Automation Panel 830

User's Manual

Version: **0.15 Preliminary (November 2013)**
Model no.: **MAAP830-ENG**

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Chapter 1 • General information

1 Manual history

Version	Date	Change
0.10 Preliminary	27-Feb-13	• First version
0.15 Preliminary	14-Nov-13	• Updated the technical data for displays "5AP830.215C-00 (hanging mount)" on page 13 and "5AP830.215C-01 (standing mount)" on page 44 • Adjusted revision information from Revision B0 to Revisions ≥ B0.

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**
  …Must be 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.

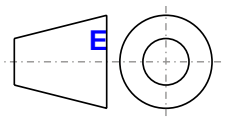
3 Organization of safety notices

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

Chapter 2 • Technical data

1 Introduction

Touch panels have been used for many years to provide a way for operators to control systems and machines. Many devices previously operated using buttons and keys have since been replaced by more versatile touch screens. The advantages are clear: Whereas function keys must be relabeled with slide-in labels when they are reassigned, this is possible on touch screen displays with simple software settings. At the same time, HMI applications have developed over the years to provide much more logical and intuitive operation. This not only makes interaction much faster, it also helps avoid operating errors by facilitating a clear arrangement of buttons and providing much more detailed information.

Multi-touch technology, which is able to detect several simultaneous touch contact points, has actually been used for a number of years and can be traced back to the 1980s. In the area of consumer electronics, however, it was Apple's iPhone that ushered in a new era of intuitive operation. Whereas with single touch screens, i.e. the classic touch screen solution, interaction was limited to pressing one button at a time, a multi-touch system like the one used on the iPhone can detect more than one location being touched at the same time. Gesture recognition, or being able to evaluate the movements taking place on the touch screen (e.g. unlocking a smartphone), is another common feature of multi-touch displays.

Multi-touch opens up whole new dimensions for defining innovative new user interactions, though these of course still need to be supported by the software. A large number of gestures could be used in an application, but in order not to overwhelm the user, a machine visualization application will primarily use only gestures that are familiar from consumer electronics devices: zooming in and out and rotating objects with two fingers, scrolling through lists and switching to the next screen with a quick swipe.

The main benefit of multi-touch technology is a considerably more intuitive user experience. Not all of the possibilities of touch operation will be suitable for every operating state. For example, zoom functionality may be more useful for commissioning or service work in order to check out the details of how material flows in a CAD drawing. At the same time, requiring two-hand gestures for certain tasks can help prevent operating errors. For example, a button critical to the system can be prevented from being pressed unintentionally if deliberate interaction is required (e.g. press with the right hand, confirm with the left). Using multi-touch for operating steps such as these are not "failsafe" with respect to personal safety, however, since a touch screen is not considered a "safe" component.

Another advantage of developing a structured multi-touch user guidance system is the ability to reduce the number of operating layers in order to improve overall ergonomics. Whereas a single touch system requires several clicks to get to deeper layers – for example, from a system overview image to detailed process settings for an individual component – the user can keep the system overview on the screen, use a finger to select the valve and the other hand to change settings in the detailed image that pops up. All of this is completely intuitive, with the operator getting to his destination much faster.

On the software side, multi-touch applications are supported by Windows® 7 Ultimate and Windows® Embedded Standard 7 Premium. Manufacturers of SCADA software have already begun implementing multi-touch support. The Windows® Presentation Foundation (WPF) also already includes multi-touch support.

Just like consumer electronics devices such as the iPhone, multi-touch applications are primarily used in combination with a projected capacitive touch screen. This consists of glass coated with a transparent conductor such as indium tin oxide (ITO). Since projected capacitive touch (PCT) is triggered not by mechanical interaction when touched but instead by a capacitive change, the front can be constructed entirely out of glass. This glass cover is bonded to the underlying touch screen, which ensures the best possible optical properties. The glass surface can also take up the entire front of the panel, just like with the iPhone. Advantages for industrial users include the easy-to-clean smooth glass surface, its robustness with regard to chemicals and cleaning agents and very comfortable haptic properties. Depending on the touch screen technology, either a finger or some sort of conductive object is needed; operation while wearing gloves is only possible if the gloves are made of thin material.

2 Features

- 21.5" Full HD TFT display
- Multi-touch technology
- Flexible support arm mounting (standing or hanging)
- 2x USB 2.0
- Panel interface (SDL/DVI) to connect Automation PCs and Panel PCs
- 24 VDC supply voltage
- Operation without a fan or heat sink

3 5AP830.215C-00 (hanging mount)

3.1 Revision A0

3.1.1 General information

- 21.5" Full HD color TFT display
- Multi-touch screen (projected capacitive)
- Flexible support arm mounting
- Fanless operation

Information:

The following technical data and dimension diagrams are based on the Automation Panel 830 5AP830.215C-00 revision A0. This is a prototype, which means the data may not correspond with the final released product!

3.1.2 Order data

Model number	Short description	Figure
	Undefined	
5AP830.215C-00	Automation Panel AP830, 21.5" Full HD color TFT display with multi-touch screen (projective capacitive), 2 USB 2.0 interfaces, IP65 protection (front), 24 VDC, flange mounting on top.	
	Required accessories	
	Terminal blocks	
0TB103.9	Connector, 24 VDC, 3-pin female, 3.31 mm² screw clamp, protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange	

Table 5: 5AP830.215C-00 - Order data

3.1.3 Technical data

Product ID	5AP830.215C-00
General information	
LEDs	Power, HDD, Run
B&R ID code	$D1BE
Certification	
CE	In preparation
Interfaces	
USB	
Quantity	1
Type	USB 2.0 1)
Design	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Current load	Max. 1 A
Monitor/Panel interface	
Design	Female DVI-I connector
Type	SDL/DVI
Display	
Type	Color TFT
Diagonal	21.5" (545.22 mm)
Colors	16 million
Resolution	Full HD, 1920x1080
Contrast	1000:1
Viewing angles	
Horizontal	Direction R / Direction L = 178°
Vertical	Direction U / Direction D = 178°
Backlight	
Classification	LED
Brightness	250 cd/m²
Half-brightness time 2)	30,000 h

Table 6: 5AP830.215C-00 - Technical data

Product ID	5AP830.215C-00
Touch screen [3]	
Type	3M
Technologies	Projected capacitive touch (PCT)
Controller	3M
Transmittance	88% ±2%
Electrical characteristics	
Nominal voltage	24 VDC ±25%
Nominal current	1.7 A
Starting current	TBD
Power consumption	50 W
Electrical isolation	Yes
Operating conditions	
Protection in accordance with EN 60529	TBD
Environmental conditions	
Temperature	
Operation	TBD
Storage	TBD
Transport	TBD
Relative humidity	
Operation	TBD
Storage	TBD
Transport	TBD
Vibration	
Operation (continuous)	TBD
Operation (occasional)	TBD
Storage	TBD
Transport	TBD
Shock	
Operation	TBD
Storage	TBD
Transport	TBD
Altitude	
Operation	TBD
Mechanical characteristics	
Housing	
Material	Cast-aluminum alloy
Paint	Similar to silver metallic (semi-matt)
Front [4]	
Frame	TBD
Design	RAL 9005
Gasket	TBD
Flange output	Top
Dimensions	
Width	557.5 mm
Height	350 mm
Depth	55.2 mm [5]
Weight	TBD

Table 6: 5AP830.215C-00 - Technical data

1) USB 2.0 is only possible with a DVI connection. If an SDL cable is connected, only USB 1.1 is available.
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) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
4) There may be visible deviations in the color and surface appearance depending on the process or batch.
5) Dimensions without flange

3.1.4 Dimensions

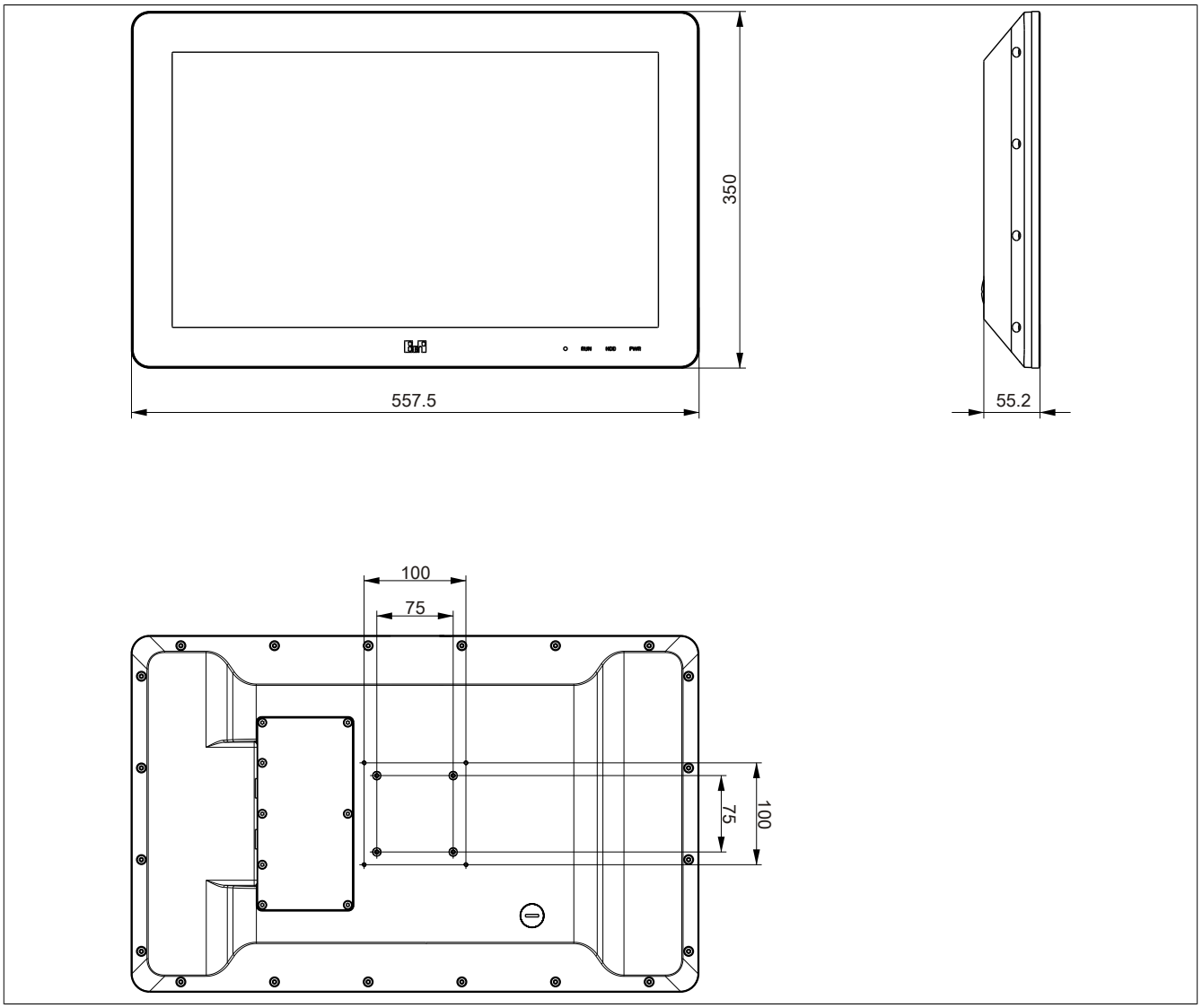


Figure 1: 5AP830.215C-00 Rev. A0 - Dimensions

3.1.5 Contents of delivery

Quantity	Description
1	Automation Panel 830 (5AP830.215C-00)

Table 7: Contents of delivery

The 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp) power supply connector must be ordered separately. SDL, DVI and USB cables[1)] are not included in delivery.

[1)] A USB cable is only required if the panel is connected via DVI cable.

3.1.6 Installation

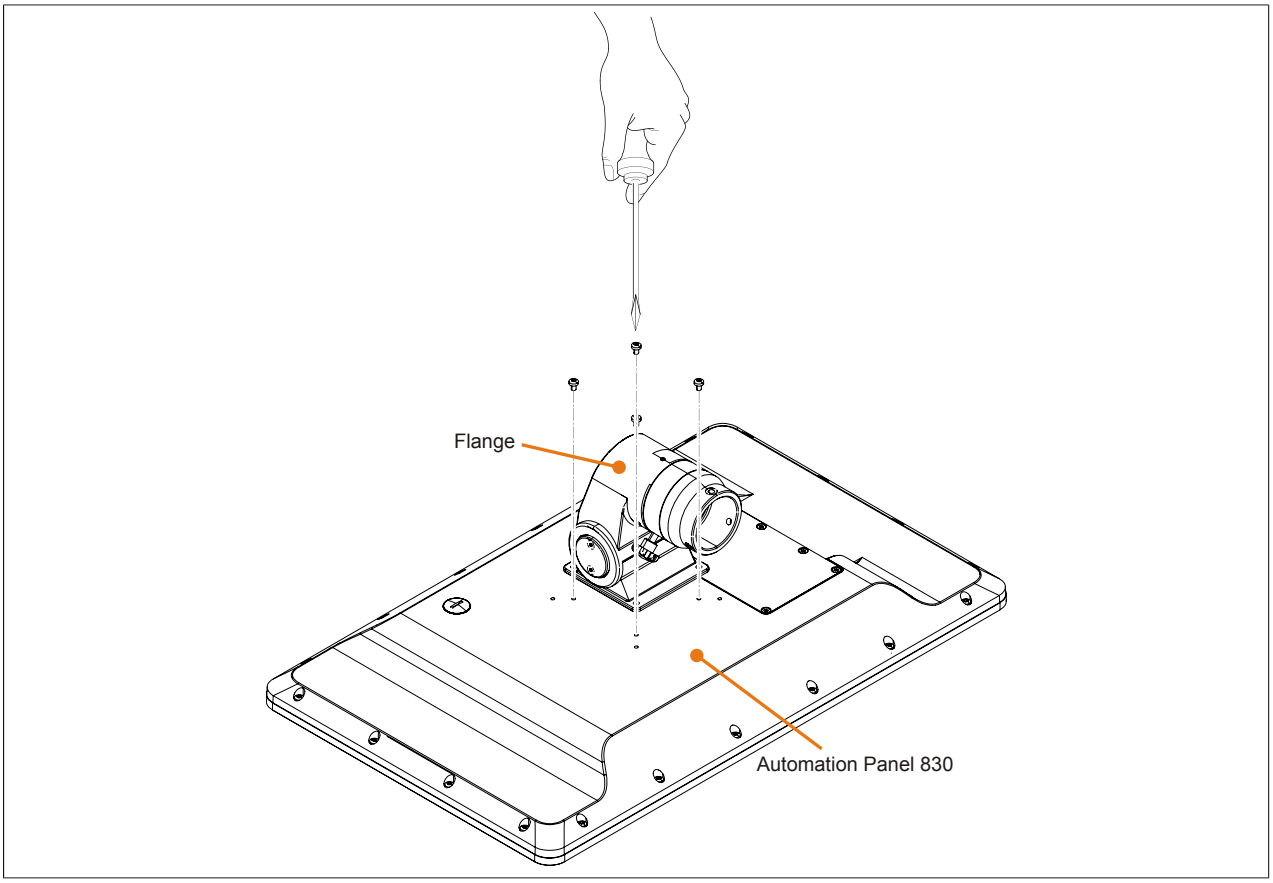
3.1.6.1 Mounting on a support arm system

Information:

The Automation Panel 830 features VESA 75/100-compliant mounting on the back side. The flange attached to the AP830 must be fastened using 4 or 8 M4 screws (1.3 Nm fastening torque).

The following installation guidelines use the case of a Haseke flange on a support arm system as an example.

1. Mount the Haseke flange on the Automation Panel 830 using the 4 or 8 required M4 Torx (TX20) screws (1.3 Nm fastening torque).



2. Feed the required cables (SDL or DVI cable, power supply cable[2], USB cable[3]) through the support arm shaft.

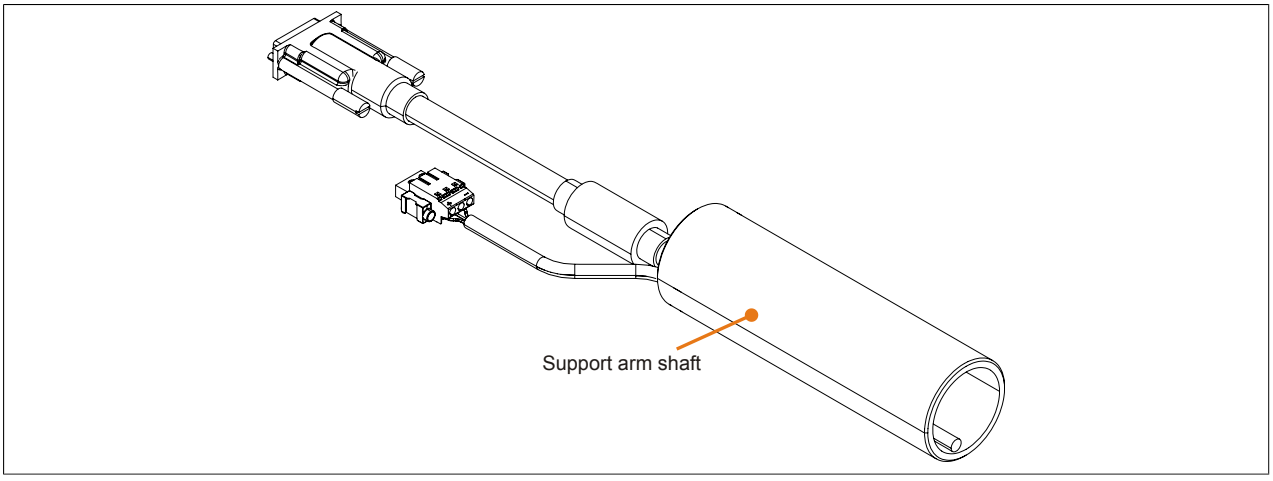


Figure 2: Feed cable through the support arm shaft

3. Attach the Automation Panel 830 to the support arm system using the flange and fasten to the shaft using the 3 M6 screws (hex key, size 3) with a fastening torque of 5 Nm.

[2] The 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp) power supply connector must be ordered separately.
[3] A USB cable is only required if the panel is connected via DVI cable.

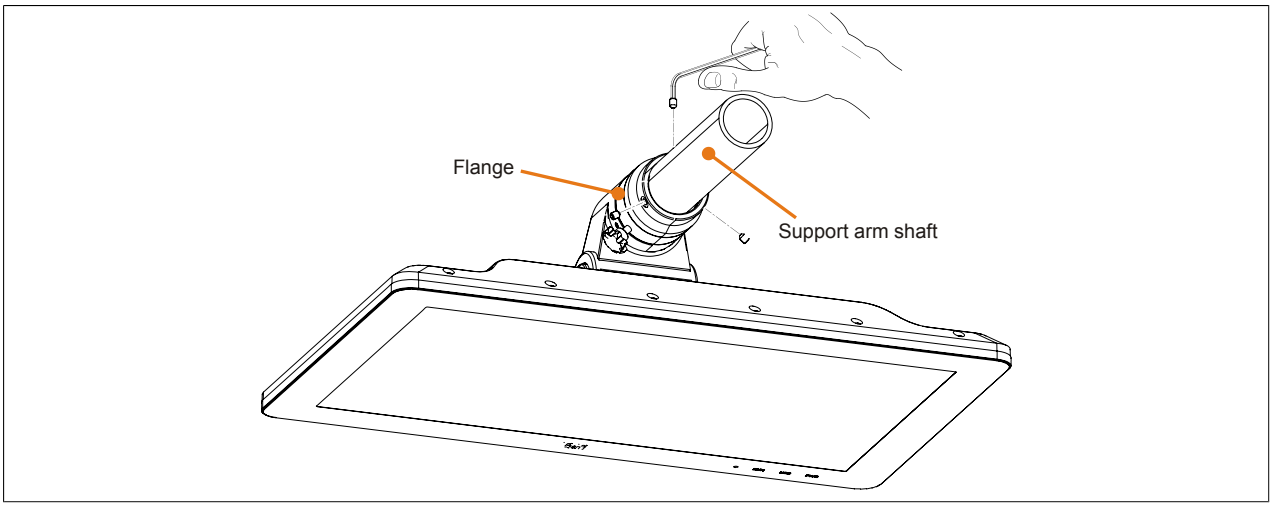


Figure 3: Mounting the Automation Panel 830

4. Remove the interface cover from the Automation Panel 830 by removing the 8 Torx screws (TX20).

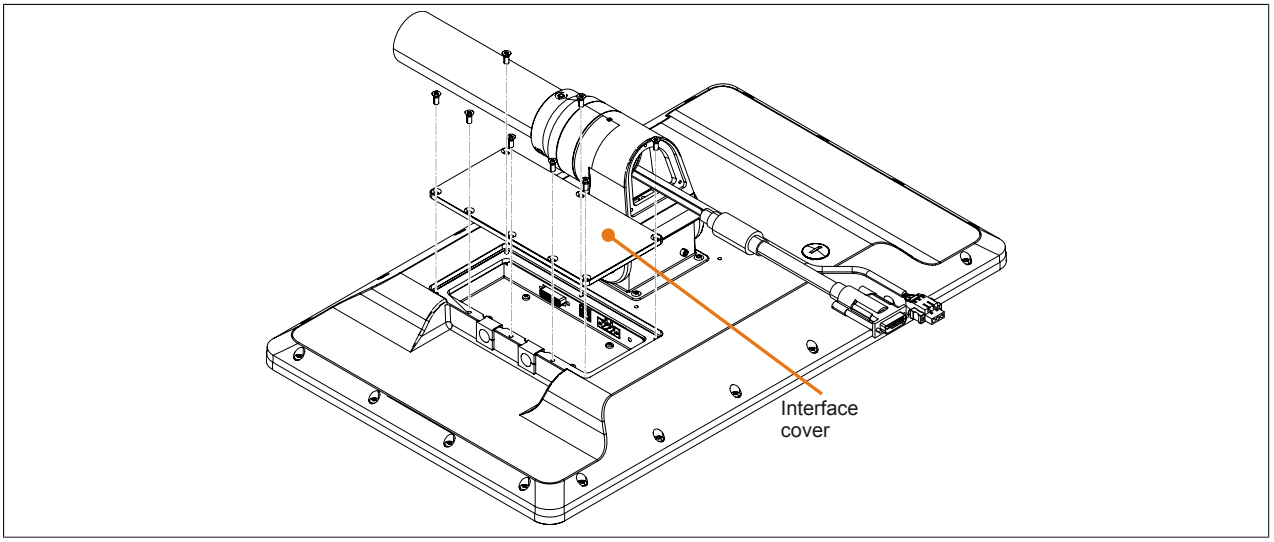


Figure 4: Remove interface cover

5. Open the cable fittings, feed through the cables and then close the cable fittings. Connect the cables to the interfaces and tighten the fastening screws.

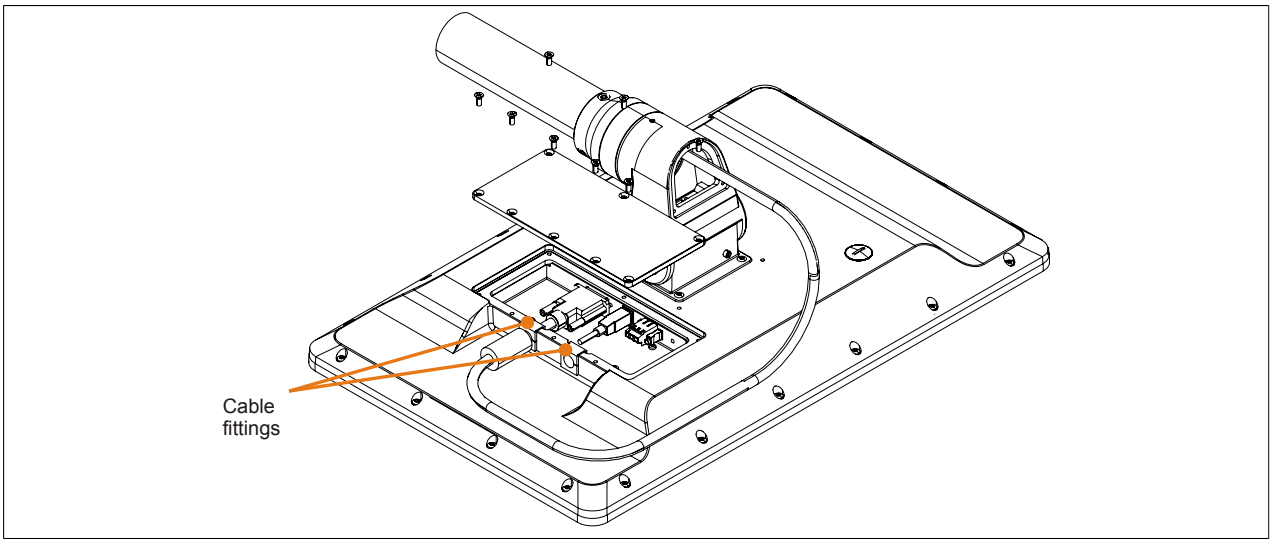


Figure 5: Connecting the cable

6. Replace the interface cover on the Automation Panel 830 using the 8 Torx screws removed earlier (1.3 Nm fastening torque).

