIOS
- Automation PC 810 / Panel PC 800 GM45 CPU board BIOS
- Provit 2000 product family - IPC2000/2001/2002
- Provit 5000 product family - IPC5000/5600/5000C/5600C
- Power Panel 100 BIOS devices
- Mobile Panel 100 BIOS devices
- Power Panel 100 / Mobile Panel 100 user boot logo
- Power Panel 100 / Mobile Panel 100 REMHOST utility
- Power Panel 300/400 BIOS devices
- Power Panel 300/400 BIOS user boot logo
- Power Panel 500 / Automation PC 510 / Automation PC 511 BIOS
- Panel PC 310

Device drivers

- Automation Device Interface (ADI)
- Audio
- Chipset
- CD-ROM
- LS120

- Graphics
- Network
- PCI / SATA RAID controller
- Touch screen
- Touchpad
- Interface board

Firmware upgrades

- Automation PC 620 / Panel PC 700 (MTCX, SDLR, SDLT)
- Automation PC 810 (MTCX, SDLR, SDLT)
- Automation PC 820 (MTCX, SDLR, SDLT)
- Mobile Panel 100 (SMCX)
- Panel PC 300 (MTCX)
- Power Panel 100 (aPCI)
- Power Panel 300/400 (aPCI)
- Power Panel 300/400 (MTCX)
- Power Panel 500 / Automation PC 510 / Automation PC 511 (MTCX, SDLR, I/O board)
- Panel PC 800 (MTCX, SDLR, SDLT)
- UPS firmware

Utilities/Tools

- B&R Embedded OS Installer
- Windows CE Tools
- User boot logo conversion program
- SATA RAID Installation Utility
- Automation Device Interface (ADI)
- CompactFlash service life calculator (Silicon Systems)
- Miscellaneous
- MTC utilities
- B&R Key Editor
- MTC & Mkey utilities
- Mkey utilities
- UPS configuration software
- ICU ISA configuration
- Intel PCI NIC boot ROM
- Diagnostic programs

Windows

- Windows CE 6.0
- Windows CE 5.0
- Windows CE 4.2
- Windows CE 4.1
- Windows CE Tools
- Windows Embedded Standard 2009
- Windows Embedded Standard 7
- Thin client
- Windows NT Embedded
- Windows XP Embedded
- VNC viewer

MCAD templates for

- Industrial PCs

- Visualization and operating devices
- Slide-in label templates
- Custom designs

ECAD templates for

- Industrial PCs
- Automation PCs
- Automation Panel 900
- Panels (Power Panel)

Documentation for

- Automation PC 511
- Automation PC 620
- Automation PC 680
- Automation PC 810
- Automation PC 820
- Automation Panel 800
- Automation Panel 900
- Panel PC 310
- Panel PC 700
- Panel PC 725
- Panel PC 800
- Power Panel 15/21/35/41
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200
- Mobile Panel connection box
- Provit 2000
- Provit 3030
- Provit 4000
- Provit 5000
- Provit Benchmark
- Provit Mkey
- Windows CE 5.0 help documentation
- Windows CE 6.0 help documentation
- Windows NT Embedded application guide
- Windows XP Embedded application guide
- Uninterruptible power supply
- Implementation guides
- B&R Hilscher fieldbus cards (CANopen, DeviceNet, PROFIBUS, PROFINET)

Service tools

- Acrobat Reader 5.0.5 (freeware in German, English and French)
- Power Archiver 6.0 (freeware in German, English and French)
- Internet Explorer 5.0 (German and English)
- Internet Explorer 6.0 (German and English)

Chapter 7 • Maintenance and service

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

1 Cleaning

Danger!