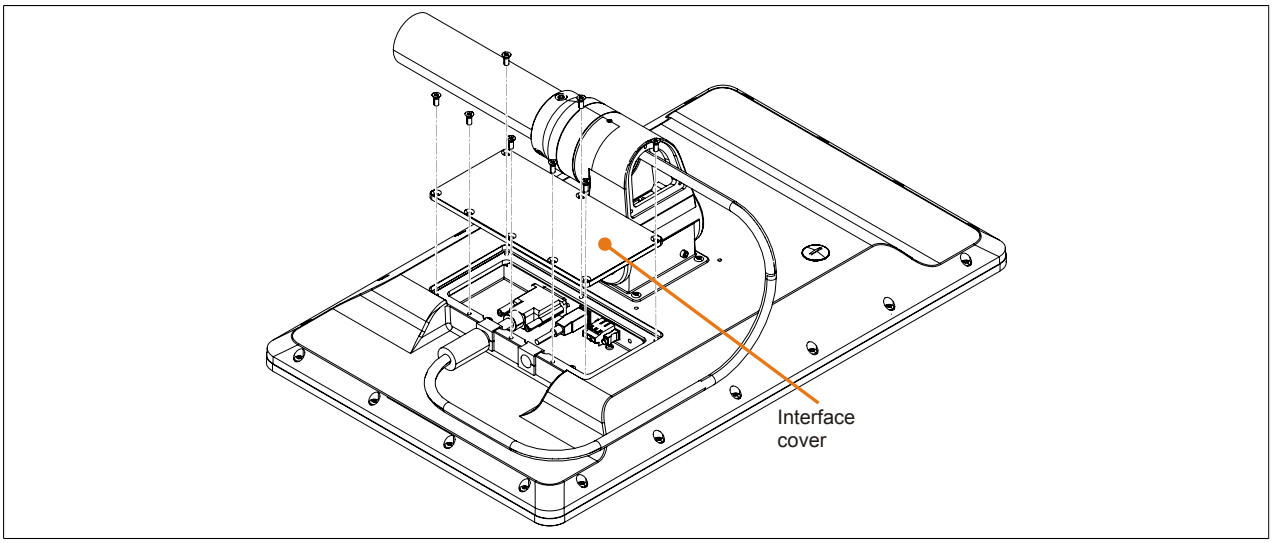


Figure 6: Attach interface cover

3.2 Revision A5

3.2.1 General information

- 21.5" Full HD color TFT display
- Multi-touch screen (projected capacitive, 4 simultaneous touch contact points)
- Flexible, hanging support arm mounting
- Fanless operation

3.2.2 Order data

Model number	Short description	Figure
	Undefined	
5AP830.215C-00	Automation Panel AP830, 21.5" Full HD color TFT display with multi-touch screen (projective capacitive), 2 USB 2.0 interfaces, IP65 protection (front), 24 VDC, flange mounting on top.	
	Required accessories	
	Terminal blocks	
0TB103.9	Connector, 24 VDC, 3-pin female, 3.31 mm² screw clamp, protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange	

Table 8: 5AP830.215C-00 - Order data

3.2.3 Technical data

Product ID	5AP830.215C-00
General information	
LEDs	Power, HDD, Run
B&R ID code	$D1BE
Certification	
CE	In preparation
Interfaces	
USB	
Quantity	1
Type	USB 2.0 1)
Design	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Current load	Max. 1 A
Monitor/Panel interface	
Design	Female DVI-I connector
Type	SDL/DVI
Display	
Type	Color TFT
Diagonal	21.5" (545.22 mm)
Colors	16 million
Resolution	Full HD, 1920x1080
Contrast	1000:1
Viewing angles	
Horizontal	Direction R / Direction L = 178°
Vertical	Direction U / Direction D = 178°
Backlight	
Classification	LED
Brightness	250 cd/m²
Half-brightness time 2)	30,000 h
Touch screen 3)	
Type	3M
Technologies	Projected capacitive touch (PCT)
Controller	3M
Transmittance	88% ±2%
Electrical characteristics	
Nominal voltage	24 VDC ±25%
Nominal current	1.7 A
Starting current	TBD
Power consumption	50 W
Electrical isolation	Yes

Table 9: 5AP830.215C-00 - Technical data

Product ID	5AP830.215C-00
Operating conditions	
Protection in accordance with EN 60529	TBD
Environmental conditions	
Temperature	
Operation	TBD
Storage	TBD
Transport	TBD
Relative humidity	
Operation	TBD
Storage	TBD
Transport	TBD
Vibration	
Operation (continuous)	TBD
Operation (occasional)	TBD
Storage	TBD
Transport	TBD
Shock	
Operation	TBD
Storage	TBD
Transport	TBD
Altitude	
Operation	TBD
Mechanical characteristics	
Housing	
Material	Cast-aluminum alloy
Paint	Similar to silver metallic (semi-matt)
Front [4]	
Frame	TBD
Design	RAL 9005
Gasket	TBD
Flange output	Top
Dimensions	
Width	557.5 mm
Height	350 mm
Depth	68.2 mm [5]
Weight	TBD

Table 9: 5AP830.215C-00 - Technical data

1) USB 2.0 is only possible with a DVI connection. If an SDL cable is connected, only USB 1.1 is available.
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) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
4) There may be visible deviations in the color and surface appearance depending on the process or batch.
5) Dimensions without flange

3.2.4 Dimensions

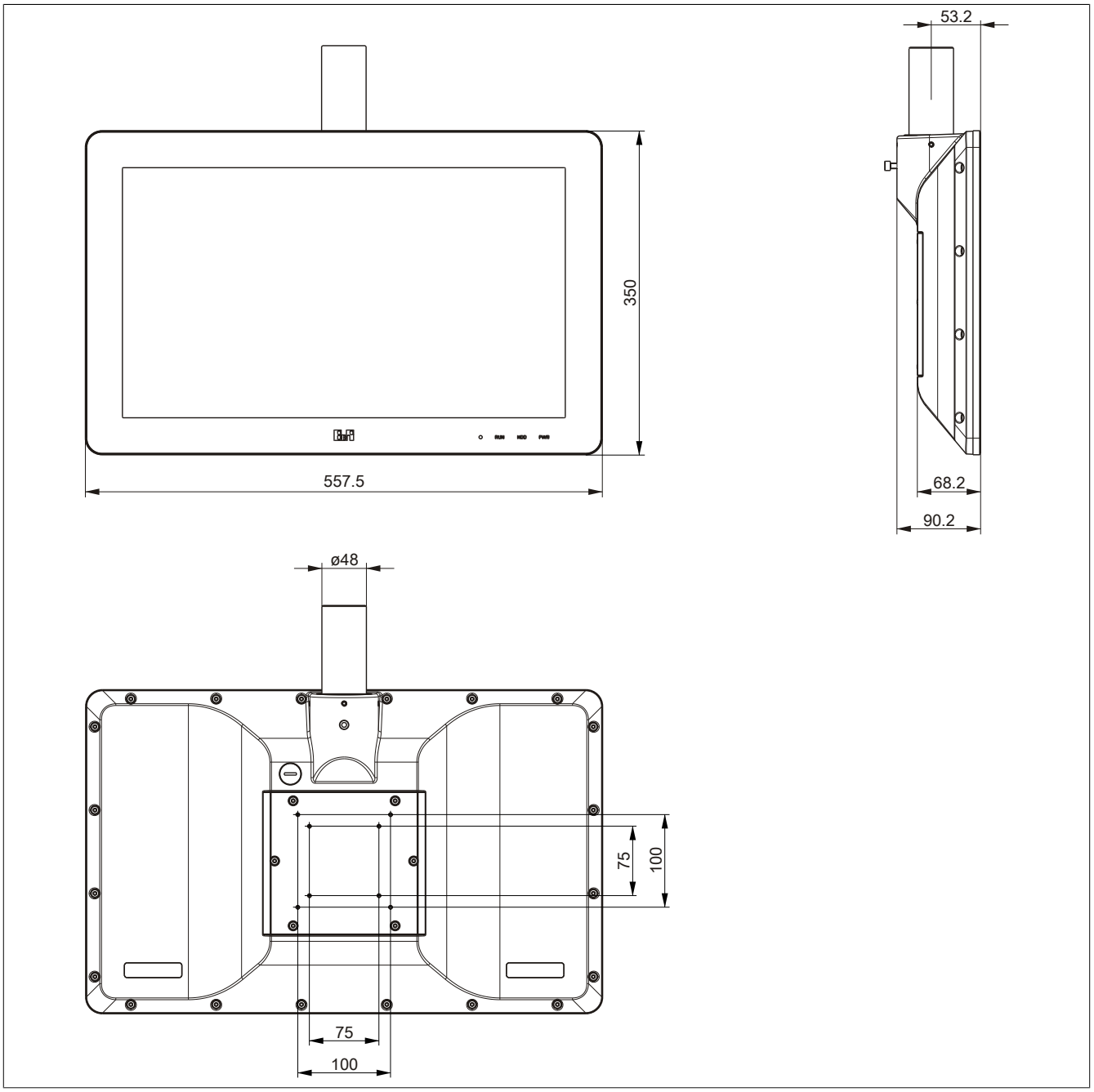


Figure 7: 5AP830.215C-00 - Dimensions

3.2.5 Contents of delivery

Quantity	Description
1 pcs.	Automation Panel 830 (5AP830.215C-00) with integrated flange (hanging)
2 pcs.	Rings for mounting on a support arm shaft
3 pcs.	M4 headless screws for mounting the rings
3 pcs.	M6 headless screws for mounting the Automation Panel 830 on a support arm system
1 pcs.	M6 locking lever for setting the angle of rotation
1 pcs.	Sealing ring
4 pcs.	M4 screws for mounting the interface cover

Table 10: 5AP830.215C-00 - Contents of delivery

The 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp) power supply connector must be ordered separately. SDL, DVI and USB cables[4)] are not included in delivery.

[4)] A USB cable is only required if the panel is connected via DVI cable.

3.2.6 Installation

3.2.6.1 Important installation information

- Environmental conditions must be taken into consideration.
- This device must be mounted to a flat surface.
- This device is only certified for operation in closed rooms.
- This device must not be subjected to direct sunlight.
- Ventilation holes must not be covered.
- This device must be mounted in one of the approved orientations.
- The wall or control cabinet must be able to withstand four times the total weight of the device.
- The flex radius of connected cables (DVI, SDL, USB, etc.) must not be exceeded.

3.2.6.2 Mounting on a support arm system

Information:

In addition to mounting with the integrated flange, the back of the Automation Panel 830 provides an option for mounting in accordance with the VESA 75/100 standard. The flange attached to the AP830 must be fastened using 4 or 8 M4 screws (1.3 Nm fastening torque).

If the Automation Panel 830 is not mounted using the integrated flange, however, then the cable must be routed externally.

Information:

Before mounting the Automation Panel 830 to the support arm system, ensure that the sealing ring is installed on the flange of the AP830.

The support arm shaft must have a diameter of 48 mm. The end of the support arm shaft that connects with the flange must be chamfered at a 45° angle and deburred.

1. Insert the sealing ring into Ring 2 before sliding the two rings onto the support arm shaft. Then fasten the two rings to the support arm shaft using 3x M4 headless screws (hex key, size 2) with a fastening torque of 1.5 Nm. Make sure that Ring 1 (with the tappet) is on the side that gets inserted into the flange. The distance from the bottom edge of the support arm shaft and the bottom edge of the ring must be 21.5 mm ±0.5 mm (bottom edge of support arm shaft to ring tappet = 19 mm ±0.5 mm). There must be no space between the two rings.

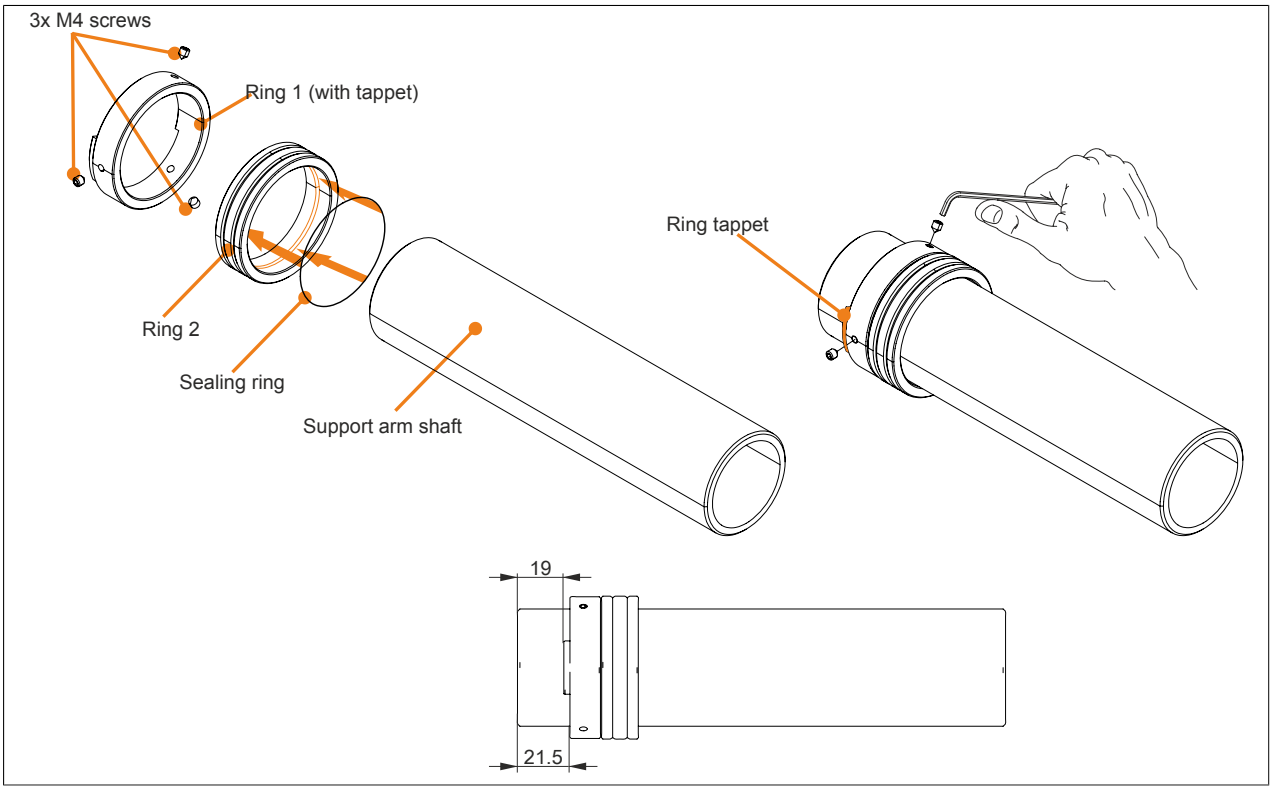


Figure 8: Mounting the rings to the support arm shaft

2. Feed the required cables (SDL or DVI cable, power supply cable[5], USB cable[6]) through the support arm shaft. The types of cables that can or must be used depends on the type of connection (SDL or DVI) used for the Automation Panel 830 (see "Mounting for SDL operation" on page 33 and "Mounting for DVI / USB (Type B) operation" on page 36).

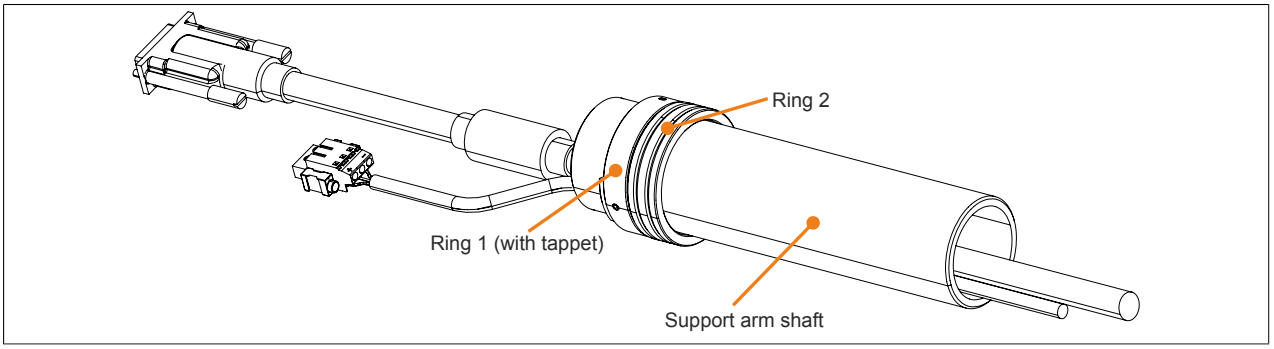


Figure 9: Feeding a cable through the support arm shaft

[5] The 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp) power supply connector must be ordered separately.
[6] A USB cable is only required if the panel is connected via DVI cable.

3. Connect the Automation Panel 830 to the support arm system. The tappet on the lower ring must fit perfectly into the filed part of the flange. The Automation Panel 830 has been correctly mounted if the upper ring forms a smooth surface with the flange. Fasten to the support arm shaft using the 3 M6 headless screws (hex key, size 3) with a fastening torque of 5 Nm.

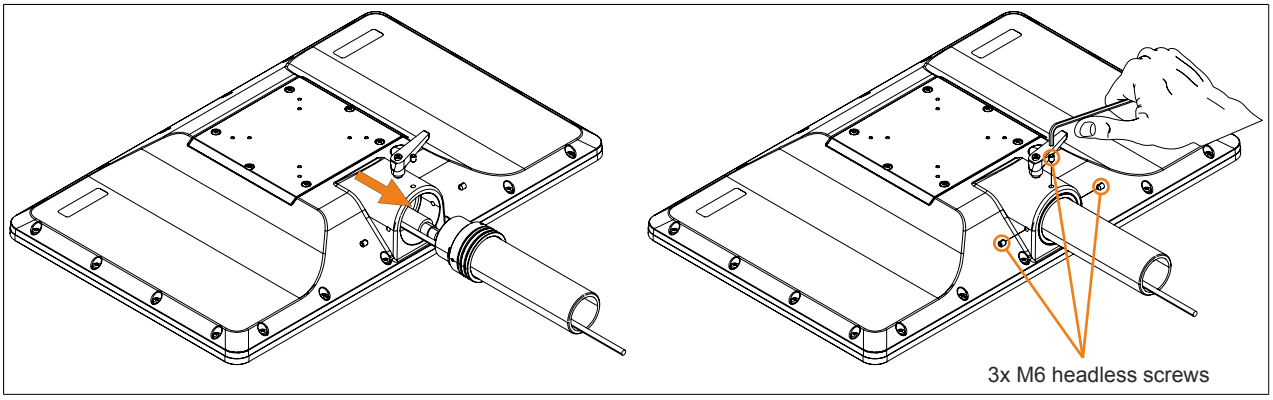


Figure 10: Mounting the Automation Panel 830

3.2.6.3 Mounting orientation

An Automation Panel 830 must be mounted as described in the following sections.

The set screw can be used to set the rotation angle of the Automation Panel 830 between +45° and -45°.

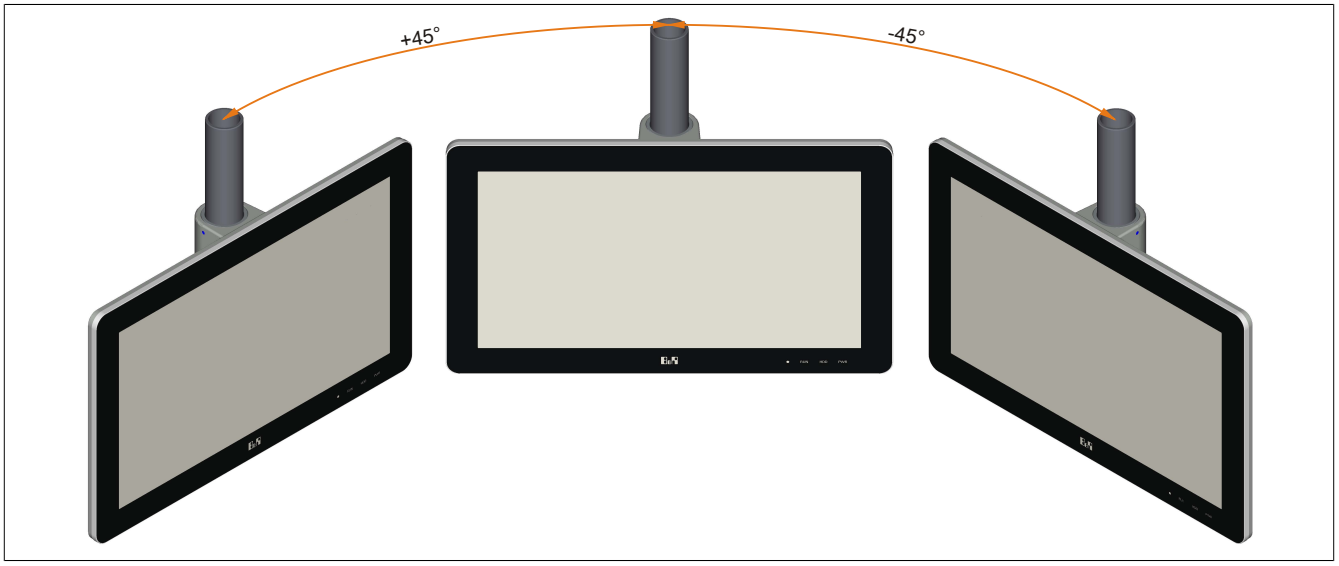


Figure 11: Mounting orientation / Angle of rotation

3.2.6.3.1 Vertical mounting orientation

A vertical or horizontal mounting angle is not permitted with the Automation Panel 830.

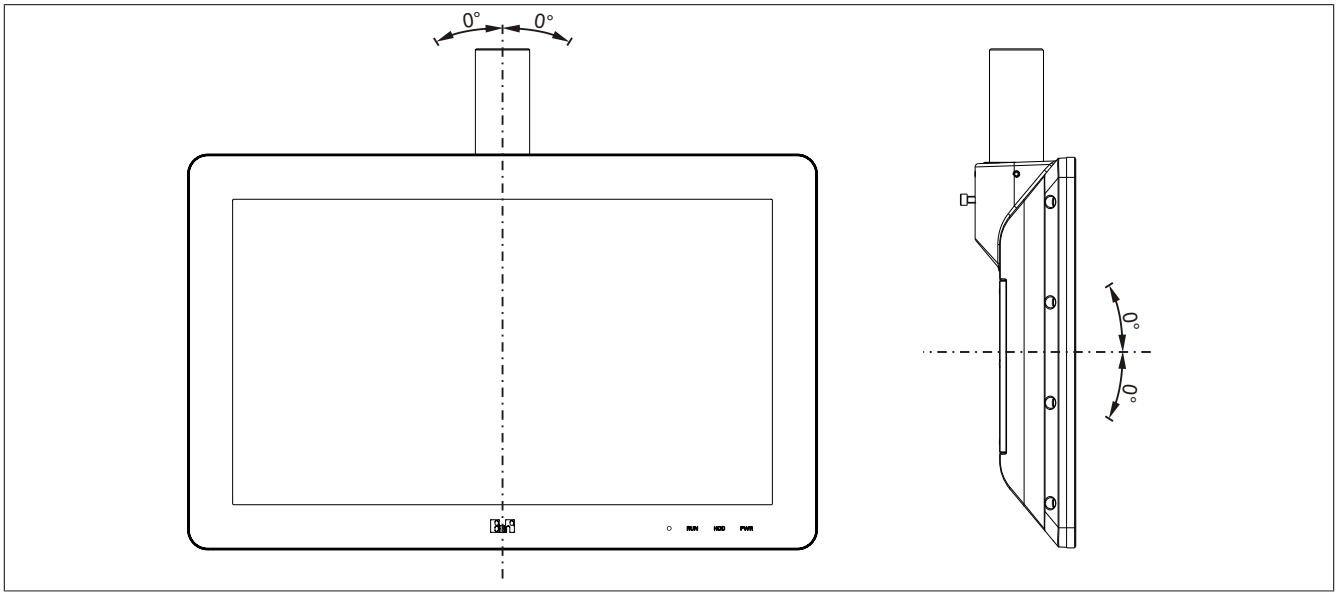


Figure 12: Vertical mounting orientation

3.2.7 Installing the DC mains cable

Danger!

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

3.2.7.1 Wiring

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

Installing the 0TB103.9 screw clamp terminal block

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

It is important to pay attention to the pin assignments of the power supply connector on the device!

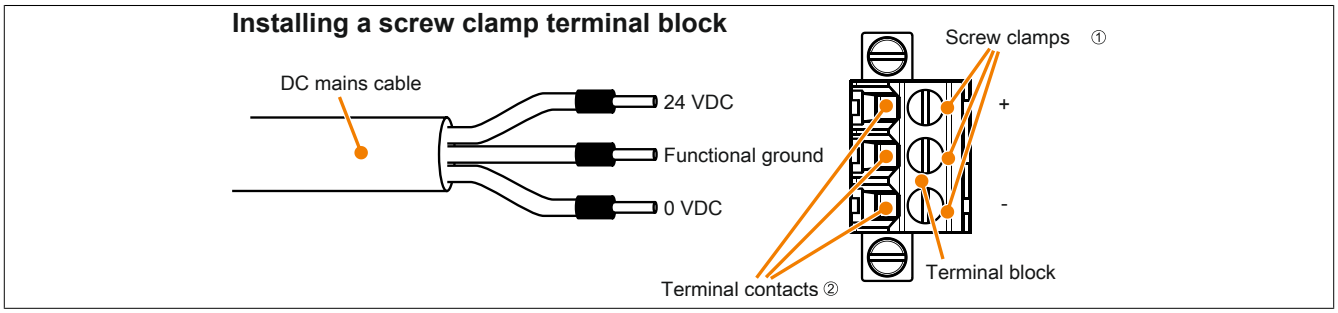


Figure 13: Installing a screw clamp terminal block

Installing the 0TB103.91 cage clamp terminal block

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

It is important to pay attention to the pin assignments of the power supply connector on the device!

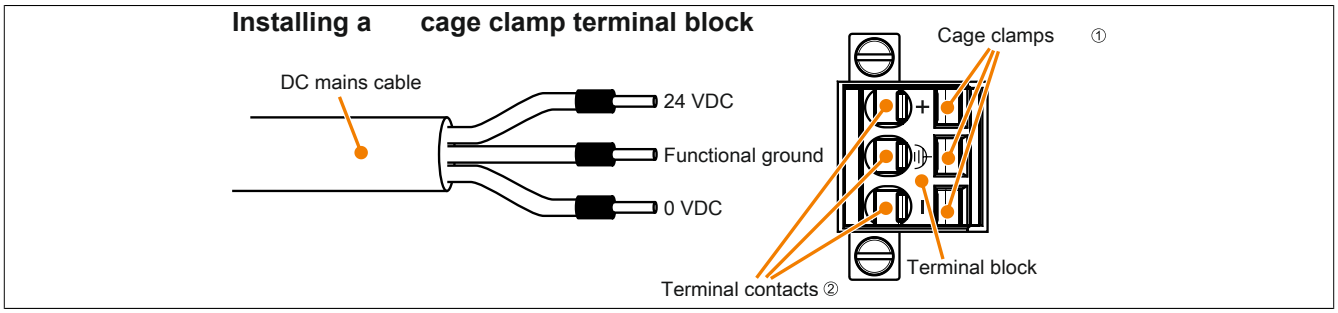


Figure 14: Installing a cage clamp terminal block

3.3 Revision ≥ B0

3.3.1 General information

- 21.5" Full HD color TFT display
- Multi-touch screen (projected capacitive, 4 simultaneous touch contact points)
- Flexible, hanging support arm mounting
- Fanless operation

3.3.2 Order data

Model number	Short description	Figure
	Undefined	
5AP830.215C-00	Automation Panel AP830, 21.5" Full HD color TFT display with multi-touch screen (projective capacitive), 2 USB 2.0 interfaces, IP65 protection (front), 24 VDC, flange mounting on top.	
	Required accessories	
	Terminal blocks	
0TB103.9	Connector, 24 VDC, 3-pin female, 3.31 mm² screw clamp, protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange	

Table 11: 5AP830.215C-00 - Order data

3.3.3 Technical data

Product ID	5AP830.215C-00
General information	
LEDs	Power, HDD, Run
B&R ID code	$D1BE
Certification	
CE	In preparation
Interfaces	
USB	
Quantity	1 internal & 1 external (service interface)
Type	USB 2.0 1)
Design	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Current load	Max. 1 A
Monitor/Panel interface	
Design	Female DVI-I connector
Type	SDL/DVI
Display	
Type	Color TFT
Diagonal	21.5" (545.22 mm)
Colors	16 million
Resolution	Full HD, 1920x1080
Contrast	1000:1
Viewing angles	
Horizontal	Direction R / Direction L = 178°
Vertical	Direction U / Direction D = 178°
Backlight	
Classification	LED
Brightness	250 cd/m²
Half-brightness time 2)	30,000 h
Touch screen 3)	
Type	DMC
Technologies	Projected capacitive touch (PCT)
Controller	EETI (EXC7200)
Transmittance	91% (typical value at full wavelength)
Electrical characteristics	
Nominal voltage	24 VDC ±25%
Nominal current	1.7 A
Starting current	TBD
Power consumption	50 W
Electrical isolation	Yes

Table 12: 5AP830.215C-00 - Technical data

Product ID	5AP830.215C-00
Operating conditions	
Protection in accordance with EN 60529	IP65 [4]
Environmental conditions	
Temperature	
Operation	Standing (0°): 45°C Lying (90°): 35°C
Storage	TBD
Transport	TBD
Relative humidity	
Operation	TBD
Storage	TBD
Transport	TBD
Vibration	
Operation (continuous)	TBD
Operation (occasional)	TBD
Storage	TBD
Transport	TBD
Shock	
Operation	TBD
Storage	TBD
Transport	TBD
Altitude	
Operation	TBD
Mechanical characteristics	
Housing	
Material	Cast-aluminum alloy
Paint	Similar to silver metallic (semi-matt)
Front [5]	
Frame	Anodized aluminum
Design	RAL 9005
Gasket	Duplocoll
Flange output	Top
Dimensions	
Width	557.5 mm
Height	350 mm
Depth	68.2 mm [6]
Weight	Approx. 10 kg

Table 12: 5AP830.215C-00 - Technical data

1) USB 2.0 is only possible with a DVI connection. If an SDL cable is connected, only USB 1.1 is available.
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) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
4) Only with flange mounting
5) There may be visible deviations in the color and surface appearance depending on the process or batch.
6) Dimensions without flange

3.3.4 Dimensions

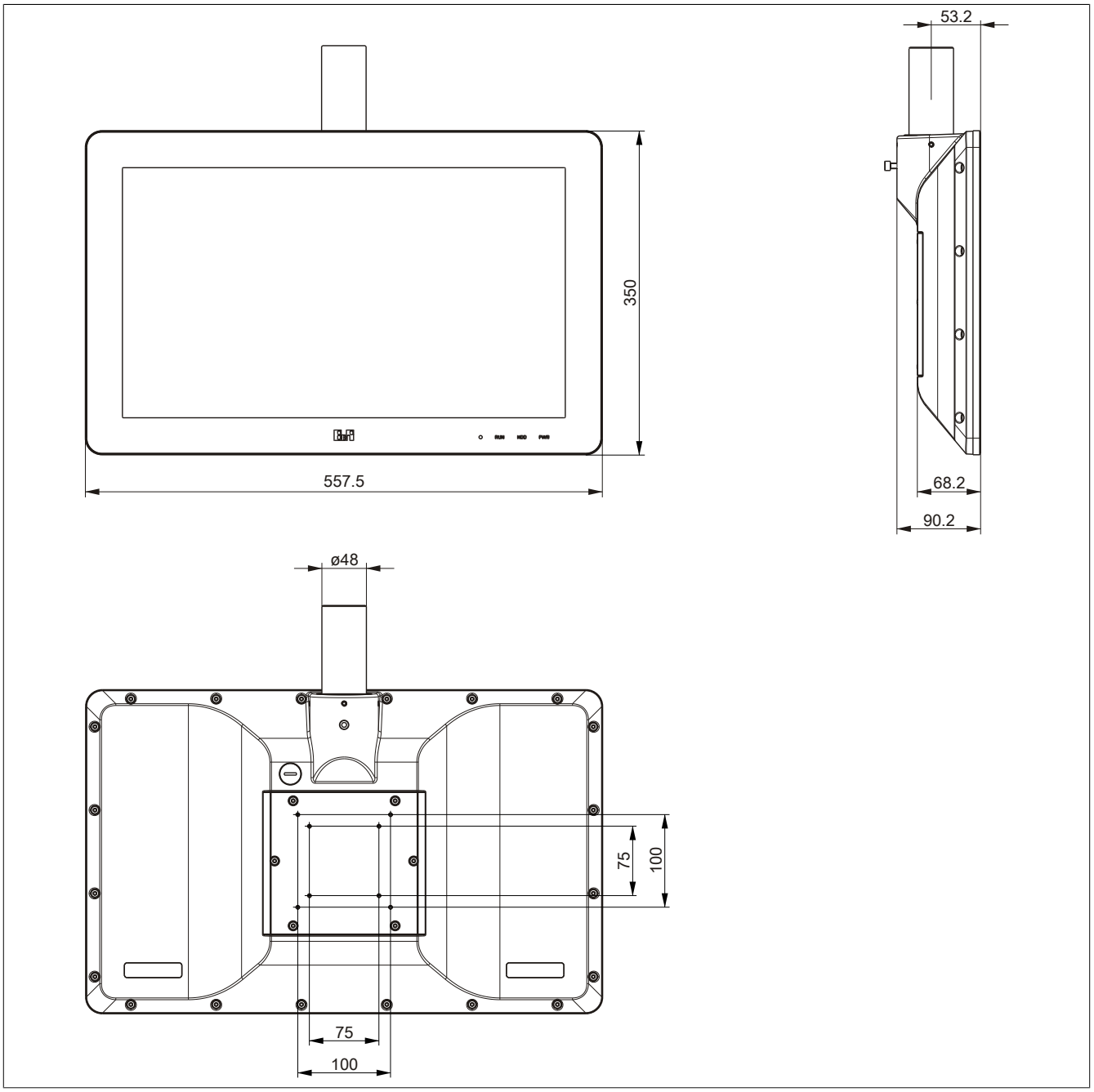


Figure 15: 5AP830.215C-00 - Dimensions

3.3.5 Contents of delivery

Quantity	Description
1 pcs.	Automation Panel 830 (5AP830.215C-00) with integrated flange (hanging)
2 pcs.	Rings for mounting on a support arm shaft
3 pcs.	M4 headless screws for mounting the rings
3 pcs.	M6 headless screws for mounting the Automation Panel 830 on a support arm system
1 pcs.	M6 locking lever for setting the angle of rotation
1 pcs.	Sealing ring
4 pcs.	M4 screws for mounting the interface cover

Table 13: 5AP830.215C-00 - Contents of delivery

The 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp) power supply connector must be ordered separately. SDL, DVI and USB cables[7)] are not included in delivery.

[7)] A USB cable is only required if the panel is connected via DVI cable.

3.3.6 Installation

3.3.6.1 Important installation information

- Environmental conditions must be taken into consideration.
- This device is only certified for operation in closed rooms.
- This device must not be subjected to direct sunlight.
- This device must be mounted in one of the approved orientations.
- The support arm system must be able to hold four times the total weight of the device.
- The flex radius of connected cables (DVI, SDL, USB, etc.) must not be exceeded.
- This device should be mounted in a position that minimizes glare on the screen.
- This device should be mounted in a position and orientation that make viewing as easy as possible for the operator.

3.3.6.2 Mounting on a support arm system

Information:

In addition to mounting with the integrated flange, the back of the Automation Panel 830 provides an option for mounting in accordance with the VESA 75/100 standard. The flange attached to the AP830 must be fastened using 4 or 8 M4 screws (1.3 Nm fastening torque).

If the Automation Panel 830 is not mounted using the integrated flange, however, then the cable must be routed externally.

Information:

Before mounting the Automation Panel 830 to the support arm system, ensure that the sealing ring is installed on the flange of the AP830.

The support arm shaft must have a diameter of 48 mm. The end of the support arm shaft that connects with the flange must be chamfered at a 45° angle and deburred.

1. Insert the sealing ring into Ring 2 before sliding the two rings onto the support arm shaft. Then fasten the two rings to the support arm shaft using 3x M4 headless screws (hex key, size 2) with a fastening torque of 1.5 Nm. Make sure that Ring 1 (with the tappet) is on the side that gets inserted into the flange. The distance from the bottom edge of the support arm shaft and the bottom edge of the ring must be 21.5 mm ±0.5 mm (bottom edge of support arm shaft to ring tappet = 19 mm ±0.5 mm). There must be no space between the two rings.

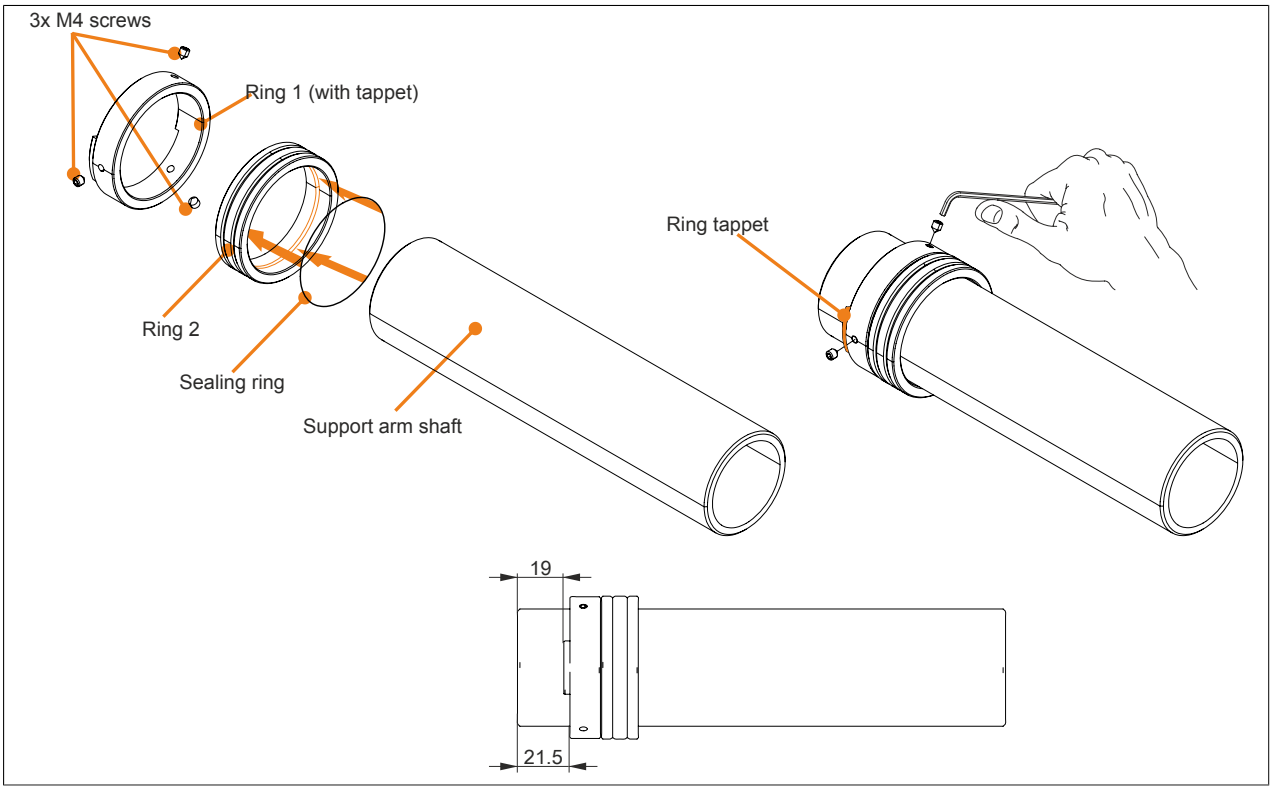


Figure 16: Mounting the rings to the support arm shaft

2. Feed the required cables (SDL or DVI cable, power supply cable[8], USB cable[9]) through the support arm shaft. The types of cables that can or must be used depends on the type of connection (SDL or DVI) used for the Automation Panel 830 (see "Mounting for SDL operation" on page 33 and "Mounting for DVI / USB (Type B) operation" on page 36).

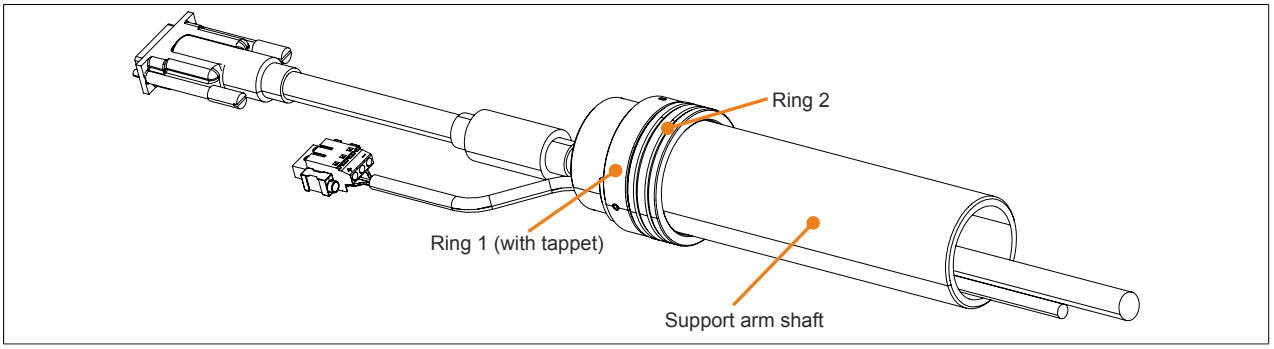


Figure 17: Feeding a cable through the support arm shaft

[8] The 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp) power supply connector must be ordered separately.
[9] A USB cable is only required if the panel is connected via DVI cable.

3. Connect the Automation Panel 830 to the support arm system. The tappet on the lower ring must fit perfectly into the filed part of the flange. The Automation Panel 830 has been correctly mounted if the upper ring forms a smooth surface with the flange. Fasten to the support arm shaft using the 3 M6 headless screws (hex key, size 3) with a fastening torque of 5 Nm.

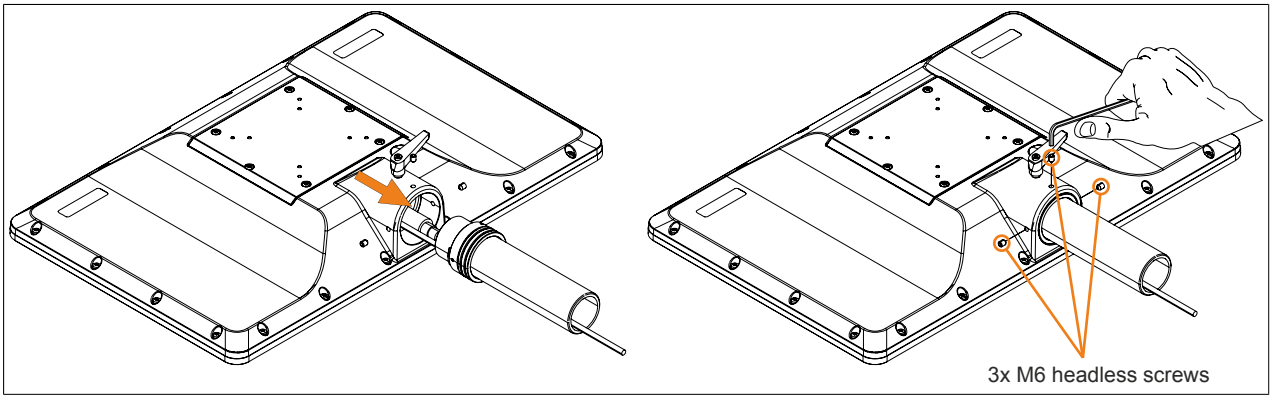


Figure 18: Mounting the Automation Panel 830

3.3.6.3 Mounting for SDL operation

The Automation Panel 830 can be connected to a B&R Industrial PC using an SDL cable. The SDL cable transfers all of the data necessary to operate the touch screen and USB ports, eliminating the need for other cables.

3.3.6.3.1 Connection

1. Remove the interface cover from the Automation Panel 830 by removing the 6 Torx screws (T20).

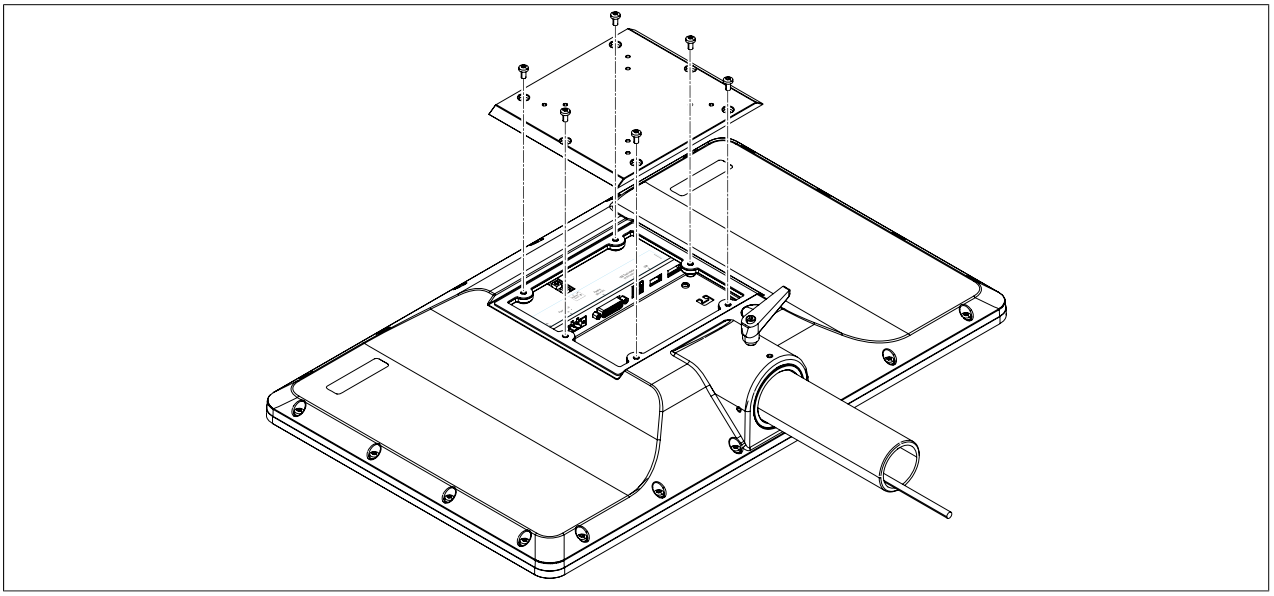


Figure 19: Removing the interface cover

2. Feed the necessary cables (supply voltage, SDL) through the support arm, connect them to the interfaces and secure them with the fastening screws.

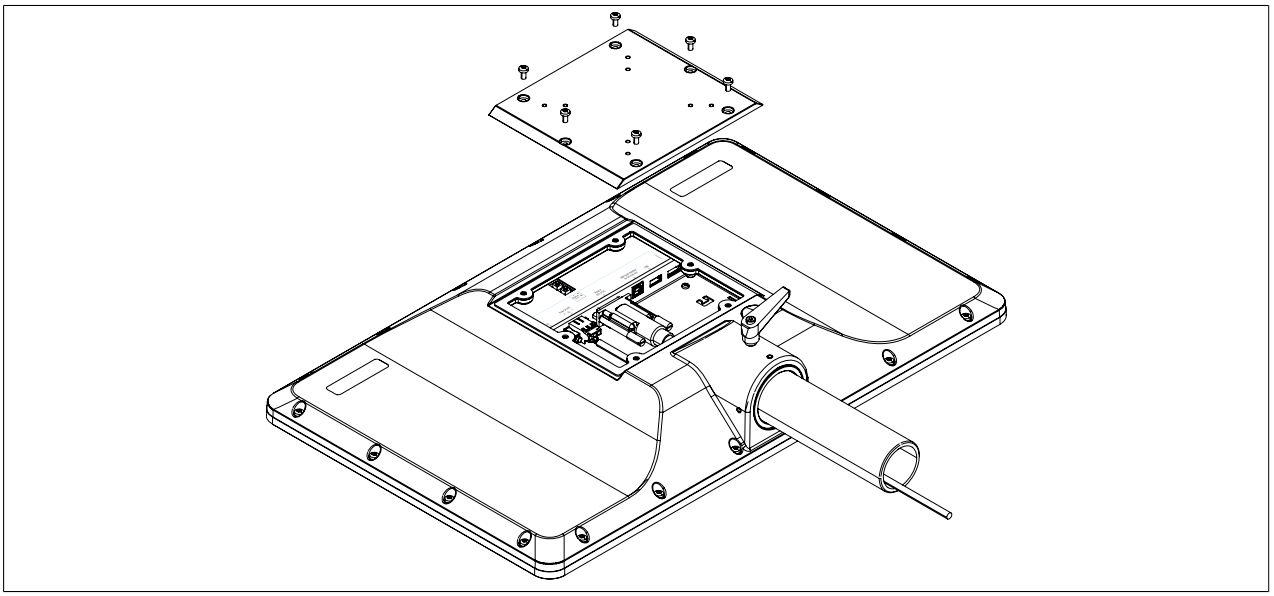


Figure 20: Connecting the cables

3. Connect the functional ground for the AP830. The largest possible conductor cross section should be used (at least 2.5 mm²). The ground cable should be connected to the central grounding point in the control cabinet via the shortest possible route.