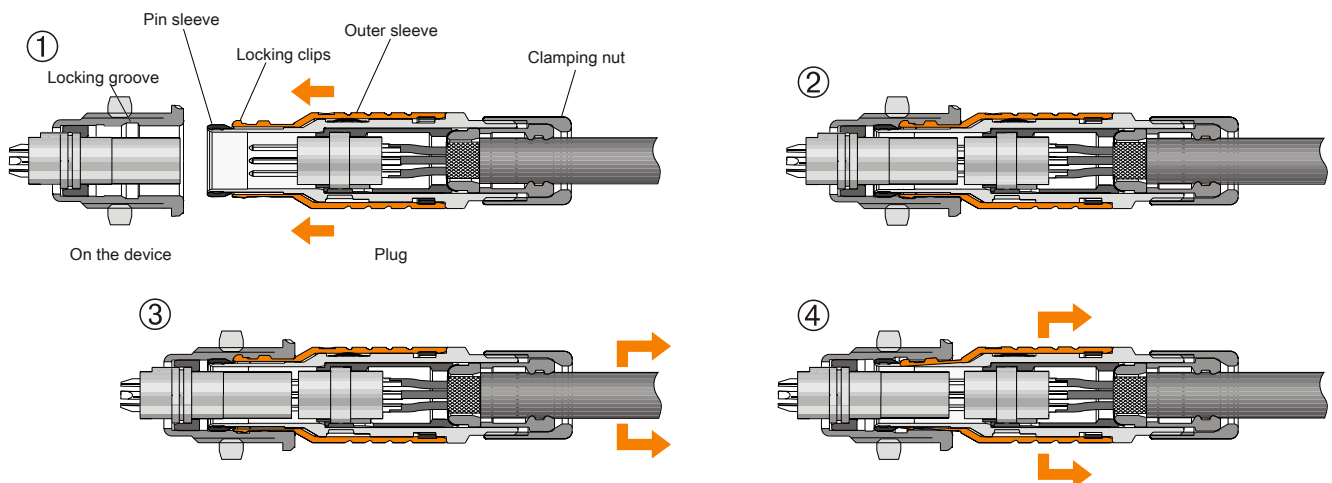
This device can only be cleaned when switched off in order to prevent unintended functions from being triggered when handling the touch screen or pressing keys.

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

Information:

Displays with a touch screen should be cleaned regularly.

2 Connecting and disconnecting cables on the AP800



- ① Unconnected push-pull circular connector
- ② Push-Pull circular connector installed on the device. Pulling on the cable or clamping nut shifts the pin sleeve under the locking clips to hold the connector tightly in place in the locking groove on the device. This prevents the plug and receptacle from separating.
- ③ Connected push-pull circular connector
- ④ Push-Pull circular connector removed from the device. Pushing and then pulling on the outer sleeve ejects the locking clips from the locking groove on the device, allowing the plug to be easily separated from the receptacle.

3 Exchanging the legend strips

Danger!

The legend strips may only be exchanged when the device is turned off, and only by knowledgeable and qualified personnel.

3.1 Procedure

3.1.1 Display

- Loosen the screws on the back of the display (using Torx screw driver size 20).



Figure 97: Removing the screws

- Open housing (lift carefully to the side).

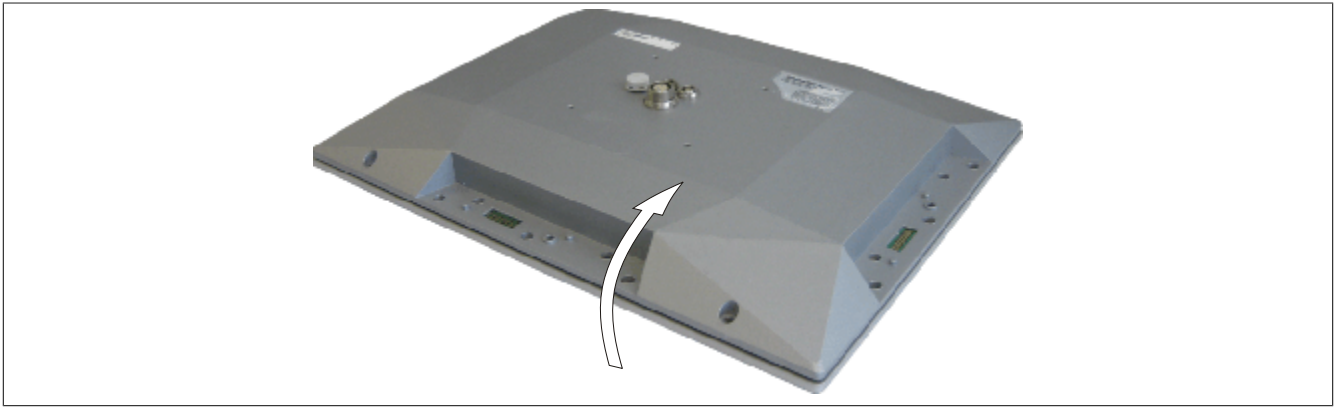


Figure 98: Open housing

- Remove blank legend strips and replace with printed ones.

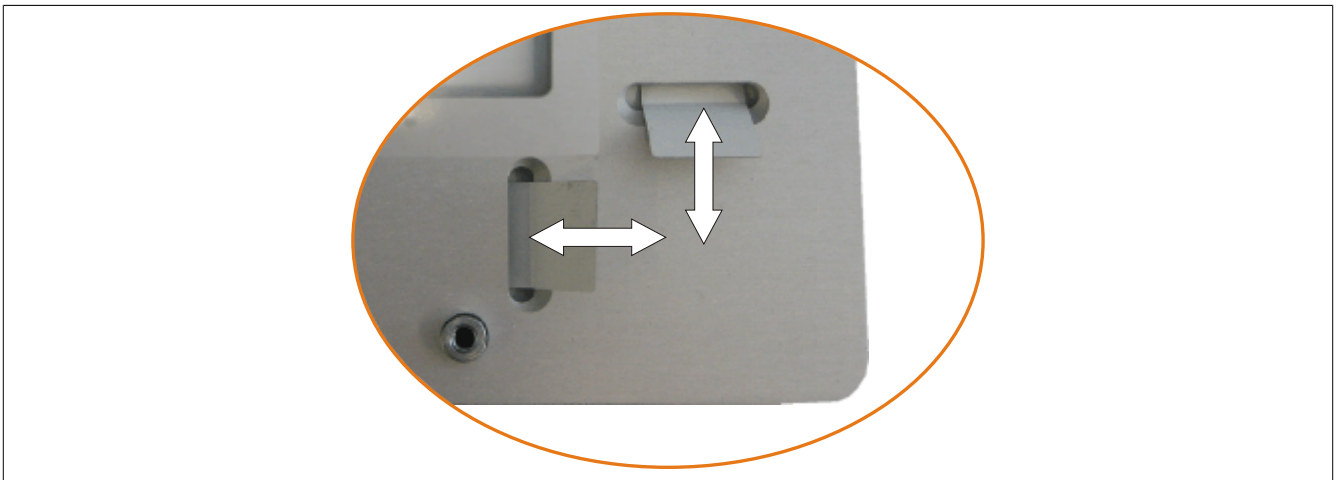


Figure 99: Exchange legend strips

- Reassemble display in reverse order - Fasten the screws alternately and diagonally.

3.1.2 Extension units

- Loosen the screws on the back of the extension unit (using a size 20 Torx screw driver).



Figure 100: Removing the screws

- Open housing (lift carefully to the side).