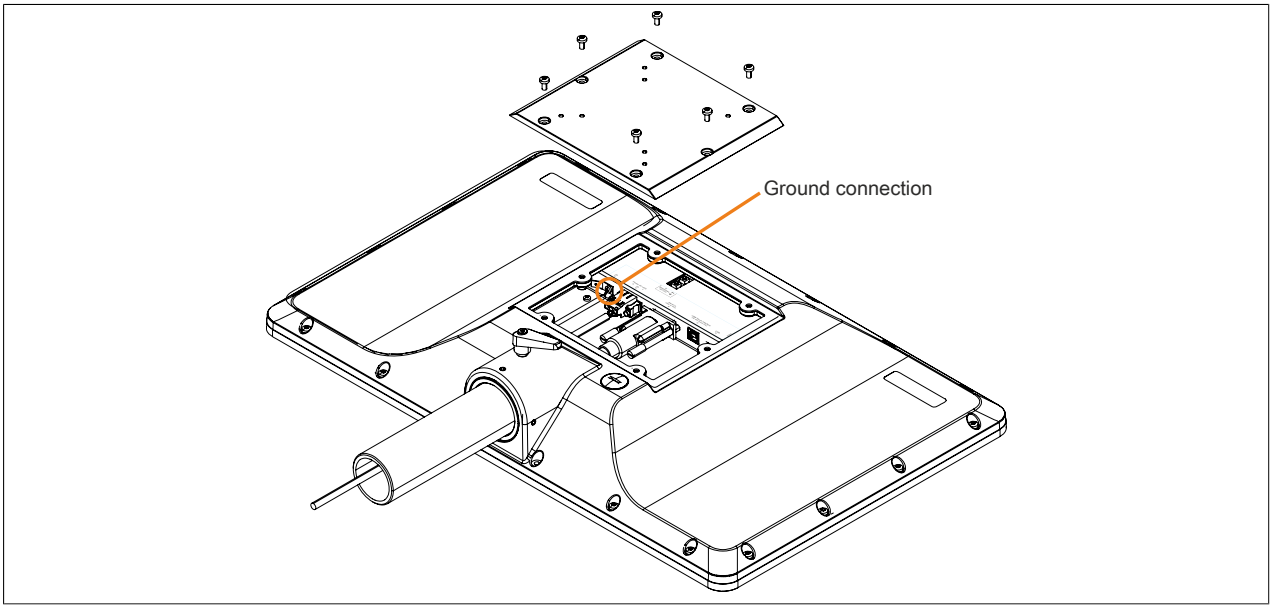


Figure 21: Connecting the ground cable

4. Replace the interface cover on the Automation Panel 830 using the 6 Torx screws removed earlier (1.3 Nm fastening torque).

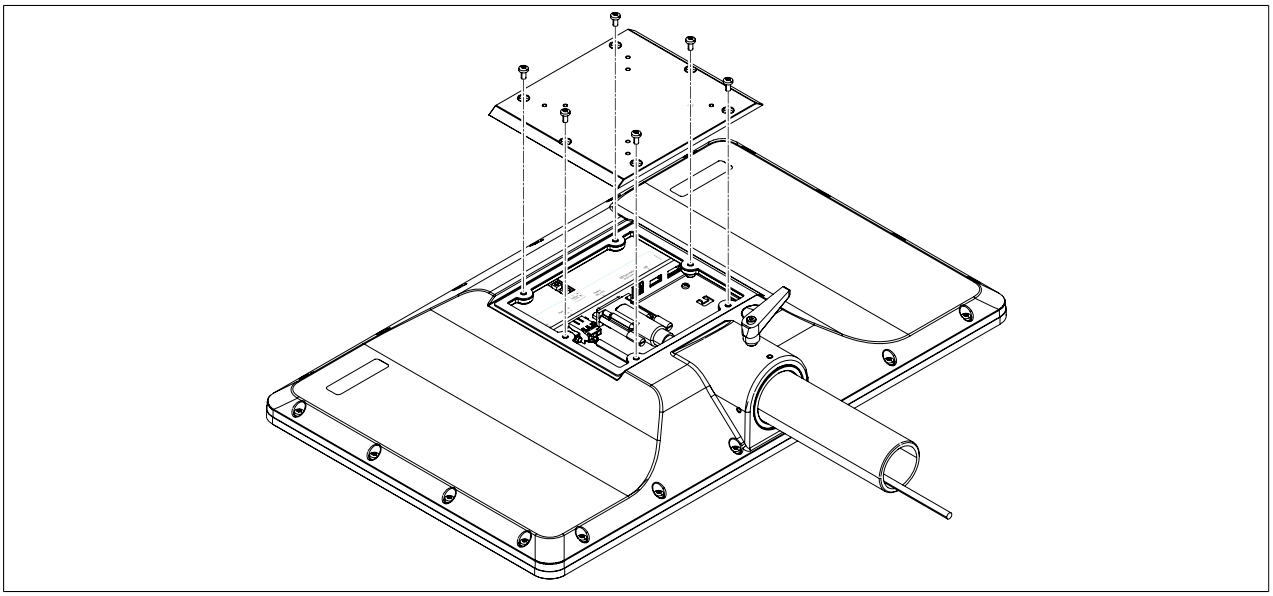


Figure 22: Replacing the interface cover

5. Use the locking lever to set the angle of rotation of the Automation Panel 830 between +45° and -45° (see "Mounting orientation" on page 25).

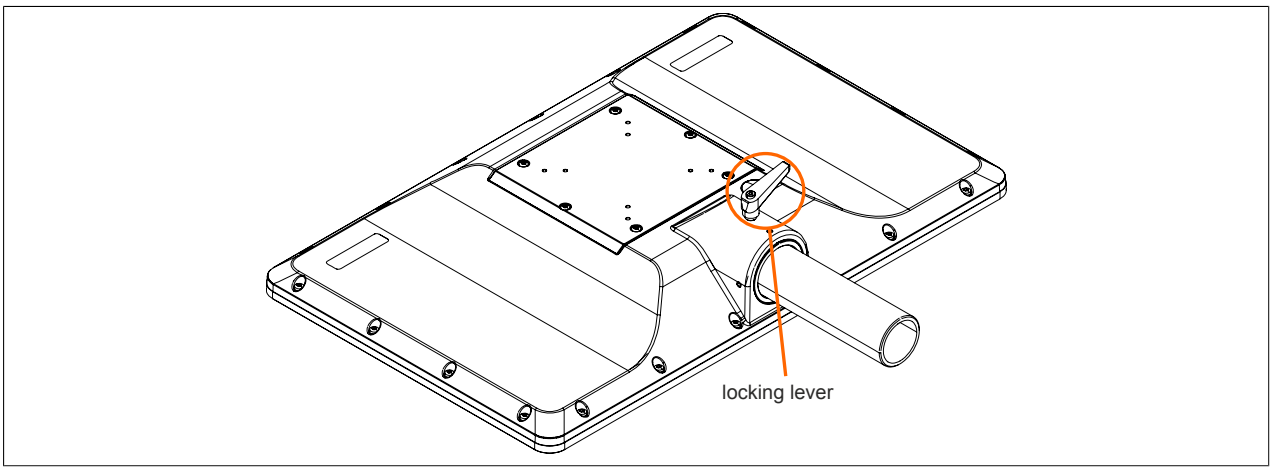


Figure 23: Adjusting the angle of rotation

3.3.6.4 Mounting for DVI / USB (Type B) operation

If the Automation Panel 830 is connected to a PC (e.g. Automation PC, Panel PC, PC from another manufacturer) via DVI cable, then an additional USB (Type B) cable is also required in order to operate the touch screen and USB ports.

3.3.6.4.1 Connection

1. Remove the interface cover from the Automation Panel 830 by removing the 6 Torx screws (T20).

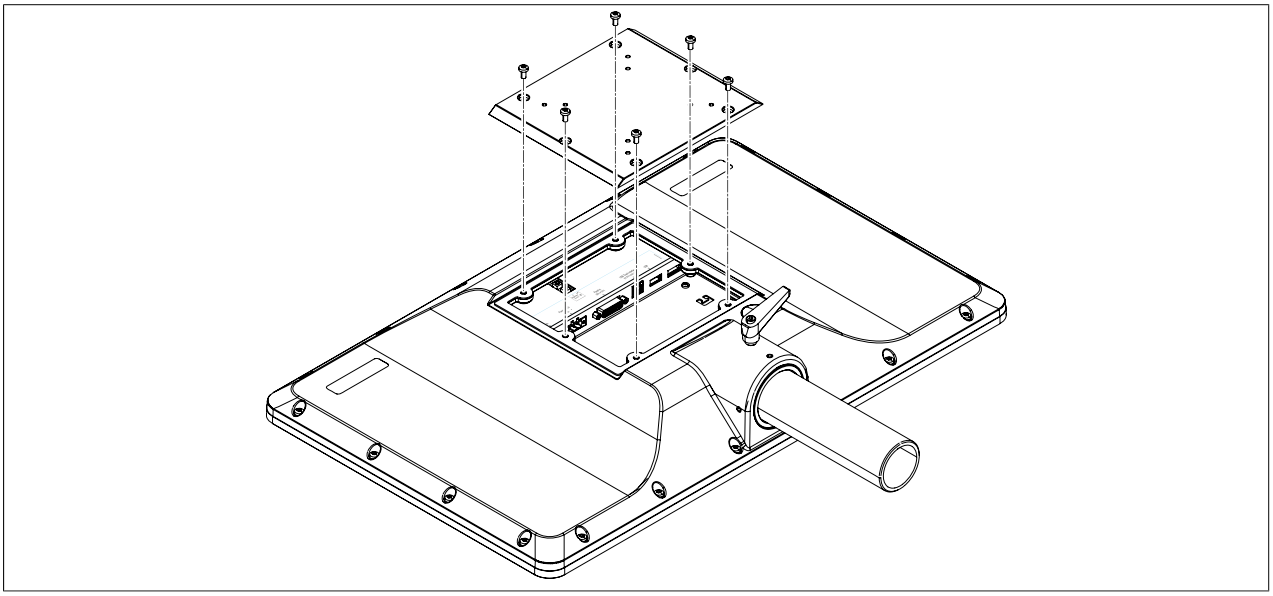


Figure 24: Removing the interface cover

2. Feed the necessary cables (supply voltage, DVI **and** USB) through the support arm, plug them into the interfaces and secure them with the fastening screws.

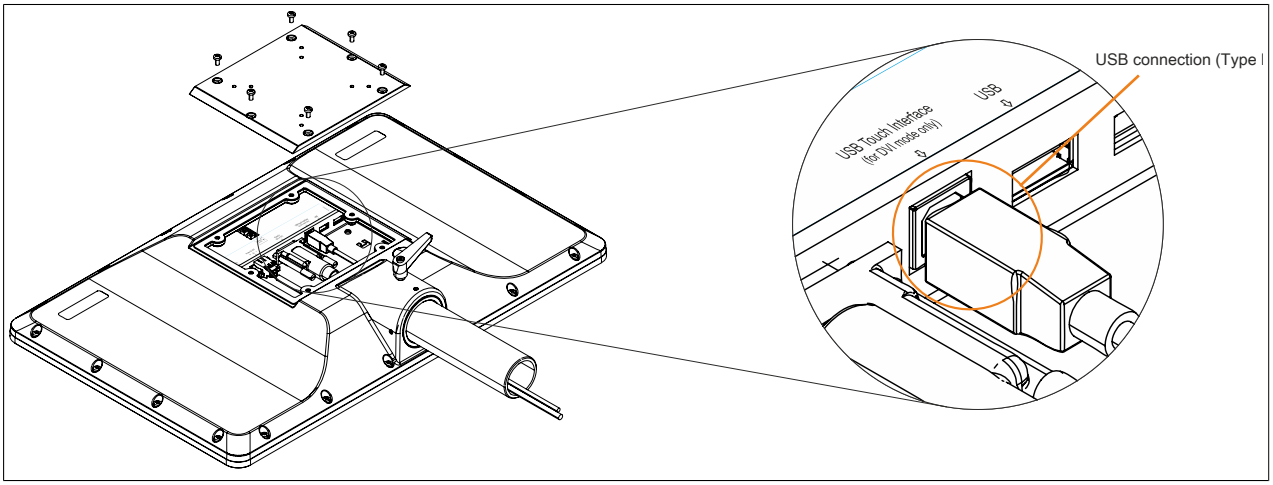


Figure 25: Connecting the cables

3. Connect the functional ground for the AP830. The largest possible conductor cross section should be used (at least 2.5 mm²). The ground cable should be connected to the central grounding point in the control cabinet via the shortest possible route.

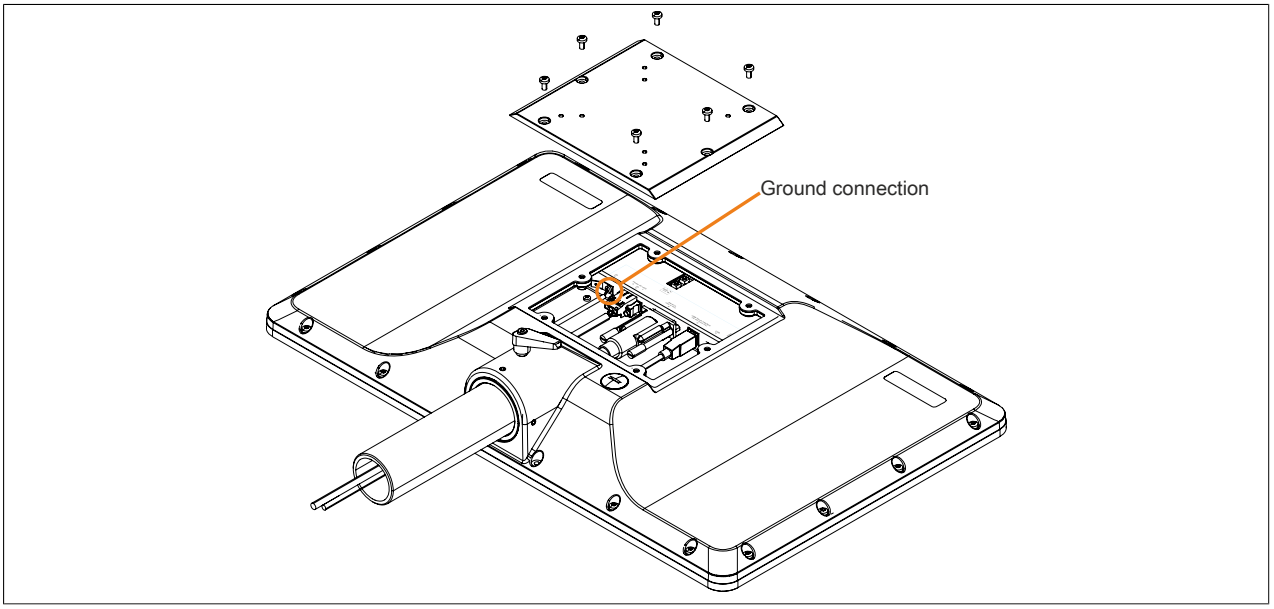


Figure 26: Connecting the ground cable

4. Replace the interface cover on the Automation Panel 830 using the 6 Torx screws removed earlier (1.3 Nm fastening torque).

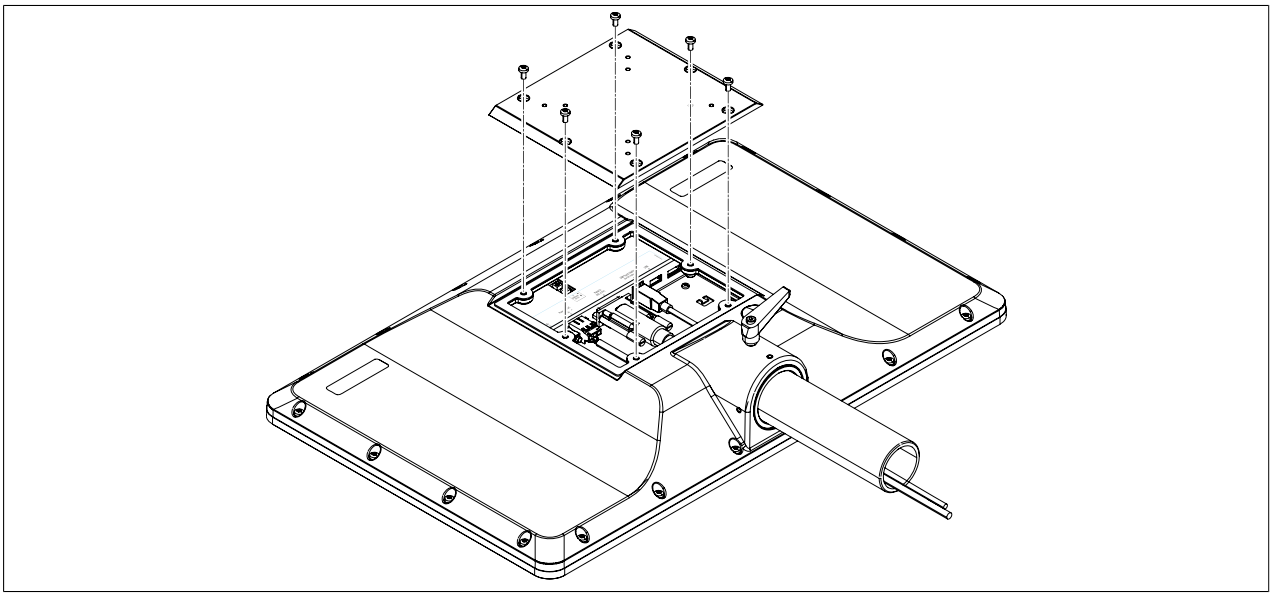


Figure 27: Replacing the interface cover

5. Use the locking lever to set the angle of rotation of the Automation Panel 830 between +45° and -45° (see "Mounting orientation" on page 25).

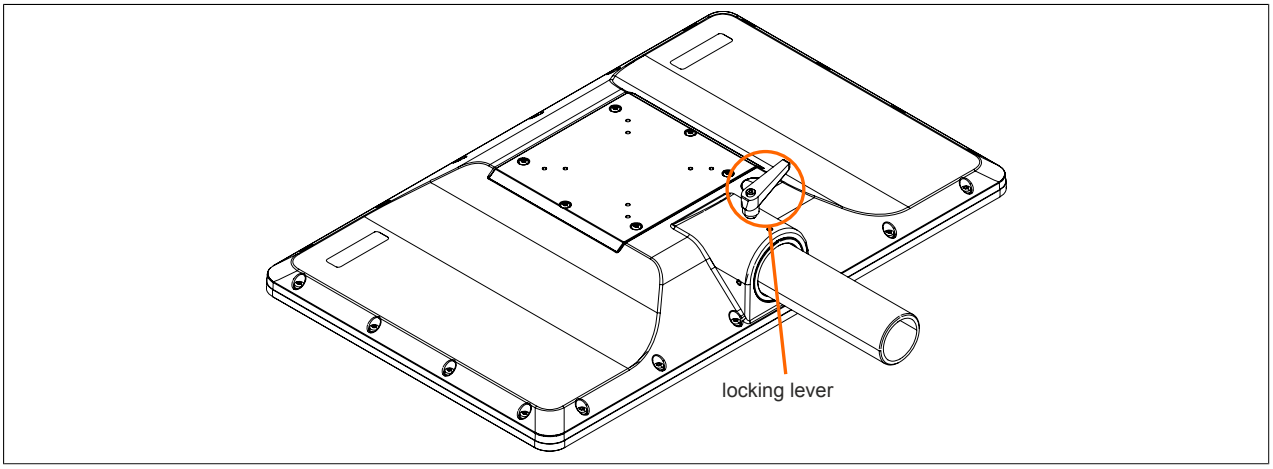


Figure 28: Adjusting the angle of rotation

3.3.6.5 Mounting orientation

The following diagrams show the approved mounting orientations for the Automation Panel 830. The AP830 display unit must be mounted as described and illustrated in the following sections.

Use the set lever on the flange to set the rotation angle of the Automation Panel 830 between +45° and -45°.

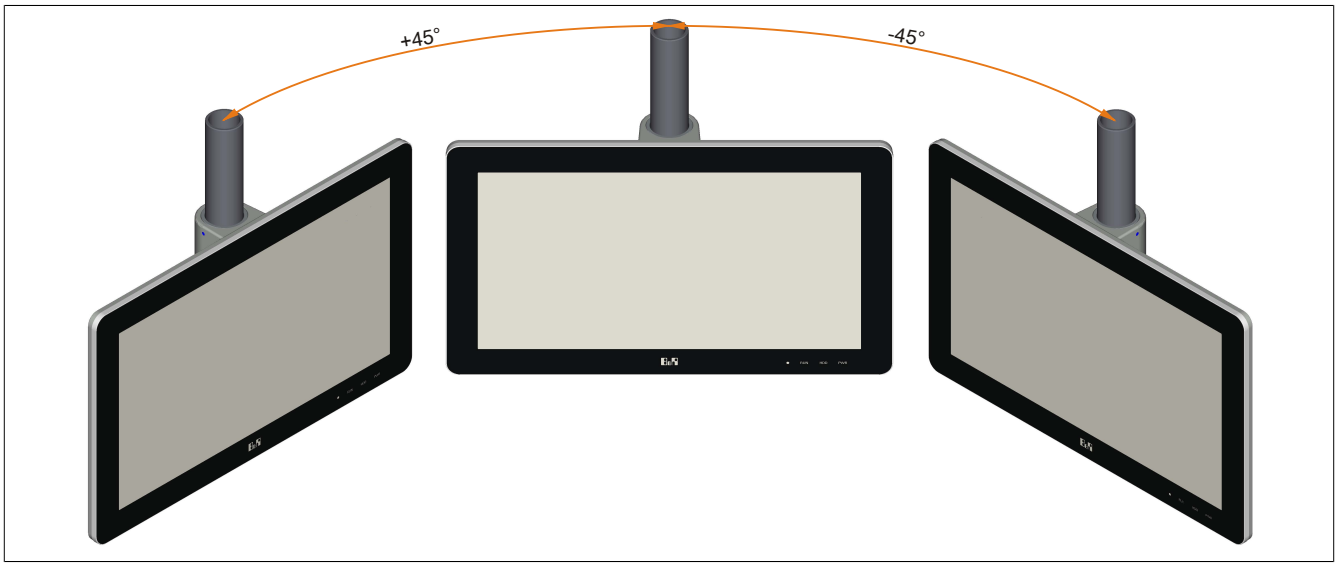


Figure 29: Mounting orientation / Angle of rotation

3.3.6.5.1 Vertical/Horizontal mounting orientation

A vertical or horizontal mounting angle is not permitted with the Automation Panel 830.