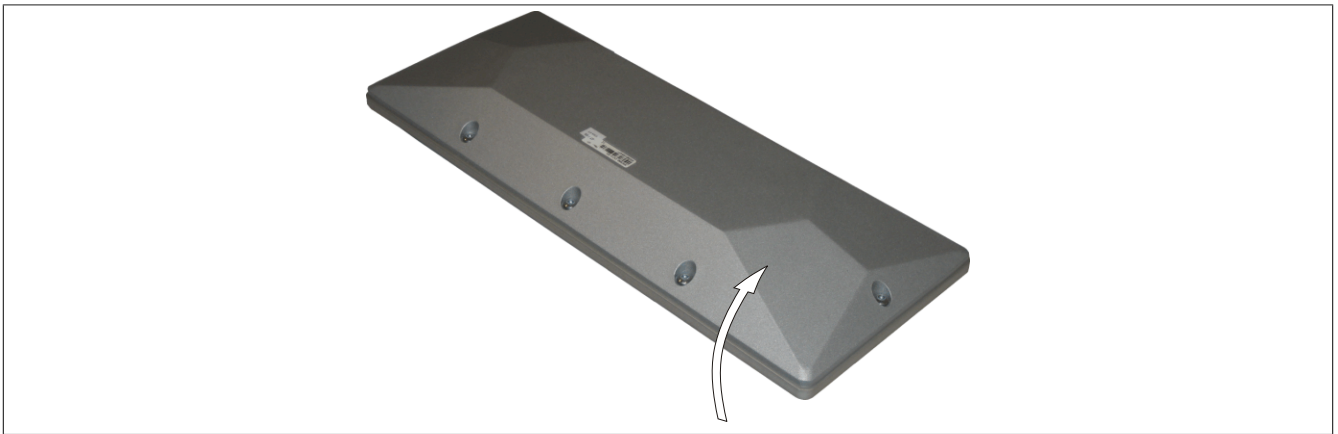


Figure 101: Open housing

- Remove blank legend strips and replace with printed ones.

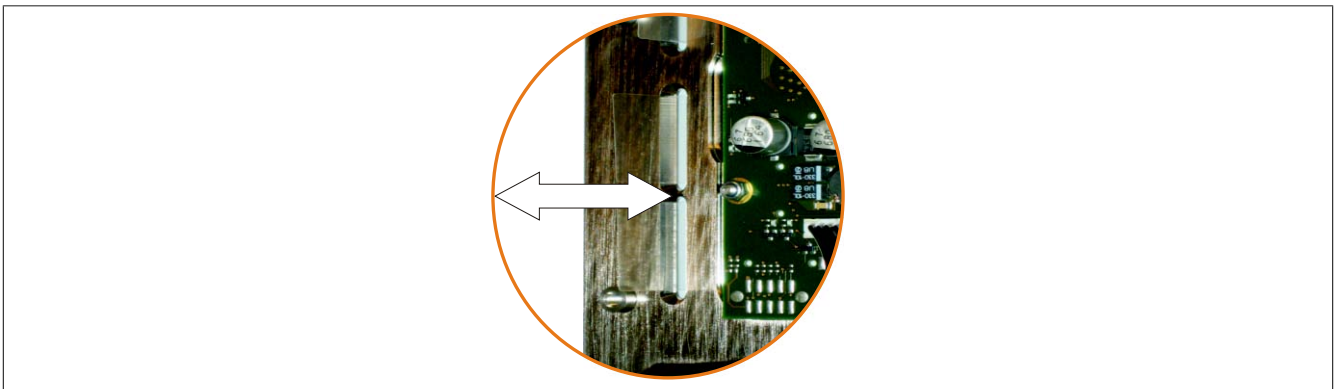


Figure 102: Exchange legend strips

- Reassemble display in reverse order - Fasten the screws alternately and diagonally.

Appendix A

1 E-stop button

The E-stop unit consists of an E-stop switching element and an E-stop button.

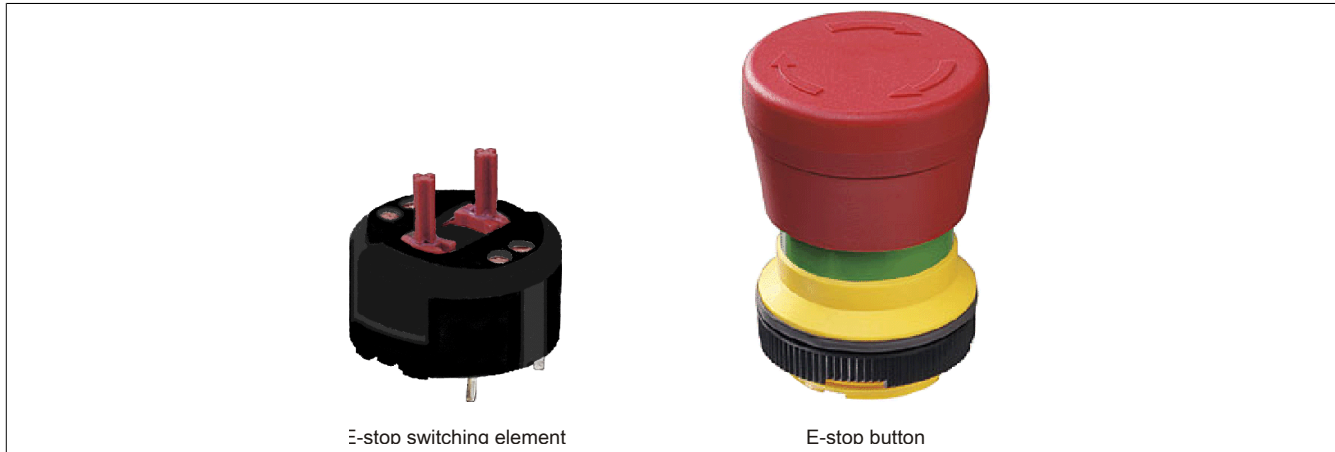


Figure 103: E-stop entry device

Information:

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

Property		
Manufacturer	RAFI	RAFI
Type	22FS switching element E-stop, 2 N.C. contacts	22FS E-stop, not illuminated
AC/DC operating voltage	Max. 120 V	-
AC/DC operating current	Max. 550 mA	-
Contact system	Self-cleaning bridge contact	-
Standards		
Normally closed contact	Positive opening operation in accordance with IEC 947-5-1	-
Weathering resistance	-	In accordance with IEC 68-1-2, 2-2 and 2-30
Salt mist	-	In accordance with IEC 68-2-11
Protection (front)	-	IP65
Approval	-	IEC 947, 1058; UL 508; CSA 22.2; EU-NSR 73/23; ULc
Impact resistance	Min. 100 N	
Actuating force	Approx. 5N per contact element	-
Service life	1 million actuations at 10mA / 24 VDC	50,000 actuations
Ambient temperature		
Operation	-25 to 70°C	
Storage	-40 to 80°C	
Transport	-40 to 80°C	

Table 61: E-stop switching element and button - Technical data

2 Key Switch

The key switch unit consists of a key switch switching element and a key switch actuating element.



Figure 104: Key switch devices

Information:

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

Property	Key switch switching element	
Manufacturer	RAFI	
Type	22FS universal switching element, 1 S	22FS key switch, round collar
Contact function	Key	
AC/DC operating voltage	Max. 42 V	-
AC/DC operating current	Max. 100 mA	-
Contact system	Self-cleaning bridge contact	-
Standards	-	
Normally open contact	-	-
Weathering resistance	-	In accordance with IEC 68-1-2, 2-2 and 2-30
Salt mist	-	In accordance with IEC 68-2-11
Protection (front)	-	IP65
Approval	-	IEC 947, 1058; UL 508; CSA 22.2; EU-NSR 73/23; ULc
Impact resistance	Min. 100 N	
Rotation angle	1 x 40 degrees, clockwise	
Outlet position for the key	0	
Service life	1 million actuations at 10mA / 24 VDC	0.3 million, operations
Ambient temperature		
Operation	-25 to 70°C	
Storage	-40 to 80°C	
Transport	-40 to 80°C	

Table 62: Key switch switching element and button - Technical data

2.1 Rotation angle

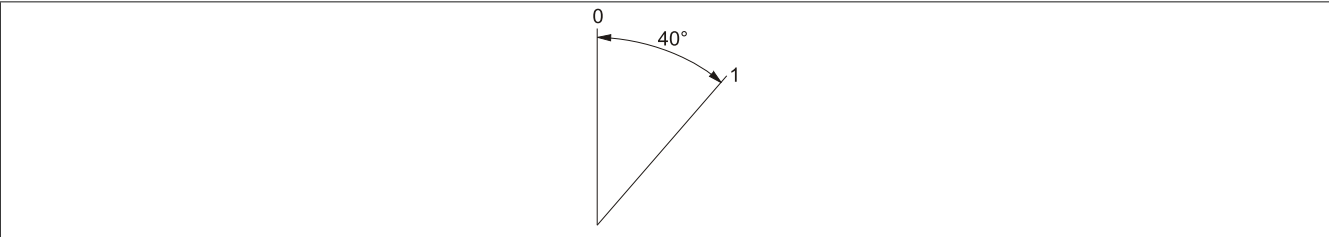


Figure 105: Key switch - Angle of rotation

3 Elo AccuTouch screen

3.1 Technical data

Information:

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

Elo AccuTouch screen	Elo AccuTouch screen
General information	
Manufacturer	Elo
Accuracy	Typically <0.080 inches (2.032 mm) Maximum error in all directions 0.180 inches (4.752 mm)
For diagonals <18"	Maximum 1% of the diagonal for the active area of the touch screens
For diagonals >18"	
Response time	<10 ms
Release pressure	<113 gram
Resolution	4096 x 4096 touch contact points
Light permeability	Up to 80% ±5%
Environmental conditions	
Temperature	
Operation	- 10 to 50°C
Storage	- 40 to 71°C
Transport	- 40 to 71°C
Relative humidity	
Operation	Max. 90% at max. 35°C
Storage	Max. 90% at max. 35°C for 240 hours, non-condensing
Transport	Max. 90% at max. 35°C for 240 hours, non-condensing
Operating conditions	
Waterproofing	IP65
Service life	35 million touch operations at the same position
Chemical resistance ¹⁾	Acetone, ammonia-based glass cleaner, ordinary food and drink, hexane, methylene chloride, methylethylketone, mineral spirits, turpentine, isopropyl alcohol
Enabling	Finger, pointer, credit card, glove
Drivers	Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com). They can also be found on the B&R HMI Drivers & Utilities DVD (model number 5SWHMI.0000-00).

Table 63: Elo AccuTouch screen - Technical data

1) The active area of the touch screen is resistant to these chemicals for a period of one hour at 21°C.