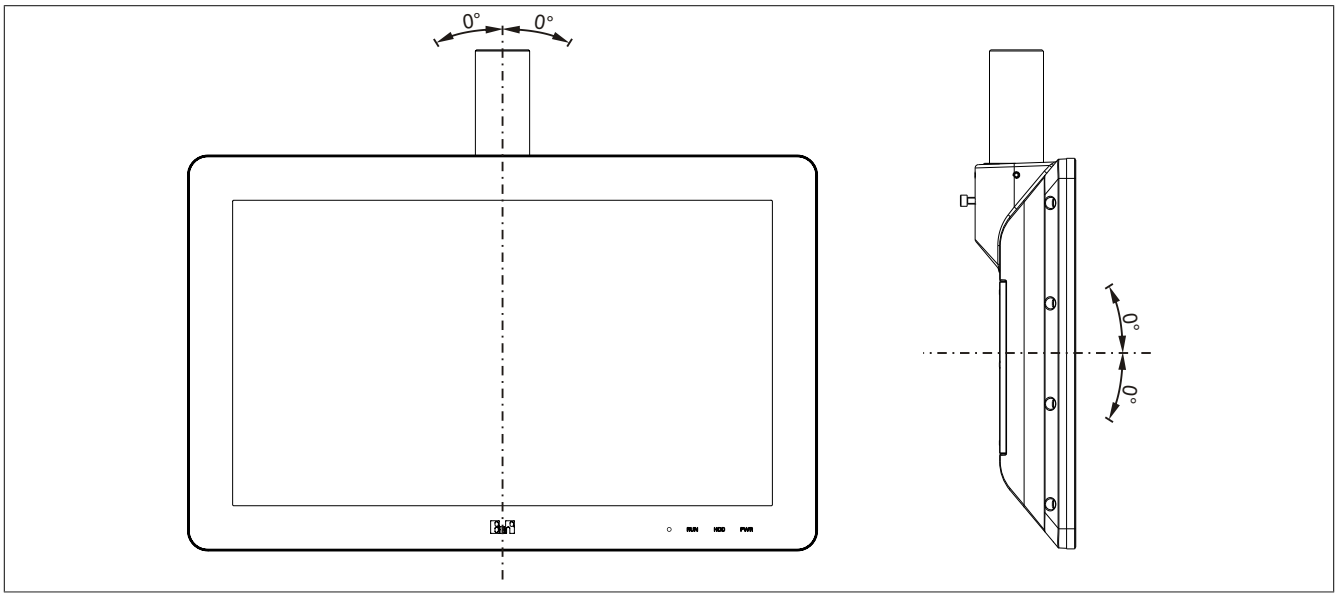


Figure 30: Vertical/Horizontal mounting orientation

3.3.7 Installing the DC mains cable

Danger!

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

3.3.7.1 Wiring

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

Installing the 0TB103.9 screw clamp terminal block

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

It is important to pay attention to the pin assignments of the power supply connector on the device!

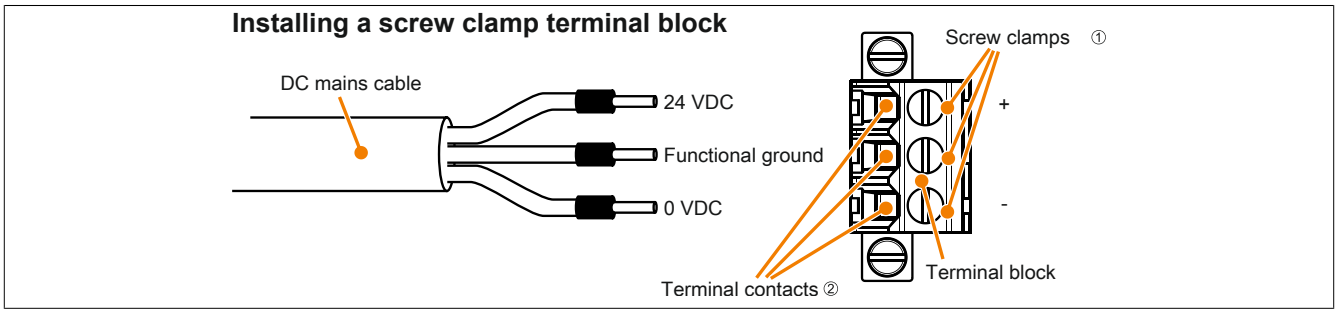


Figure 31: Installing a screw clamp terminal block

Installing the 0TB103.91 cage clamp terminal block

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

It is important to pay attention to the pin assignments of the power supply connector on the device!

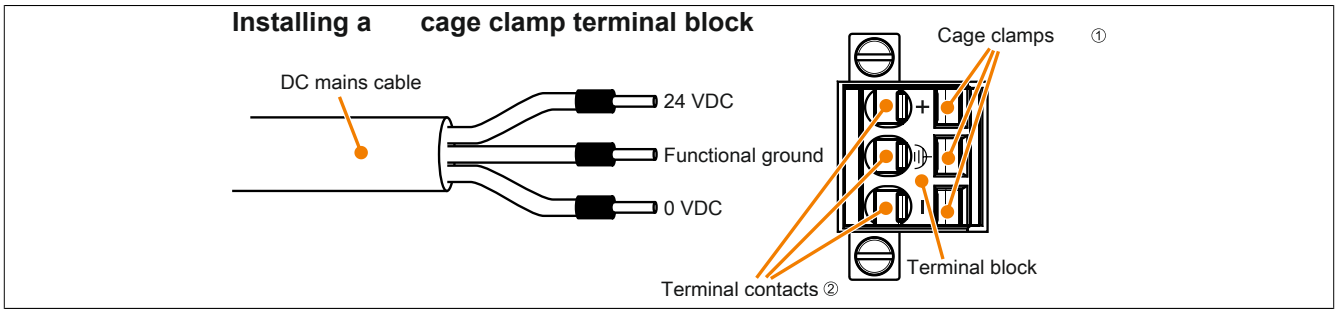


Figure 32: Installing a cage clamp terminal block

3.3.8 Adjusting the display brightness

If the display is connected with an SDL cable, its brightness can be adjusted in the Control Center on the B&R Industrial PC. If connected with a DVI cable, the brightness can only be adjusted using the two buttons located under the interface cover on the back of the Automation Panel 830.

3.3.8.1 Adjusting with an SDL connection

1. Open the Control Panel.

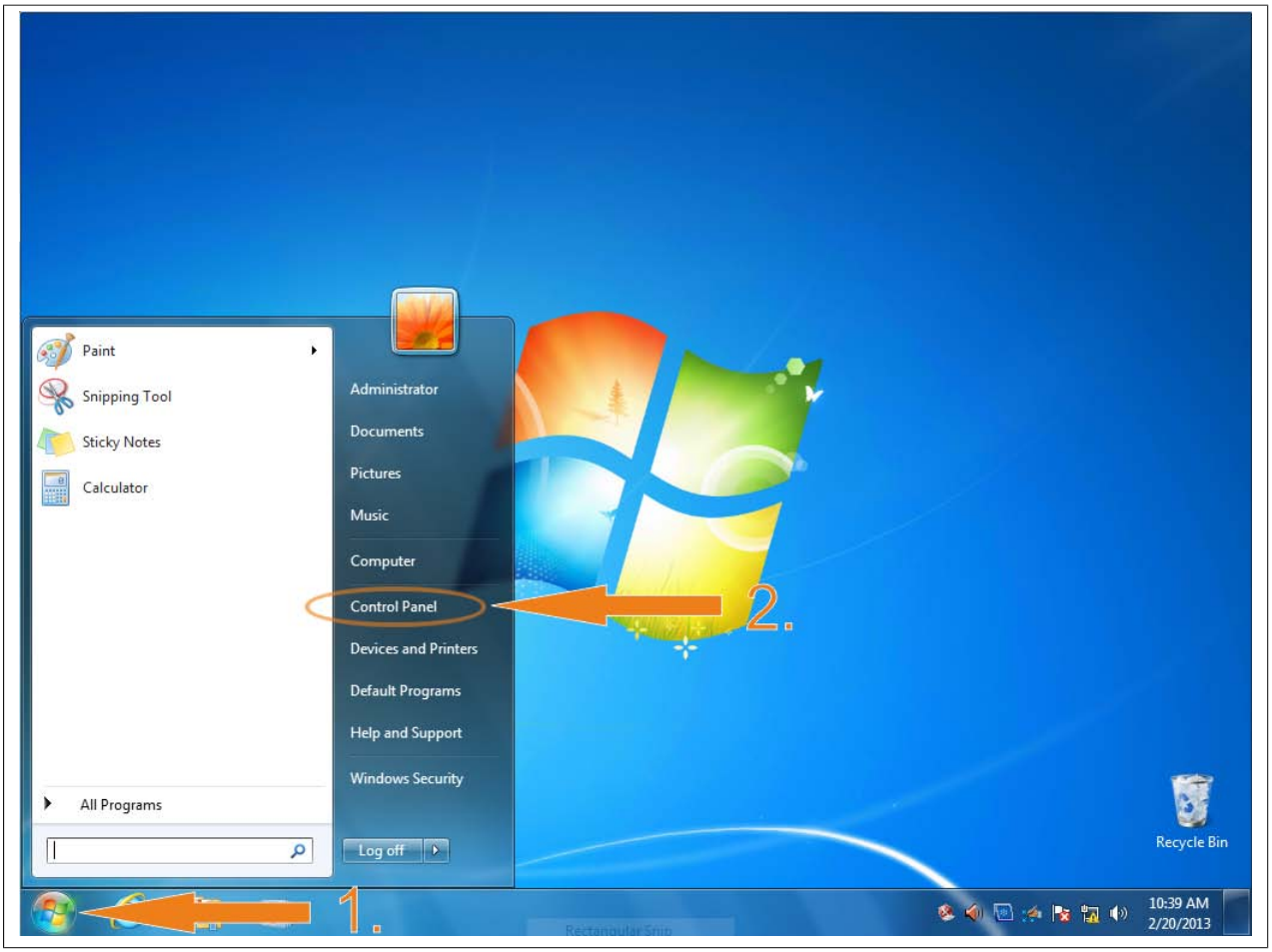


Figure 33: Opening the Control Panel

2. Select the Control Center.

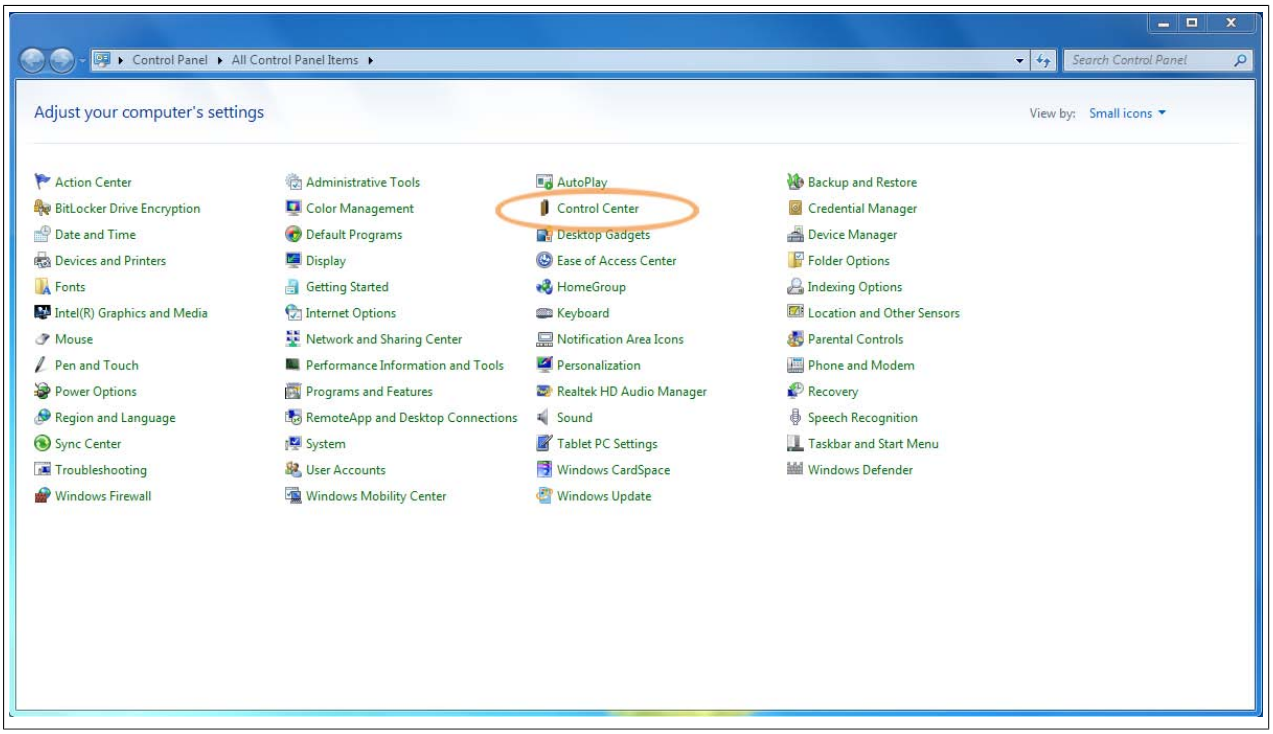


Figure 34: Selecting the Control Center

3. Use the slider to set the brightness of the panel.

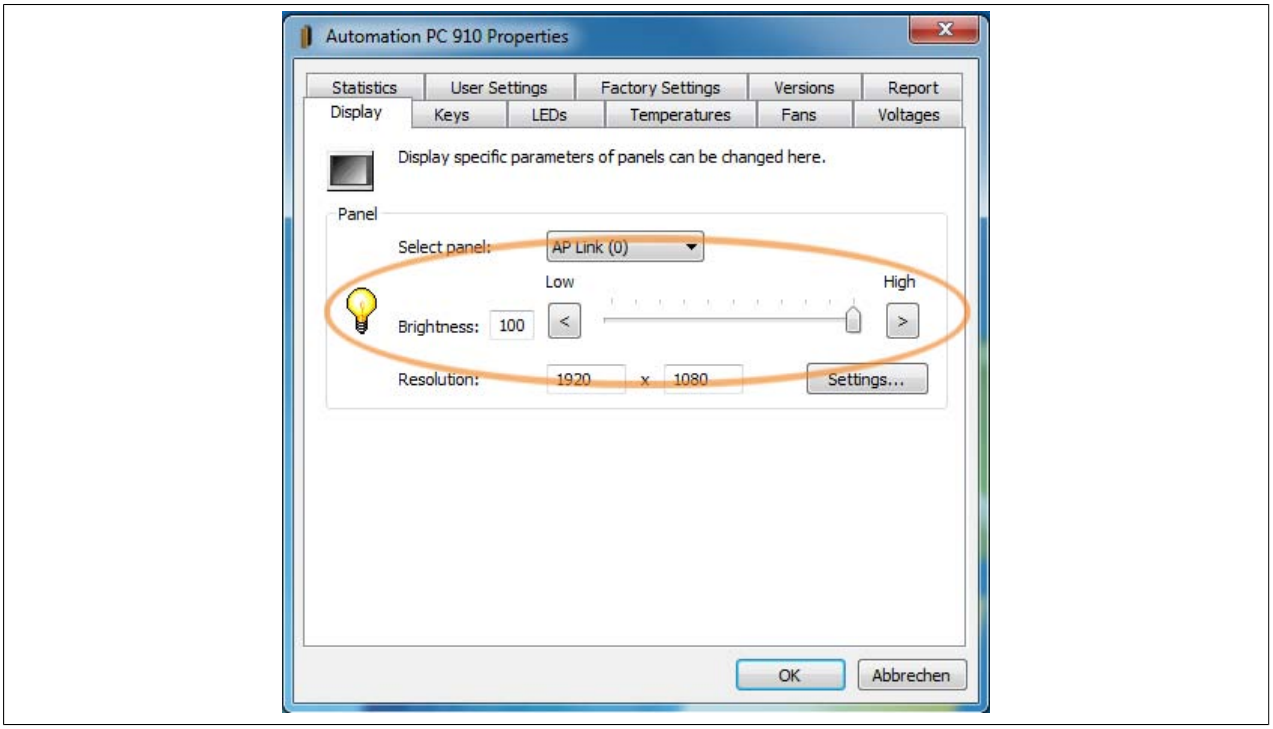


Figure 35: Adjusting the display brightness

3.3.8.2 Adjusting with a DVI connection

1. Remove the interface cover (see Figure 24 "Removing the interface cover" on page 36).
2. Use the two buttons to adjust the brightness.

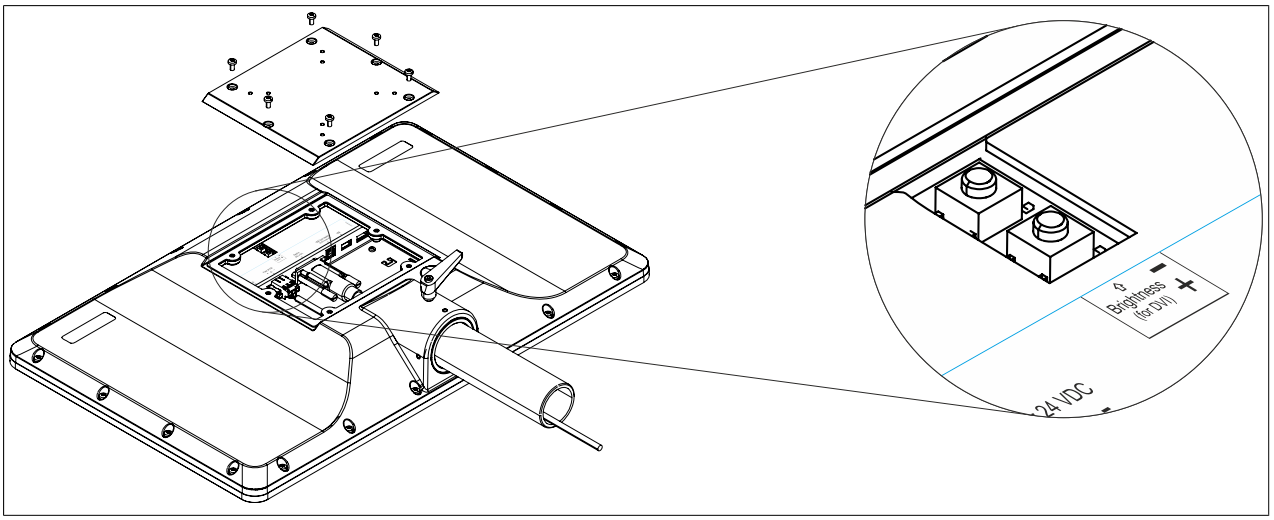


Figure 36: Buttons for adjusting the display brightness

Information:

Hold down one of the buttons for at least three seconds in order to change the brightness.

3. Once the brightness setting is satisfactory, replace the interface cover (see Figure 27 "Replacing the interface cover" on page 37).

4 5AP830.215C-01 (standing mount)

4.1 Revision A5

4.1.1 General information

- 21.5" Full HD color TFT display
- Multi-touch screen (projected capacitive, 4 simultaneous touch contact points)
- Flexible, standing support arm mounting
- Fan-free operation

4.1.2 Order data

Model number	Short description	Figure
	Undefined	
5AP830.215C-01	Automation Panel AP830, 21.5" Full HD color TFT display with multi-touch screen (projective capacitive), 2 USB 2.0 interfaces, IP65 protection (front), 24 VDC, flange mounting on bottom.	
	Required accessories	
	Terminal blocks	
0TB103.9	Connector, 24 VDC, 3-pin female, 3.31 mm² screw clamp, protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange	

Table 14: 5AP830.215C-01 - Order data

4.1.3 Technical data

Product ID	5AP830.215C-01
General information	
LEDs	Power, HDD, Run
B&R ID code	$D701
Certification	
CE	In preparation
Interfaces	
USB	
Quantity	1
Type	USB 2.0 [1]
Design	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Current load	Max. 1 A
Monitor/Panel interface	
Design	Female DVI-I connector
Type	SDL/DVI
Display	
Type	Color TFT
Diagonal	21.5" (545.22 mm)
Colors	16 million
Resolution	Full HD, 1920x1080
Contrast	1000:1
Viewing angles	
Horizontal	Direction R / Direction L = 178°
Vertical	Direction U / Direction D = 178°
Backlight	
Classification	LED
Brightness	250 cd/m²
Half-brightness time [2]	30,000 h
Touch screen [3]	
Type	3M
Technologies	Projected capacitive touch (PCT)
Controller	3M
Transmittance	88% ±2%
Electrical characteristics	
Nominal voltage	24 VDC ±25%
Nominal current	1.7 A

Table 15: 5AP830.215C-01 - Technical data

Product ID	5AP830.215C-01
Starting current	TBD
Power consumption	50 W
Electrical isolation	Yes
Operating conditions	
Protection in accordance with EN 60529	TBD
Environmental conditions	
Temperature	
Operation	TBD
Storage	TBD
Transport	TBD
Relative humidity	
Operation	TBD
Storage	TBD
Transport	TBD
Vibration	
Operation (continuous)	TBD
Operation (occasional)	TBD
Storage	TBD
Transport	TBD
Shock	
Operation	TBD
Storage	TBD
Transport	TBD
Altitude	
Operation	TBD
Mechanical characteristics	
Housing	
Material	Cast-aluminum alloy
Paint	Similar to silver metallic (semi-matt)
Front [4]	
Frame	TBD
Design	RAL 9005
Gasket	TBD
Flange output	Bottom
Dimensions	
Width	557.5 mm
Height	350 mm
Depth	90.2 mm
Weight	TBD

Table 15: 5AP830.215C-01 - Technical data

1) USB 2.0 is only possible with a DVI connection. If an SDL cable is connected, only USB 1.1 is available.
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) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
4) There may be visible deviations in the color and surface appearance depending on the process or batch.

4.1.4 Dimensions

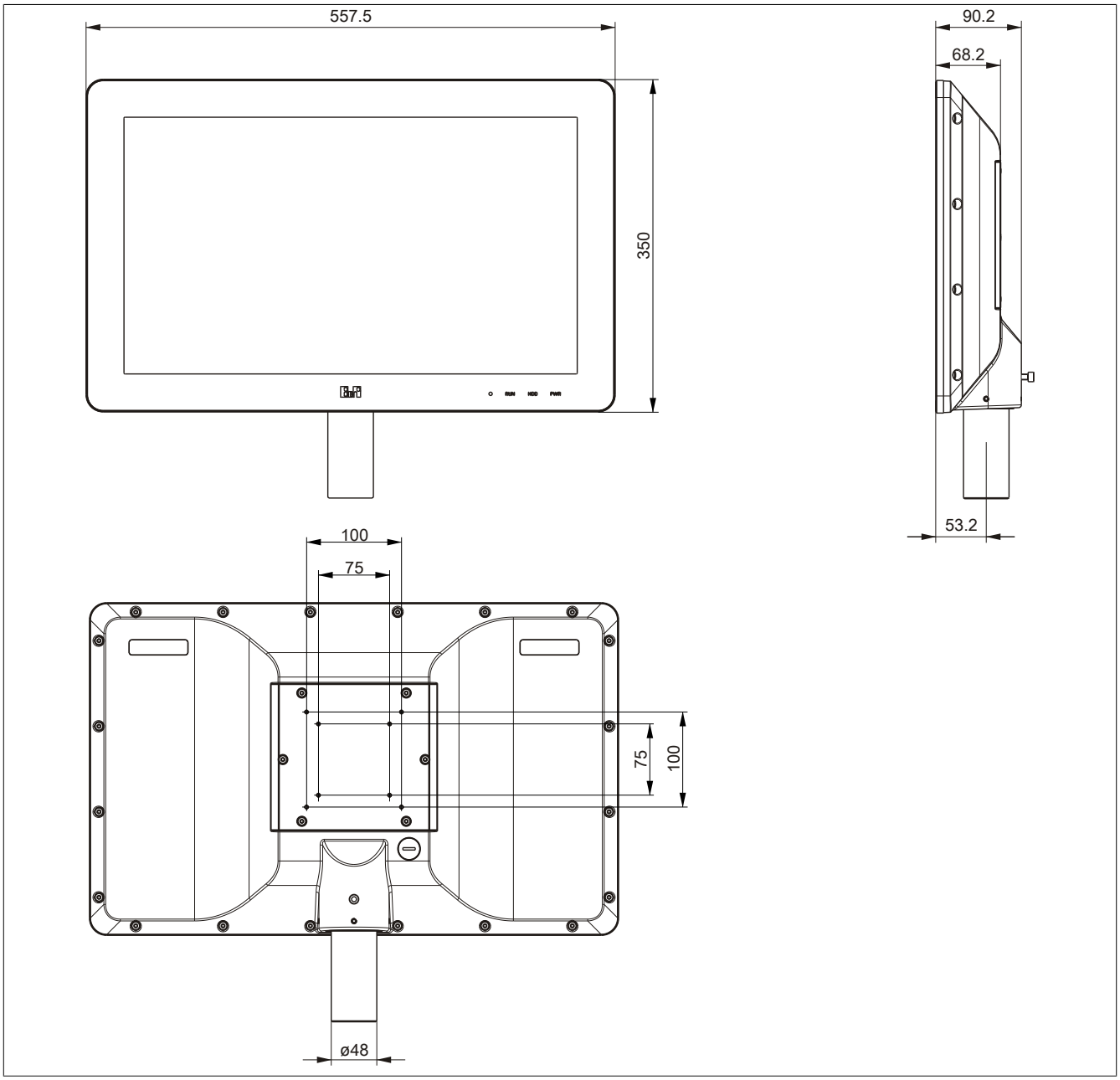


Figure 37: 5AP830.215C-01 - Dimensions

4.1.5 Contents of delivery

Quantity	Description
1 pcs.	Automation Panel 830 (5AP830.215C-01) with integrated flange (standing)
2 pcs.	Rings for mounting on a support arm shaft
3 pcs.	M4 headless screws for mounting the rings
3 pcs.	M6 headless screws for mounting the Automation Panel 830 on a support arm system
1 pcs.	M6 locking lever for setting the angle of rotation
1 pcs.	Sealing ring
4 pcs.	M4 screws for mounting the interface cover

Table 16: 5AP830.215C-01 - Contents of delivery

The 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp) power supply connector must be ordered separately. SDL, DVI and USB cables[10)] are not included in delivery.