3.2 Temperature humidity diagram

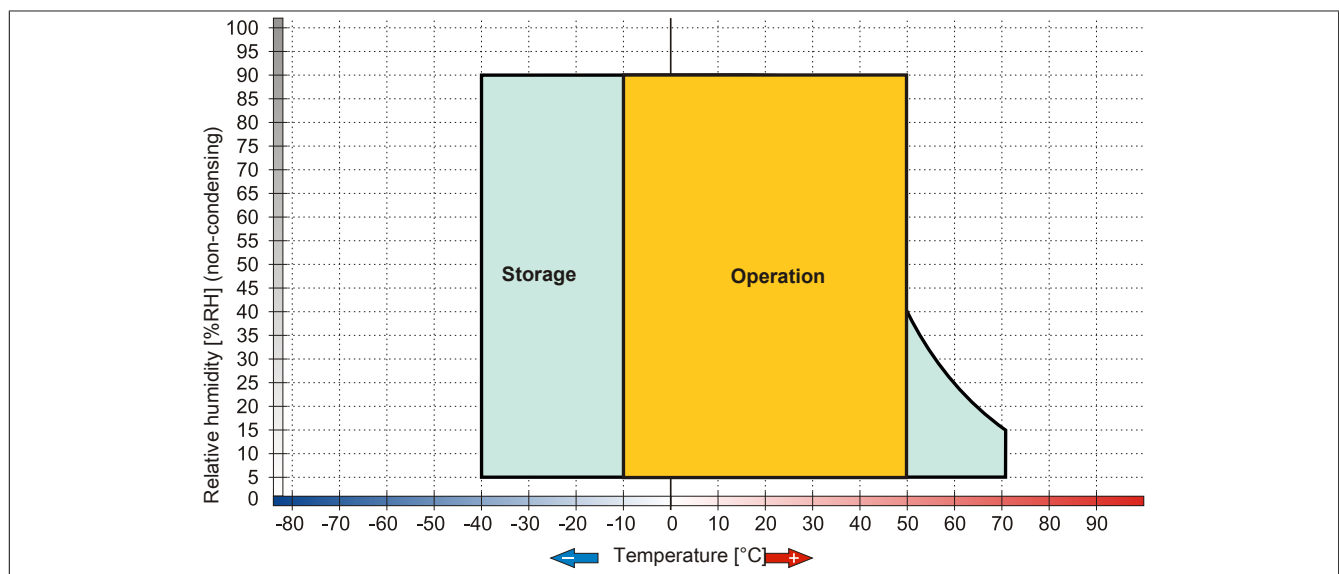


Figure 106: Elo AccuTouch screen (5-wire) - Temperature humidity diagram

3.3 Cleaning

Danger!

This device can only be cleaned when switched off in order to prevent unintended functions from being triggered when handling the touch screen or pressing keys.

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

Information:

Displays with a touch screen should be cleaned regularly.

4 5-wire AMT touch screen

4.1 Technical data

Information:

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

Product ID	5-wire AMT touch screen
General information	
Certification	
CE	Yes
c-UL-us	Yes
Manufacturer	AMT
Release pressure	<1 N
Light permeability	81 ±3%
Environmental conditions	
Temperature	
Operation	- 20 to 70°C
Storage	- 40 to 80°C
Transport	- 40 to 80°C
Relative humidity	
Operation	90% at max. 50°C
Storage	90% RH at max. 60°C for 504 hours
Transport	90% RH at max. 60°C for 504 hours
Operating conditions	
Service life	36 million touch operations at the same position (release pressure: 250 g, interval: 2x per second)
Chemical resistance ¹⁾	Acetone, methylene chloride, methyl ethyl ketone, isopropyl alcohol, hexane, turpentine, mineral spirits, unleaded gasoline, diesel, motor oil, gear lubricating oil, antifreeze, ammonia-based glass cleaner, chemical cleaning agents, household cleaning agents, vinegar, coffee, tea, lubricant, cooking oil, salt
Enabling	Finger, pointer, credit card, glove
Drivers	Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).

Table 64: 5-wire AMT touch screen - Technical data

- 1) The active area of the touch screen is resistant to these chemicals for a period of one hour at 25°C.