[10)] A USB cable is only required if the panel is connected via DVI cable.

4.1.6 Installation

4.1.6.1 Important installation information

- Environmental conditions must be taken into consideration.
- This device must be mounted to a flat surface.
- This device is only certified for operation in closed rooms.
- This device must not be subjected to direct sunlight.
- Ventilation holes must not be covered.
- This device must be mounted in one of the approved orientations.
- The wall or control cabinet must be able to withstand four times the total weight of the device.
- The flex radius of connected cables (DVI, SDL, USB, etc.) must not be exceeded.

4.1.6.2 Mounting on a support arm system

Information:

In addition to mounting with the integrated flange, the back of the Automation Panel 830 provides an option for mounting in accordance with the VESA 75/100 standard. The flange attached to the AP830 must be fastened using 4 or 8 M4 screws (1.3 Nm fastening torque).

If the Automation Panel 830 is not mounted using the integrated flange, however, then the cable must be routed externally.

Information:

Before mounting the Automation Panel 830 to the support arm system, ensure that the sealing ring is installed on the flange of the AP830.

The support arm shaft must have a diameter of 48 mm. The end of the support arm shaft that connects with the flange must be chamfered at a 45° angle and deburred.

1. Insert the sealing ring into Ring 2 before sliding the two rings onto the support arm shaft. Then fasten the two rings to the support arm shaft using 3x M4 headless screws (hex key, size 2) with a fastening torque of 1.5 Nm. Make sure that Ring 1 (with the tappet) is on the side that gets inserted into the flange. The distance from the bottom edge of the support arm shaft and the bottom edge of the ring must be 21.5 mm ±0.5 mm (bottom edge of support arm shaft to ring tappet = 19 mm ±0.5 mm). There must be no space between the two rings.

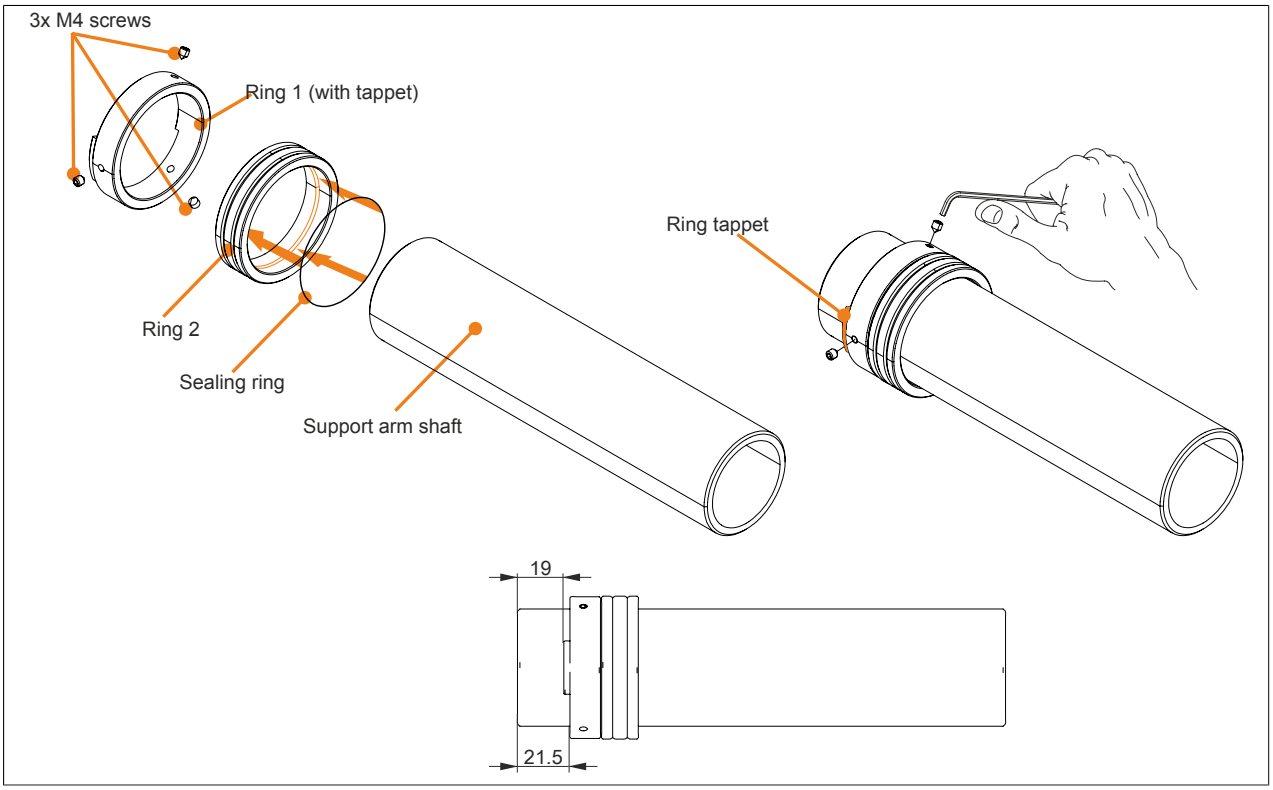


Figure 38: Mounting the rings to the support arm shaft

2. Feed the required cables (SDL or DVI cable, power supply cable[11], USB cable[12]) through the support arm shaft. The types of cables that can or must be used depends on the type of connection (SDL or DVI) used for the Automation Panel 830 (see "Mounting for SDL operation" on page 33 and "Mounting for DVI / USB (Type B) operation" on page 36).

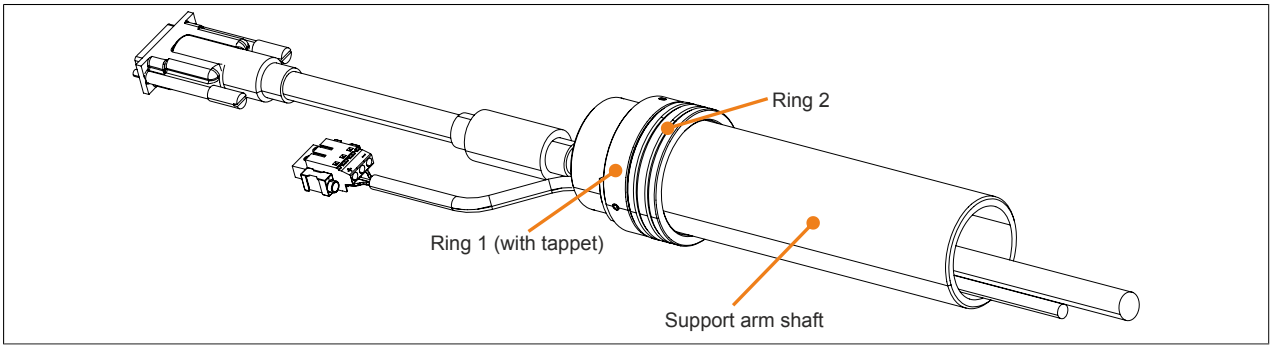


Figure 39: Feeding a cable through the support arm shaft

[11] The 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp) power supply connector must be ordered separately.
[12] A USB cable is only required if the panel is connected via DVI cable.

3. Connect the Automation Panel 830 to the support arm system. The tappet on the lower ring must fit perfectly into the filed part of the flange. The Automation Panel 830 has been correctly mounted if the upper ring forms a smooth surface with the flange. Fasten to the support arm shaft using the 3 M6 headless screws (hex key, size 3) with a fastening torque of 5 Nm.

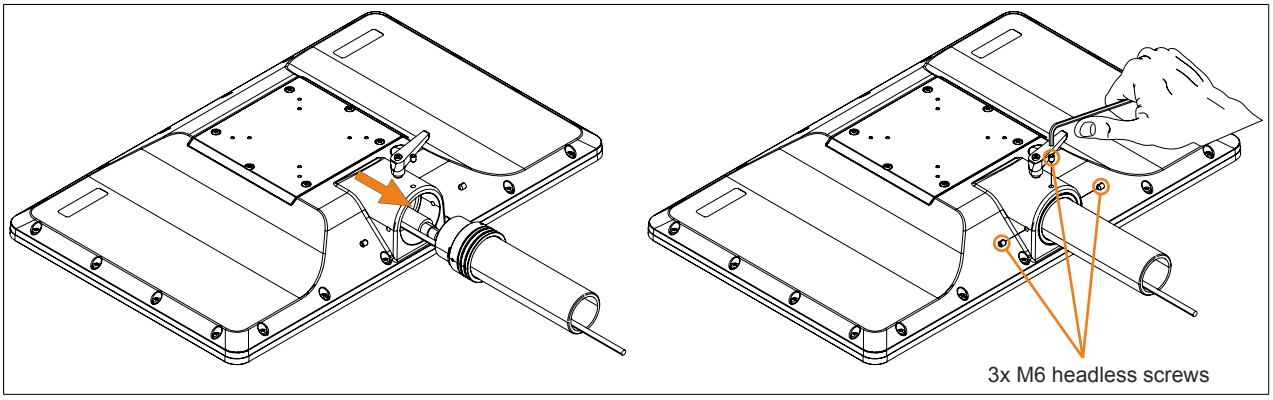


Figure 40: Mounting the Automation Panel 830

4.1.6.3 Mounting orientation

An Automation Panel 830 must be mounted as described in the following sections.

The set screw can be used to set the rotation angle of the Automation Panel 830 between +45° and -45°.

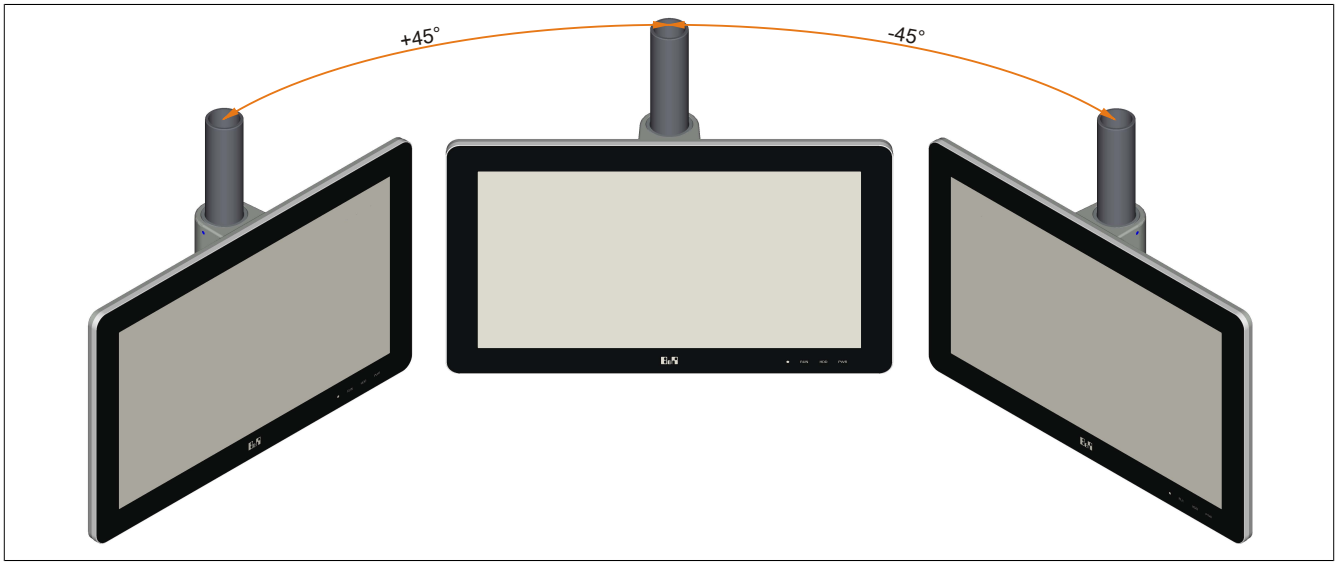


Figure 41: Mounting orientation / Angle of rotation

4.1.6.3.1 Vertical mounting orientation

A vertical or horizontal mounting angle is not permitted with the Automation Panel 830.

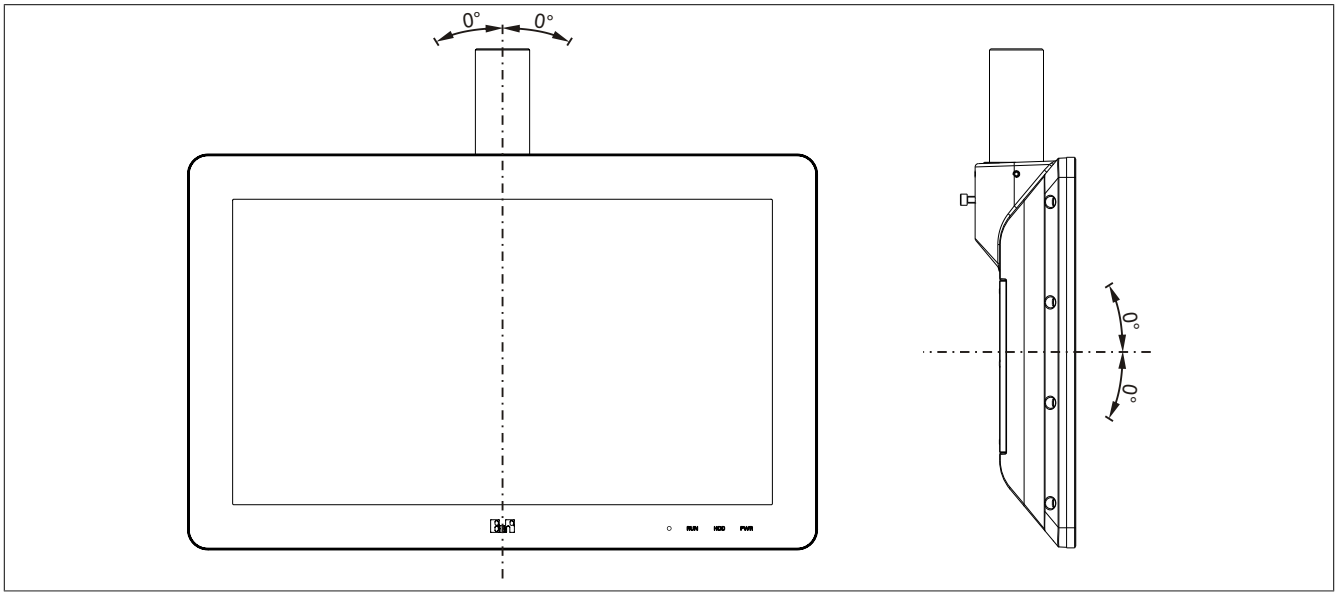


Figure 42: Vertical mounting orientation

4.1.7 Installing the DC mains cable

Danger!

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

4.1.7.1 Wiring

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

Installing the 0TB103.9 screw clamp terminal block

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

It is important to pay attention to the pin assignments of the power supply connector on the device!

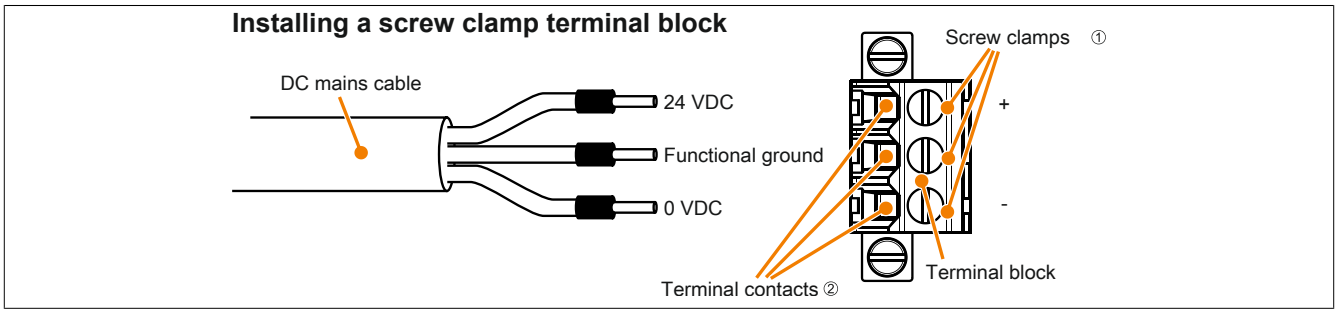


Figure 43: Installing a screw clamp terminal block

Installing the 0TB103.91 cage clamp terminal block

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

It is important to pay attention to the pin assignments of the power supply connector on the device!

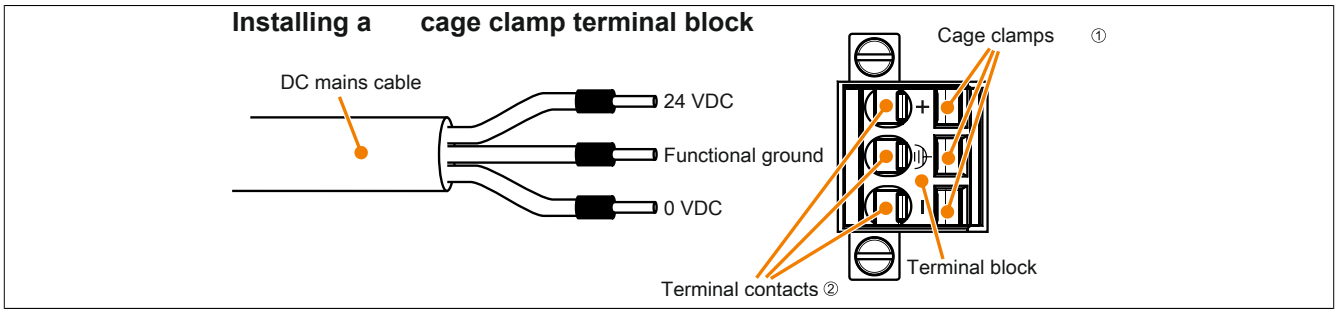


Figure 44: Installing a cage clamp terminal block

4.2 Revision ≥ B0

4.2.1 General information

- 21.5" Full HD color TFT display
- Multi-touch screen (projected capacitive, 4 simultaneous touch contact points)
- Flexible, standing support arm mounting
- Fan-free operation

4.2.2 Order data

Model number	Short description	Figure
	Undefined	
5AP830.215C-01	Automation Panel AP830, 21.5" Full HD color TFT display with multi-touch screen (projective capacitive), 2 USB 2.0 interfaces, IP65 protection (front), 24 VDC, flange mounting on bottom.	
	Required accessories	
	Terminal blocks	
0TB103.9	Connector, 24 VDC, 3-pin female, 3.31 mm² screw clamp, protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange	

Table 17: 5AP830.215C-01 - Order data

4.2.3 Technical data

Product ID	5AP830.215C-01
General information	
LEDs	Power, HDD, Run
B&R ID code	$D701
Certification	
CE	In preparation
Interfaces	
USB	
Quantity	1 internal & 1 external (service interface)
Type	USB 2.0 [1]
Design	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Current load	Max. 1 A
Monitor/Panel interface	
Design	Female DVI-I connector
Type	SDL/DVI
Display	
Type	Color TFT
Diagonal	21.5" (545.22 mm)
Colors	16 million
Resolution	Full HD, 1920x1080
Contrast	1000:1
Viewing angles	
Horizontal	Direction R / Direction L = 178°
Vertical	Direction U / Direction D = 178°
Backlight	
Classification	LED
Brightness	250 cd/m²
Half-brightness time [2]	30,000 h
Touch screen [3]	
Type	DMC
Technologies	Projected capacitive touch (PCT)
Controller	EETI (EXC7200)
Transmittance	91% (typical value at full wavelength)
Electrical characteristics	
Nominal voltage	24 VDC ±25%
Nominal current	1.7 A
Starting current	TBD
Power consumption	50 W
Electrical isolation	Yes

Table 18: 5AP830.215C-01 - Technical data

Product ID	5AP830.215C-01
Operating conditions	
Protection in accordance with EN 60529	IP65 [4]
Environmental conditions	
Temperature	
Operation	Standing (0°): 45°C Lying (90°): 35°C
Storage	TBD
Transport	TBD
Relative humidity	
Operation	TBD
Storage	TBD
Transport	TBD
Vibration	
Operation (continuous)	TBD
Operation (occasional)	TBD
Storage	TBD
Transport	TBD
Shock	
Operation	TBD
Storage	TBD
Transport	TBD
Altitude	
Operation	TBD
Mechanical characteristics	
Housing	
Material	Cast-aluminum alloy
Paint	Similar to silver metallic (semi-matt)
Front [5]	
Frame	Anodized aluminum
Design	RAL 9005
Gasket	Duplocoll
Flange output	Bottom
Dimensions	
Width	557.5 mm
Height	350 mm
Depth	90.2 mm
Weight	Approx. 10 kg

Table 18: 5AP830.215C-01 - Technical data

1) USB 2.0 is only possible with a DVI connection. If an SDL cable is connected, only USB 1.1 is available.
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) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
4) Only with flange mounting
5) There may be visible deviations in the color and surface appearance depending on the process or batch.

4.2.4 Dimensions

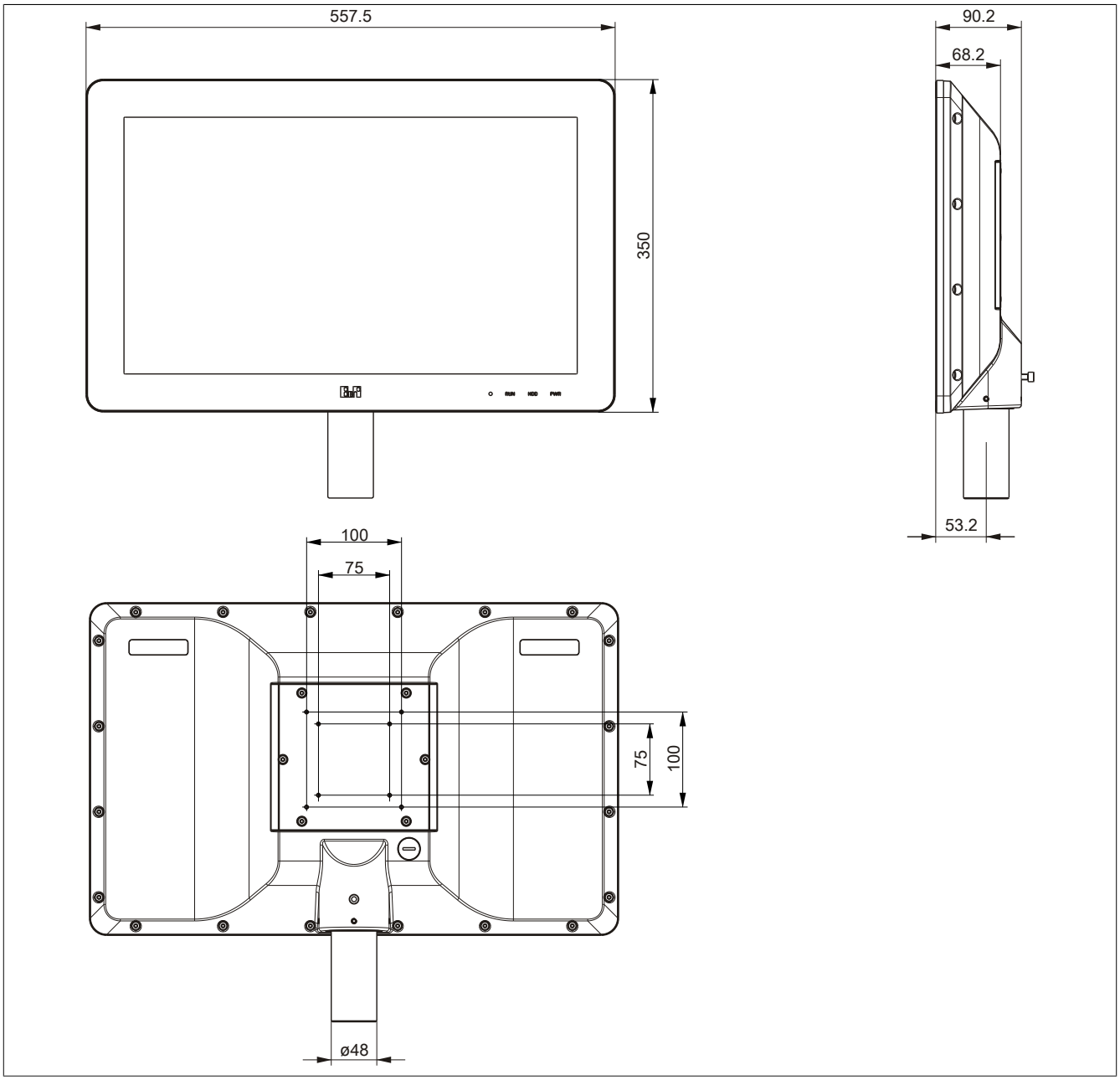


Figure 45: 5AP830.215C-01 - Dimensions

4.2.5 Contents of delivery

Quantity	Description
1 pcs.	Automation Panel 830 (5AP830.215C-01) with integrated flange (standing)
2 pcs.	Rings for mounting on a support arm shaft
3 pcs.	M4 headless screws for mounting the rings
3 pcs.	M6 headless screws for mounting the Automation Panel 830 on a support arm system
1 pcs.	M6 locking lever for setting the angle of rotation
1 pcs.	Sealing ring
4 pcs.	M4 screws for mounting the interface cover

Table 19: 5AP830.215C-01 - Contents of delivery

The 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp) power supply connector must be ordered separately. SDL, DVI and USB cables[13)] are not included in delivery.

[13)] A USB cable is only required if the panel is connected via DVI cable.

4.2.6 Installation

4.2.6.1 Important installation information

- Environmental conditions must be taken into consideration.
- This device is only certified for operation in closed rooms.
- This device must not be subjected to direct sunlight.
- This device must be mounted in one of the approved orientations.
- The support arm system must be able to hold four times the total weight of the device.
- The flex radius of connected cables (DVI, SDL, USB, etc.) must not be exceeded.
- This device should be mounted in a position that minimizes glare on the screen.
- This device should be mounted in a position and orientation that make viewing as easy as possible for the operator.

4.2.6.2 Mounting on a support arm system

Information:

In addition to mounting with the integrated flange, the back of the Automation Panel 830 provides an option for mounting in accordance with the VESA 75/100 standard. The flange attached to the AP830 must be fastened using 4 or 8 M4 screws (1.3 Nm fastening torque).

If the Automation Panel 830 is not mounted using the integrated flange, however, then the cable must be routed externally.

Information:

Before mounting the Automation Panel 830 to the support arm system, ensure that the sealing ring is installed on the flange of the AP830.

The support arm shaft must have a diameter of 48 mm. The end of the support arm shaft that connects with the flange must be chamfered at a 45° angle and deburred.

1. Insert the sealing ring into Ring 2 before sliding the two rings onto the support arm shaft. Then fasten the two rings to the support arm shaft using 3x M4 headless screws (hex key, size 2) with a fastening torque of 1.5 Nm. Make sure that Ring 1 (with the tappet) is on the side that gets inserted into the flange. The distance from the bottom edge of the support arm shaft and the bottom edge of the ring must be 21.5 mm ±0.5 mm (bottom edge of support arm shaft to ring tappet = 19 mm ±0.5 mm). There must be no space between the two rings.

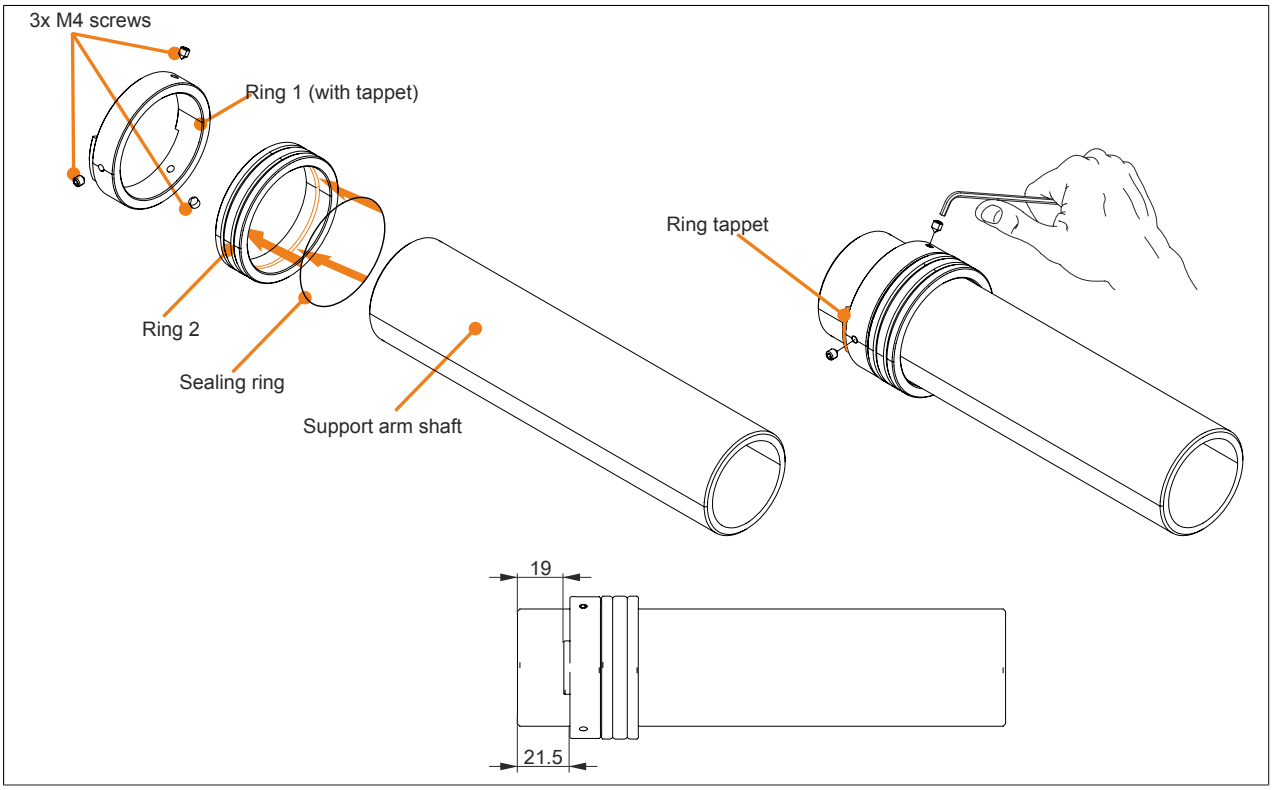


Figure 46: Mounting the rings to the support arm shaft

2. Feed the required cables (SDL or DVI cable, power supply cable[14], USB cable[15]) through the support arm shaft. The types of cables that can or must be used depends on the type of connection (SDL or DVI) used for the Automation Panel 830 (see "Mounting for SDL operation" on page 33 and "Mounting for DVI / USB (Type B) operation" on page 36).

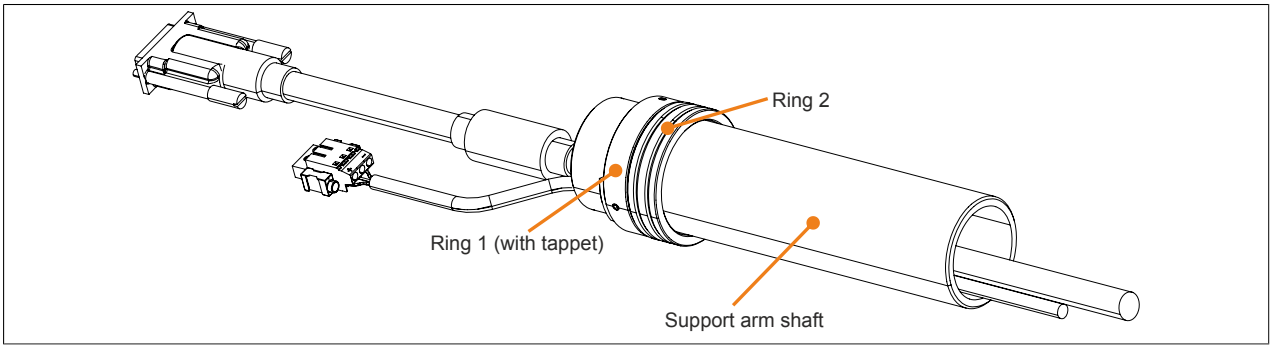


Figure 47: Feeding a cable through the support arm shaft

[14] The 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp) power supply connector must be ordered separately.
[15] A USB cable is only required if the panel is connected via DVI cable.

3. Connect the Automation Panel 830 to the support arm system. The tappet on the lower ring must fit perfectly into the filed part of the flange. The Automation Panel 830 has been correctly mounted if the upper ring forms a smooth surface with the flange. Fasten to the support arm shaft using the 3 M6 headless screws (hex key, size 3) with a fastening torque of 5 Nm.

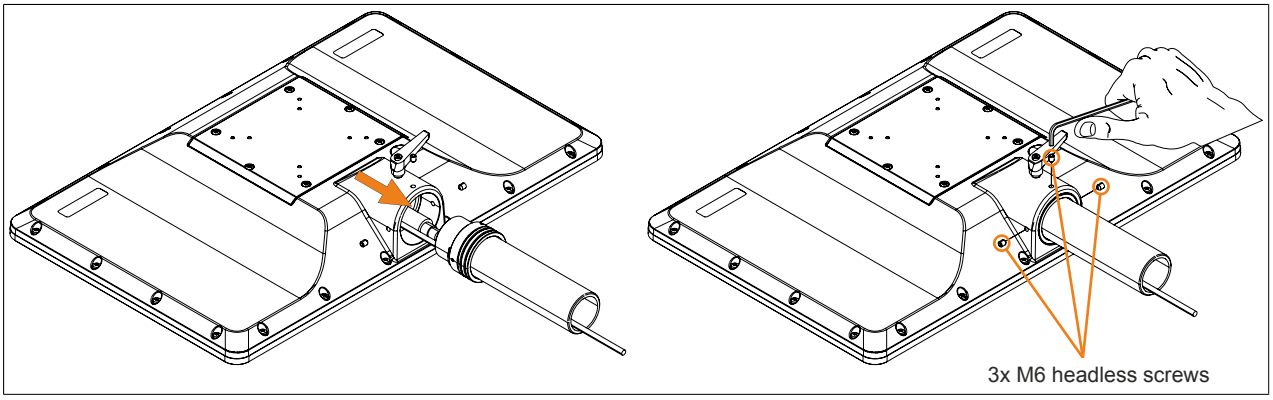


Figure 48: Mounting the Automation Panel 830

4.2.6.3 Mounting for SDL operation

The Automation Panel 830 can be connected to a B&R Industrial PC using an SDL cable. The SDL cable transfers all of the data necessary to operate the touch screen and USB ports, eliminating the need for other cables.

4.2.6.3.1 Connection

1. Remove the interface cover from the Automation Panel 830 by removing the 6 Torx screws (T20).

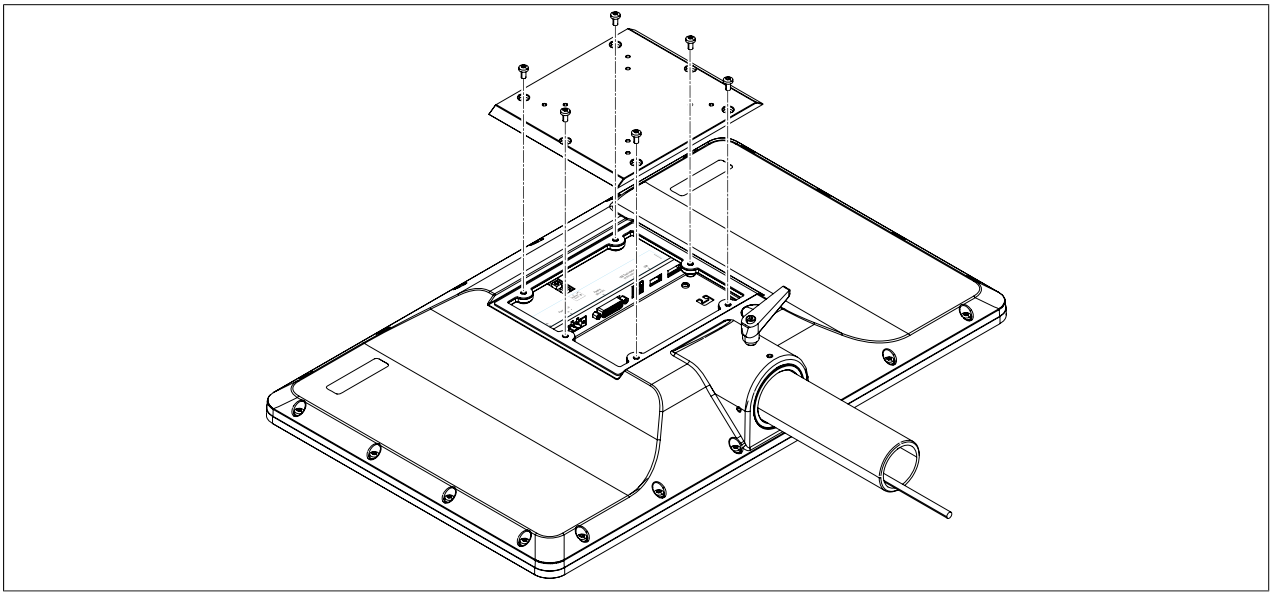


Figure 49: Removing the interface cover

2. Feed the necessary cables (supply voltage, SDL) through the support arm, connect them to the interfaces and secure them with the fastening screws.

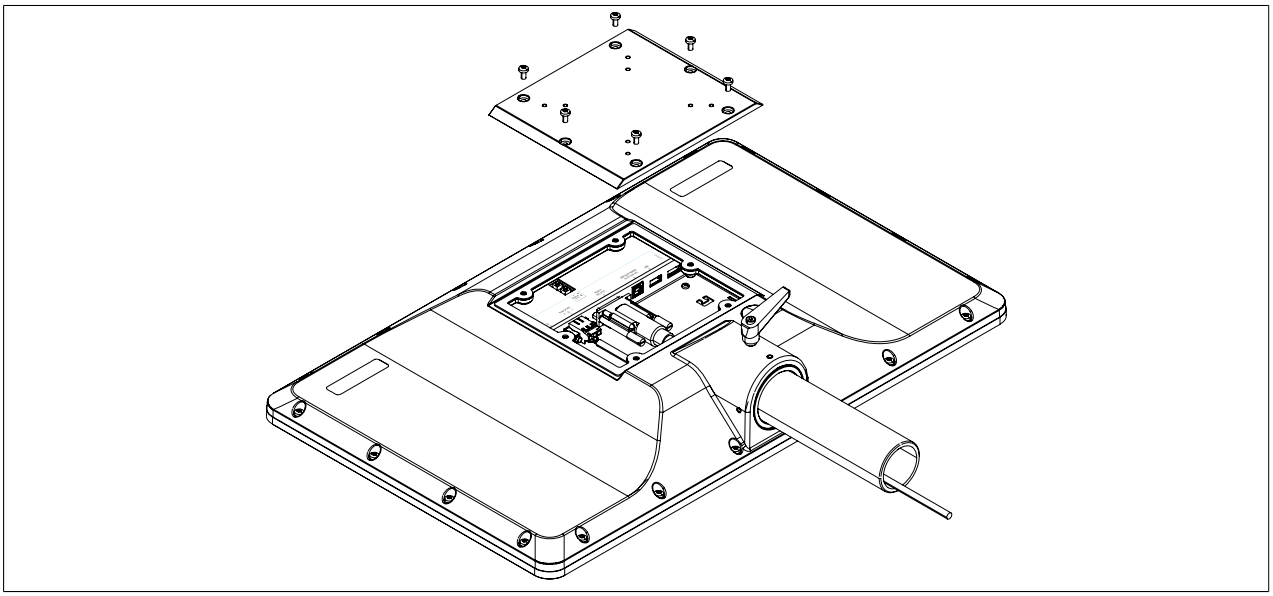


Figure 50: Connecting the cables

3. Connect the functional ground for the AP830. The largest possible conductor cross section should be used (at least 2.5 mm²). The ground cable should be connected to the central grounding point in the control cabinet via the shortest possible route.

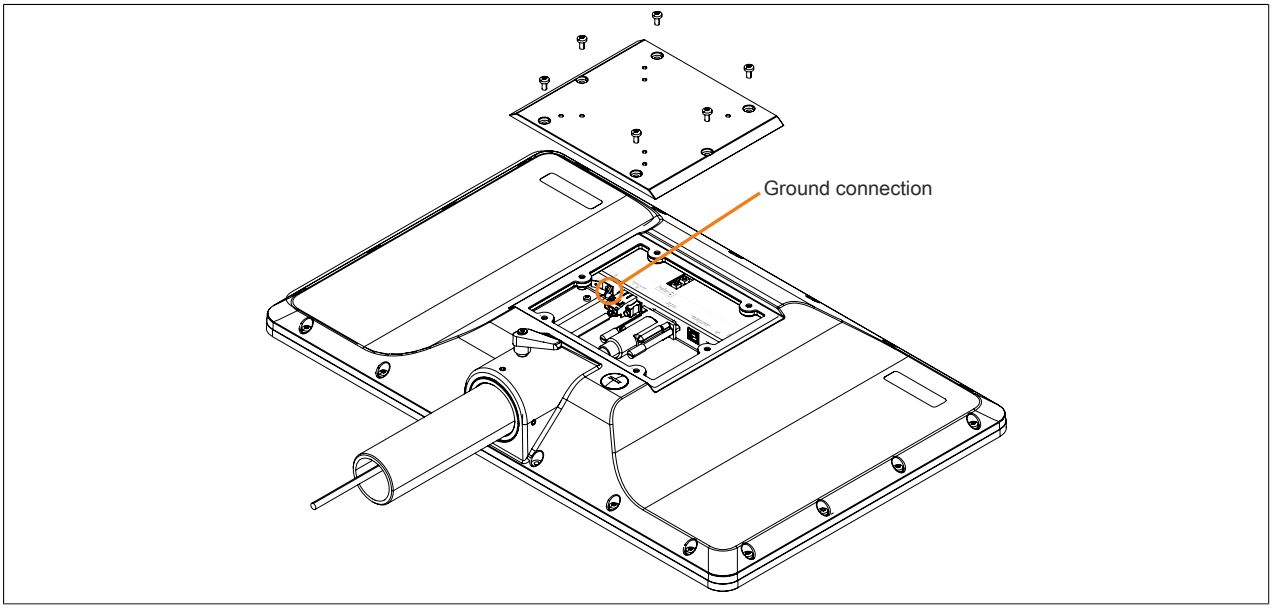


Figure 51: Connecting the ground cable

4. Replace the interface cover on the Automation Panel 830 using the 6 Torx screws removed earlier (1.3 Nm fastening torque).

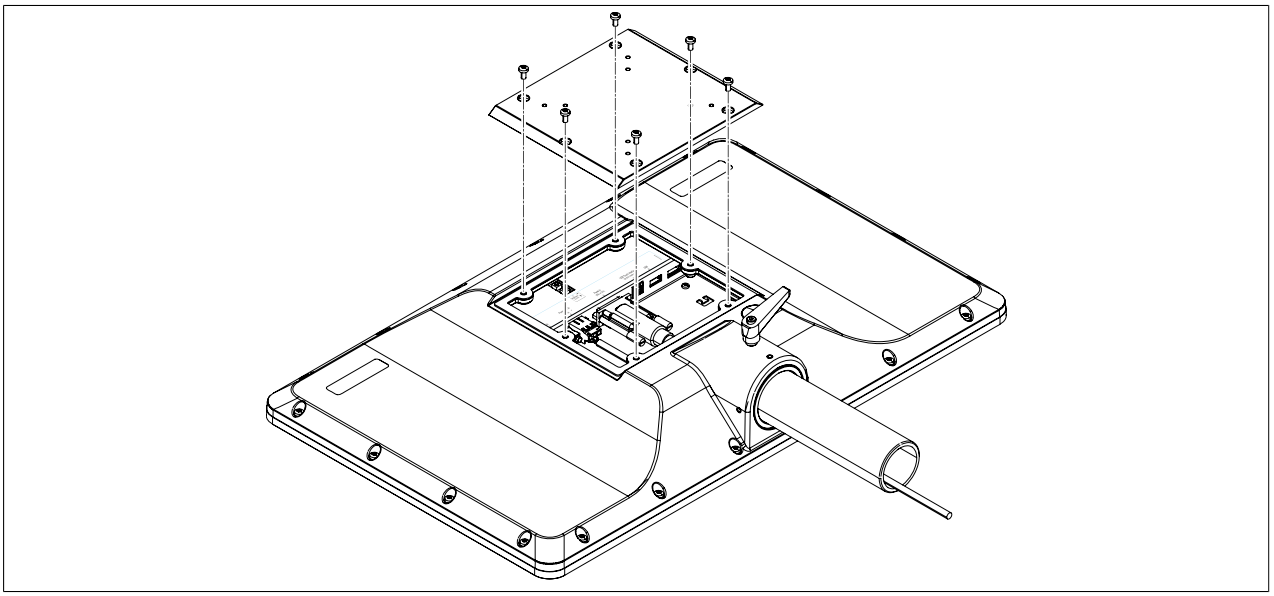


Figure 52: Replacing the interface cover

5. Use the locking lever to set the angle of rotation of the Automation Panel 830 between +45° and -45° (see "Mounting orientation" on page 25).

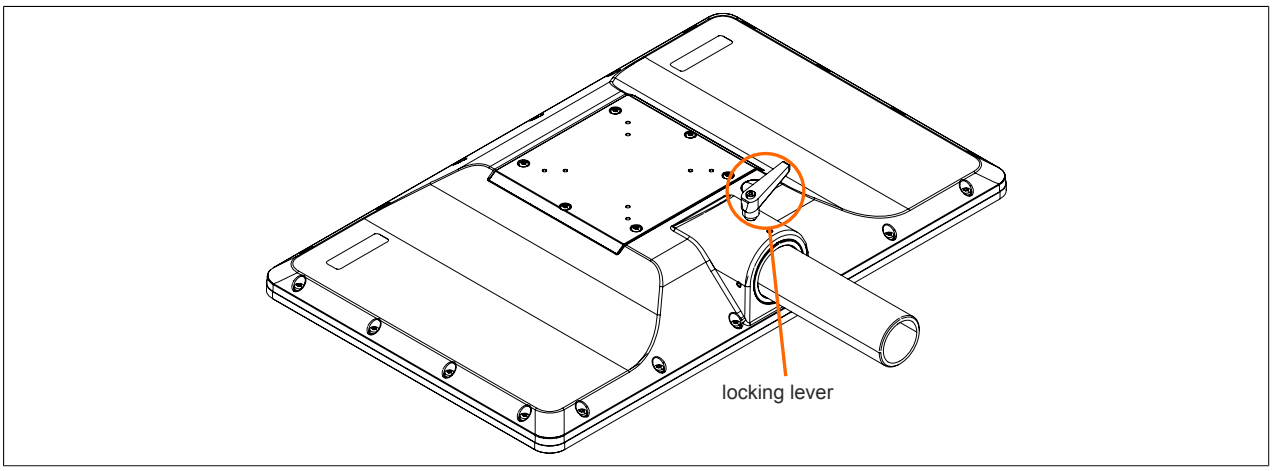


Figure 53: Adjusting the angle of rotation

4.2.6.4 Mounting for DVI / USB (Type B) operation

If the Automation Panel 830 is connected to a PC (e.g. Automation PC, Panel PC, PC from another manufacturer) via DVI cable, then an additional USB (Type B) cable is also required in order to operate the touch screen and USB ports.