4.2 Temperature humidity diagram

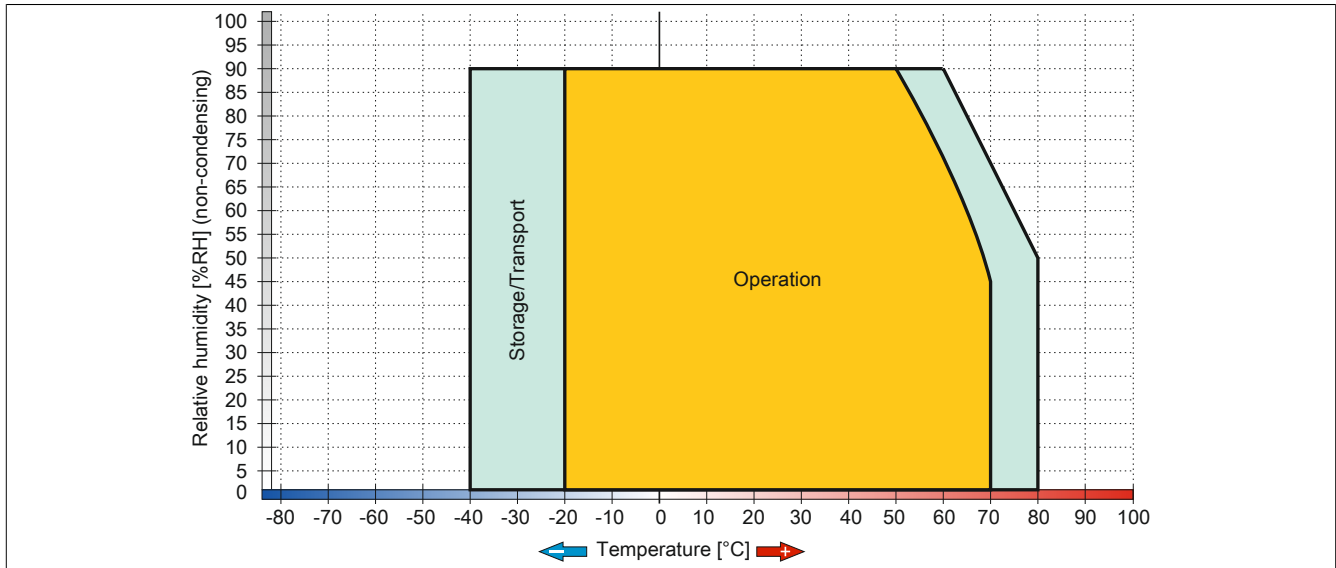


Figure 107: 5-wire AMT touch screen - Temperature humidity diagram

4.3 Cleaning

Danger!

This device can only be cleaned when switched off in order to prevent unintended functions from being triggered when handling the touch screen or pressing keys.

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

Information:

Displays with a touch screen should be cleaned regularly.

5 Panel overlay

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

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the complete system.

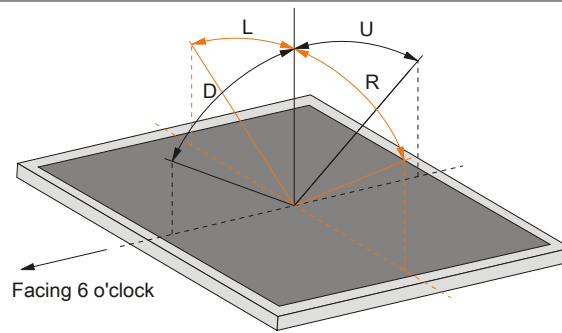
Ethanol Cyclohexanol Diacetone alcohol Glycol Isopropanol Glycerine Methanol Triacetin Dowandol DRM/PM	Formaldehyde 37 to 42% Acetaldehyde Aliphatic hydrocarbons Toluene Xylene White spirits	Trichloroethane Ethyl acetate Diethyl ether N-Butyl acetate Amyl acetate Butylcellosolve Ether
Acetone Methyl ethyl ketone Dioxan Cyclohexanone MIBK Isophorone	Formic acid < 50% Acetic acid < 50% Phosphoric acid < 30% Hydrochloric acid < 36% Nitric acid < 10% Trichloroacetic acid < 50% Sulphuric acid < 10%	Sodium hypochlorite < 20% Hydrogen peroxide < 25% Potassium carbonate Washing agents Tenside Fabric conditioner Ferrous chloride (FeCl ₂) Ferrous chloride (FeCl ₃)
Ammonia < 40% Caustic soda < 40% Potassium hydroxide Alkali carbonate Bichromate Potassium Acetonitrile Sodium bisulphate	Cutting oil Diesel oil Linseed oil Paraffin oil Blown castor oil Silicon oil Turpentine oil substitute Brake fluid Aviation fuel Gasoline Water Sea water Decon	Dibutyl phthalate Dioctyl phthalate Sodium carbonate

Table 65: Chemical resistance of the panel overlay

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

6 Viewing angles

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



7 Glossary

APC	Abbreviation for »Automation PC«
Application software	Software, which is not used for operation by the computer itself, but rather when a computer is used to process a concrete application problem. It sets up the system software and uses this for fulfilling individual tasks. Application software can be accommodated in standard software used by a large number of customers in a wide range of industries. Common examples are Word, Excel, PowerPoint, Paint, Matlab etc. Industrial software tailored to the respective problems of a certain industry and individual software created for solving the particular problems of an individual user.
Automation	According to Brockhaus: The application of technical means, using specific programs that (either partially or totally) do not require human intervention to perform operations.
Automation Runtime	A uniform runtime system for all B&R automation components.
Failure	Failure according to IEC 61508: A function unit loses the ability to perform a required function. In regards to safety-oriented systems, a distinction is made between dangerous and safe failures. This depends on whether the status of the system failure is considered dangerous or safe. The cause of the failure may be load related or age-related, and therefore a random failure, or related to a flaw inherent in the system. In this case, it is known as a systematic failure.

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