4.2.6.4.1 Connection

1. Remove the interface cover from the Automation Panel 830 by removing the 6 Torx screws (T20).

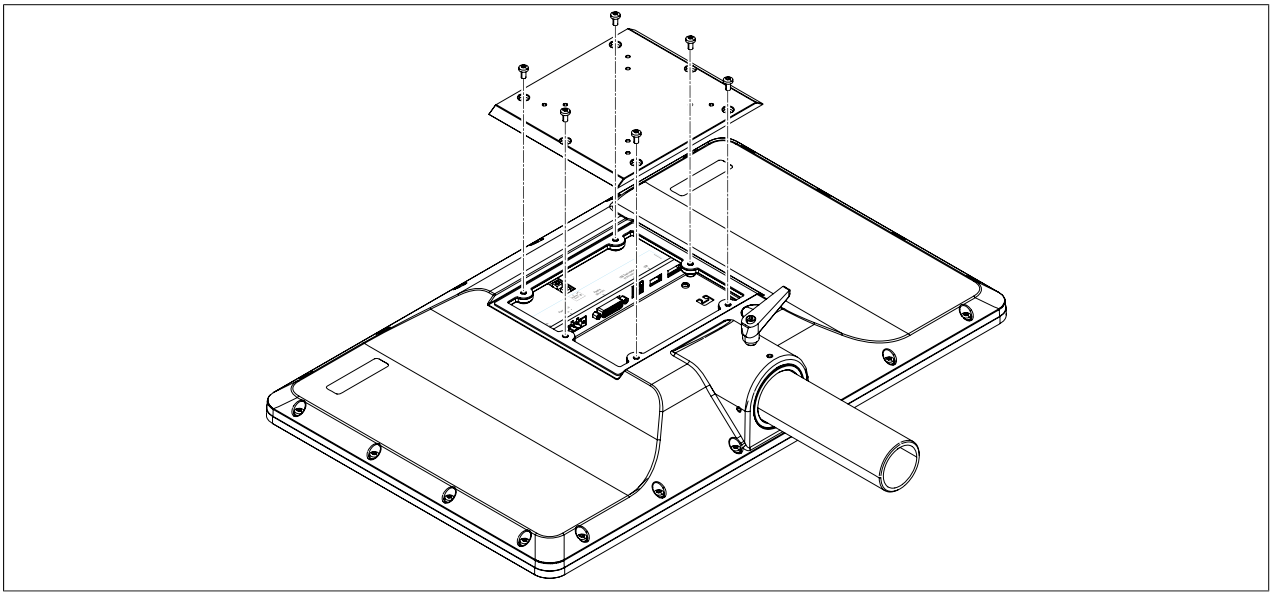


Figure 54: Removing the interface cover

2. Feed the necessary cables (supply voltage, DVI **and** USB) through the support arm, plug them into the interfaces and secure them with the fastening screws.

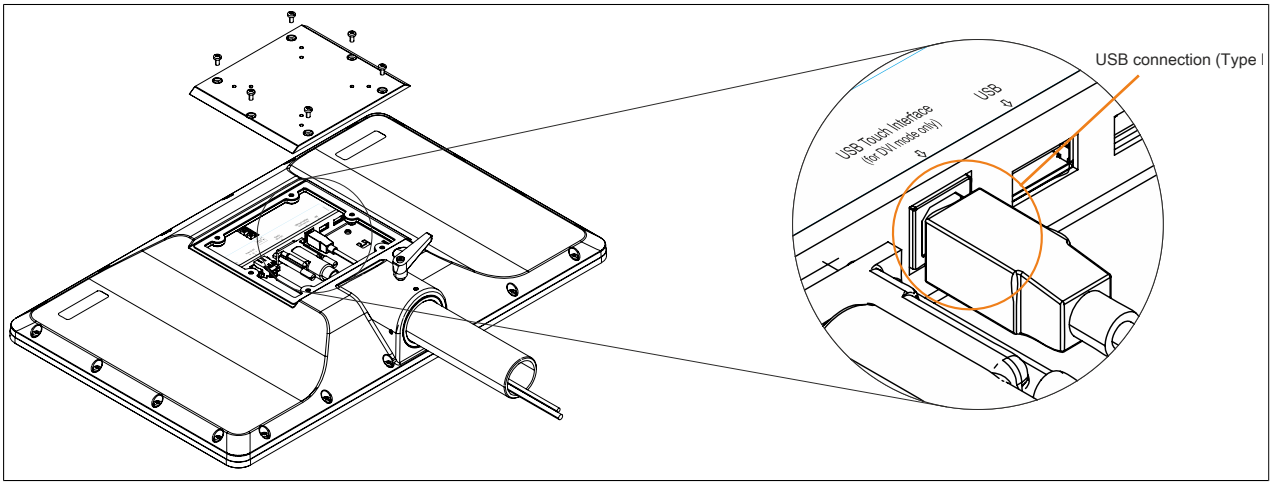


Figure 55: Connecting the cables

3. Connect the functional ground for the AP830. The largest possible conductor cross section should be used (at least 2.5 mm²). The ground cable should be connected to the central grounding point in the control cabinet via the shortest possible route.

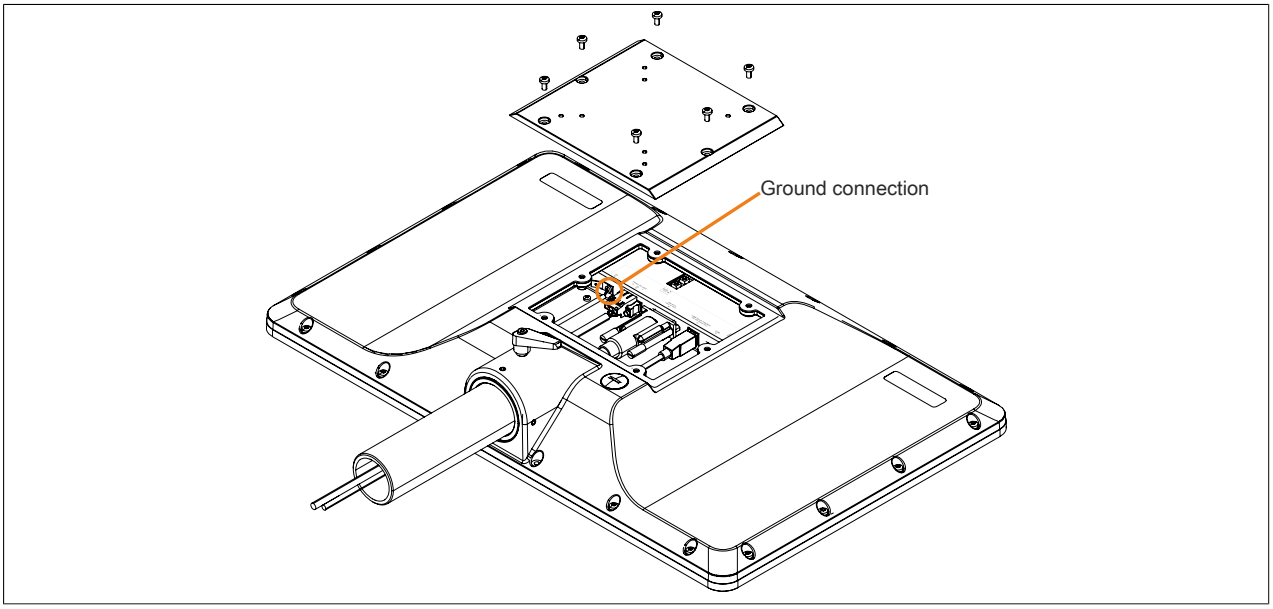


Figure 56: Connecting the ground cable

4. Replace the interface cover on the Automation Panel 830 using the 6 Torx screws removed earlier (1.3 Nm fastening torque).

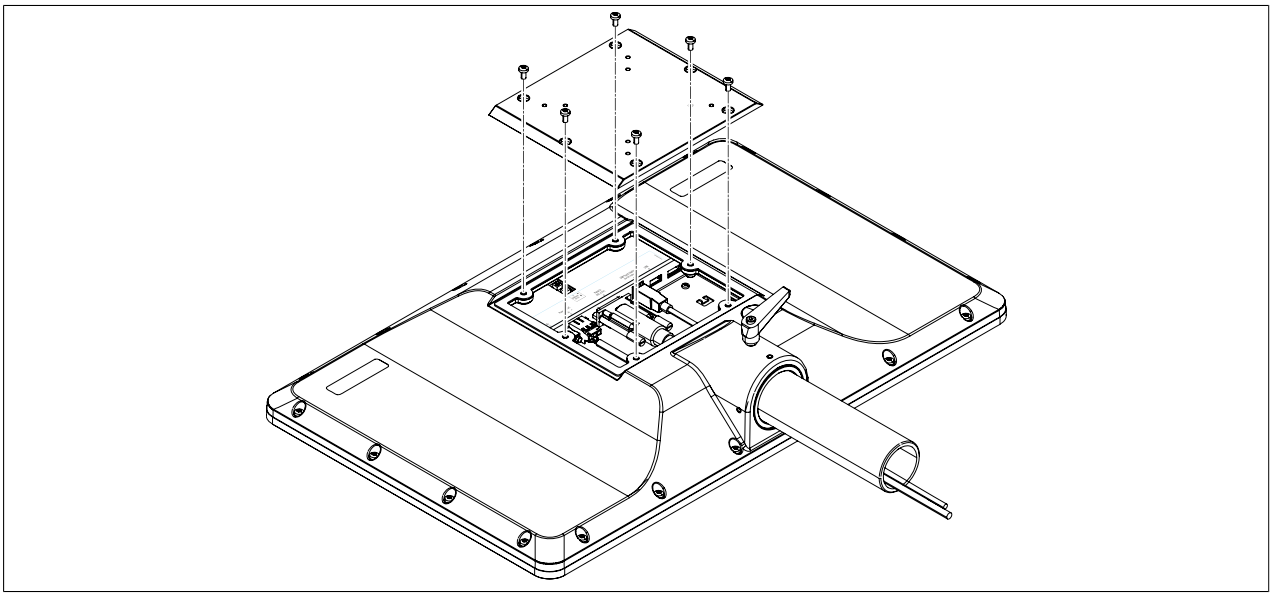


Figure 57: Replacing the interface cover

5. Use the locking lever to set the angle of rotation of the Automation Panel 830 between +45° and -45° (see "Mounting orientation" on page 25).

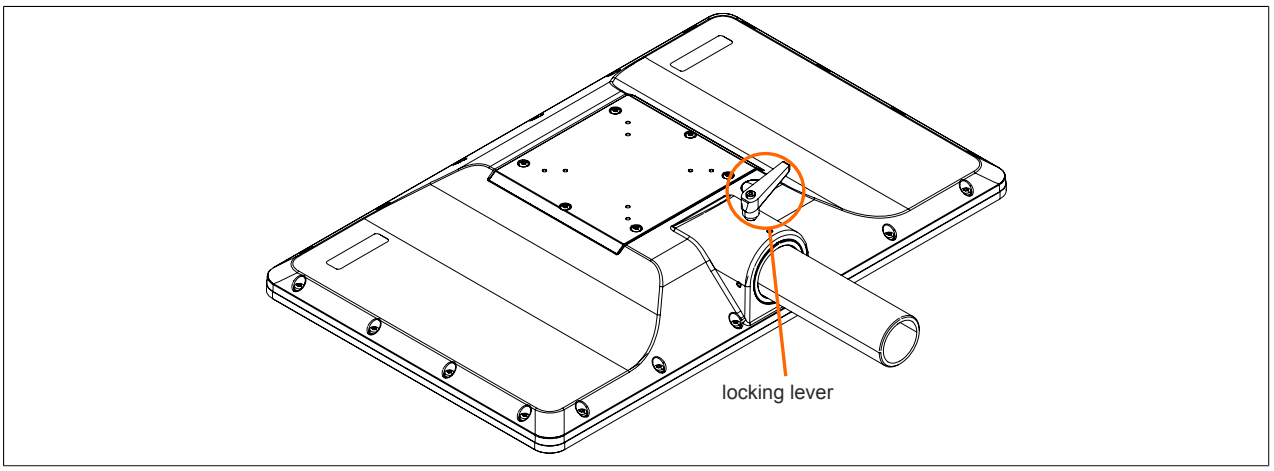


Figure 58: Adjusting the angle of rotation

4.2.6.5 Mounting orientation

The following diagrams show the approved mounting orientations for the Automation Panel 830. The AP830 display unit must be mounted as described and illustrated in the following sections.

Use the set lever on the flange to set the rotation angle of the Automation Panel 830 between +45° and -45°.

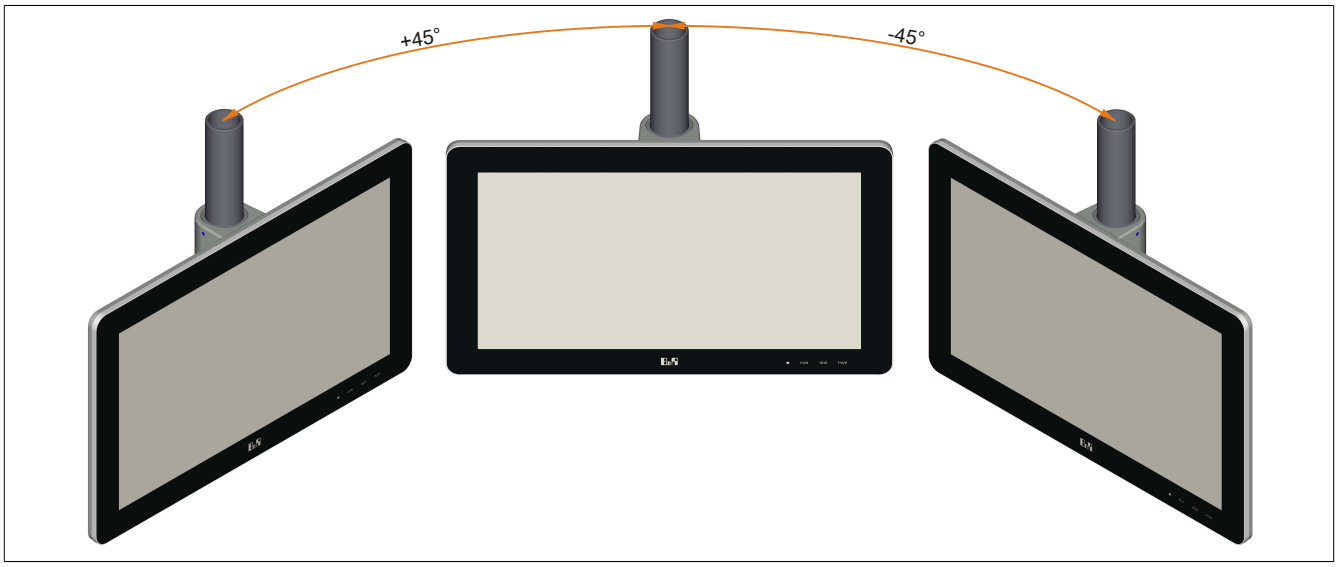


Figure 59: Mounting orientation / Angle of rotation

4.2.6.5.1 Vertical/Horizontal mounting orientation

A vertical or horizontal mounting angle is not permitted with the Automation Panel 830.

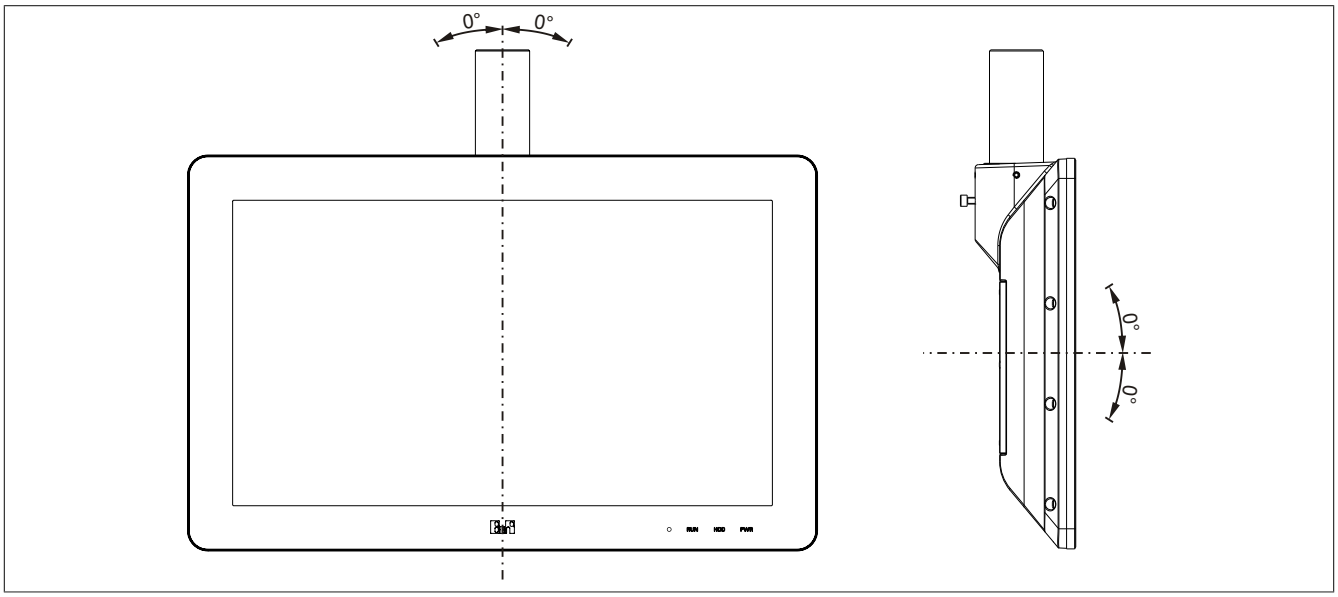


Figure 60: Vertical/Horizontal mounting orientation

4.2.7 Installing the DC mains cable

Danger!

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

4.2.7.1 Wiring

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

Installing the 0TB103.9 screw clamp terminal block

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

It is important to pay attention to the pin assignments of the power supply connector on the device!

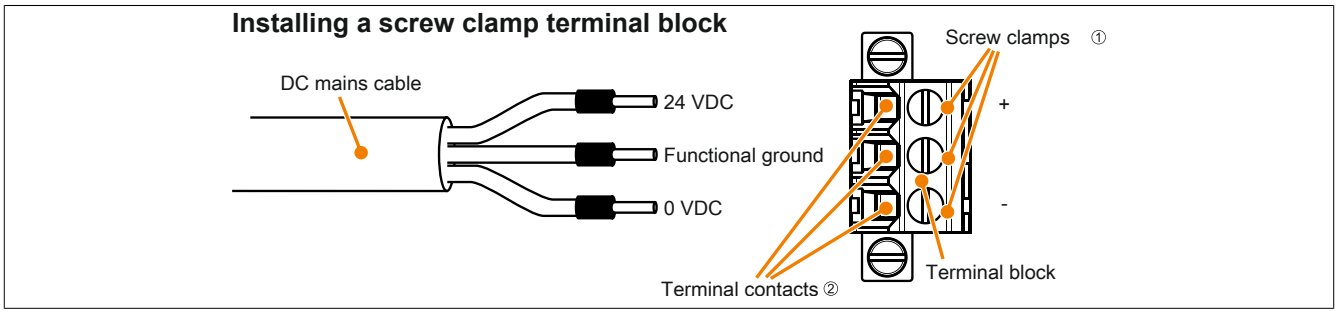


Figure 61: Installing a screw clamp terminal block

Installing the 0TB103.91 cage clamp terminal block

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

It is important to pay attention to the pin assignments of the power supply connector on the device!

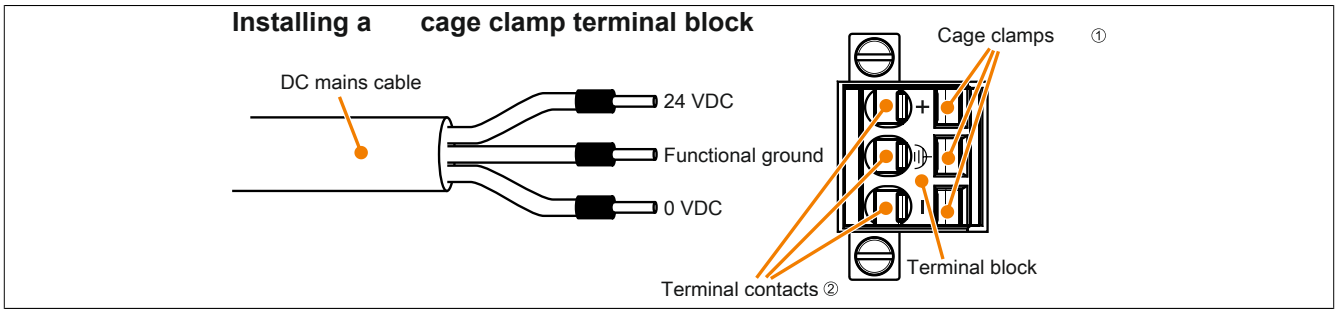


Figure 62: Installing a cage clamp terminal block

4.2.8 Adjusting the display brightness

If the display is connected with an SDL cable, its brightness can be adjusted in the Control Center on the B&R Industrial PC. If connected with a DVI cable, the brightness can only be adjusted using the two buttons located under the interface cover on the back of the Automation Panel 830.

4.2.8.1 Adjusting with an SDL connection

1. Open the Control Panel.

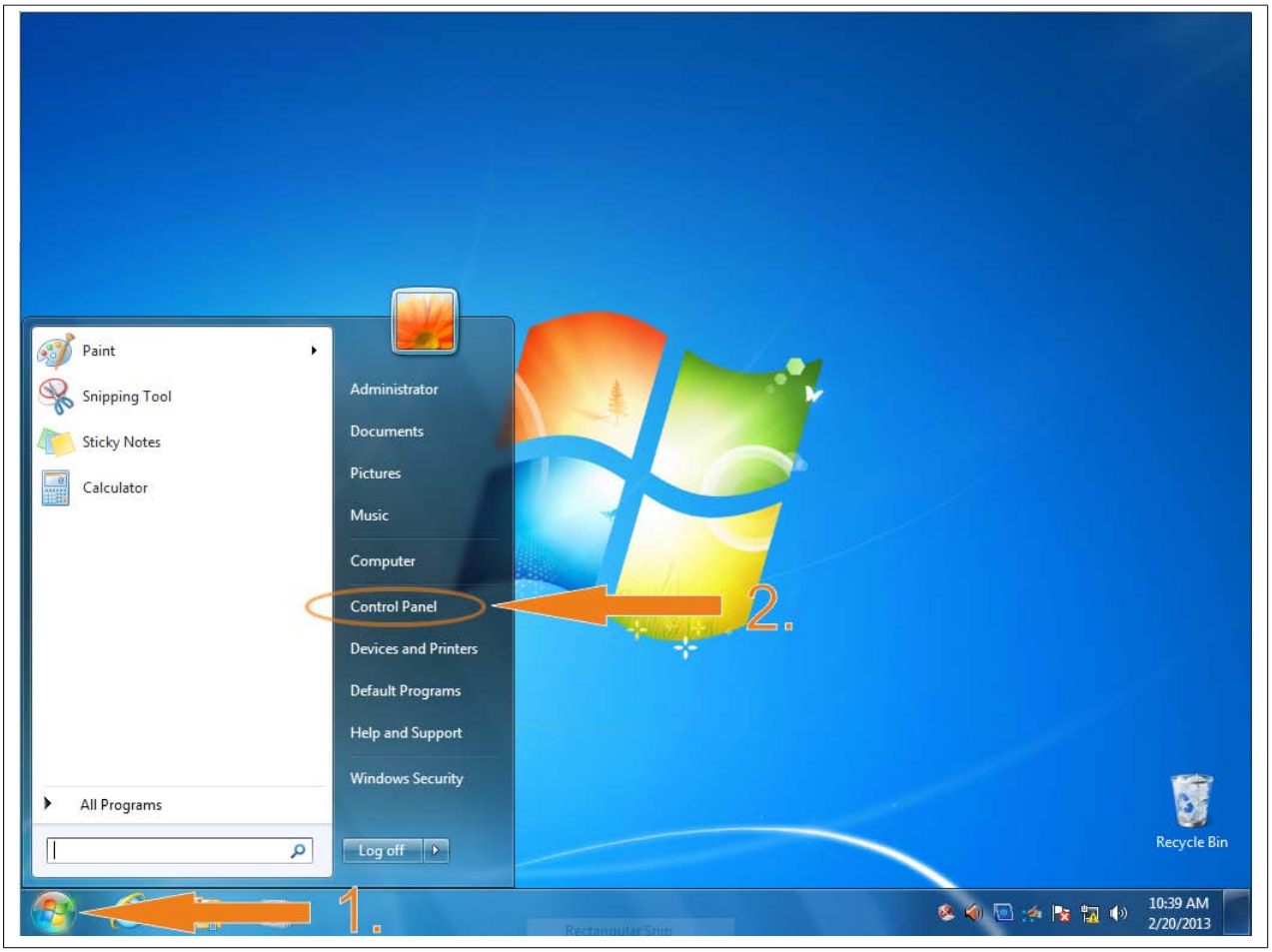


Figure 63: Opening the Control Panel

2. Select the Control Center.

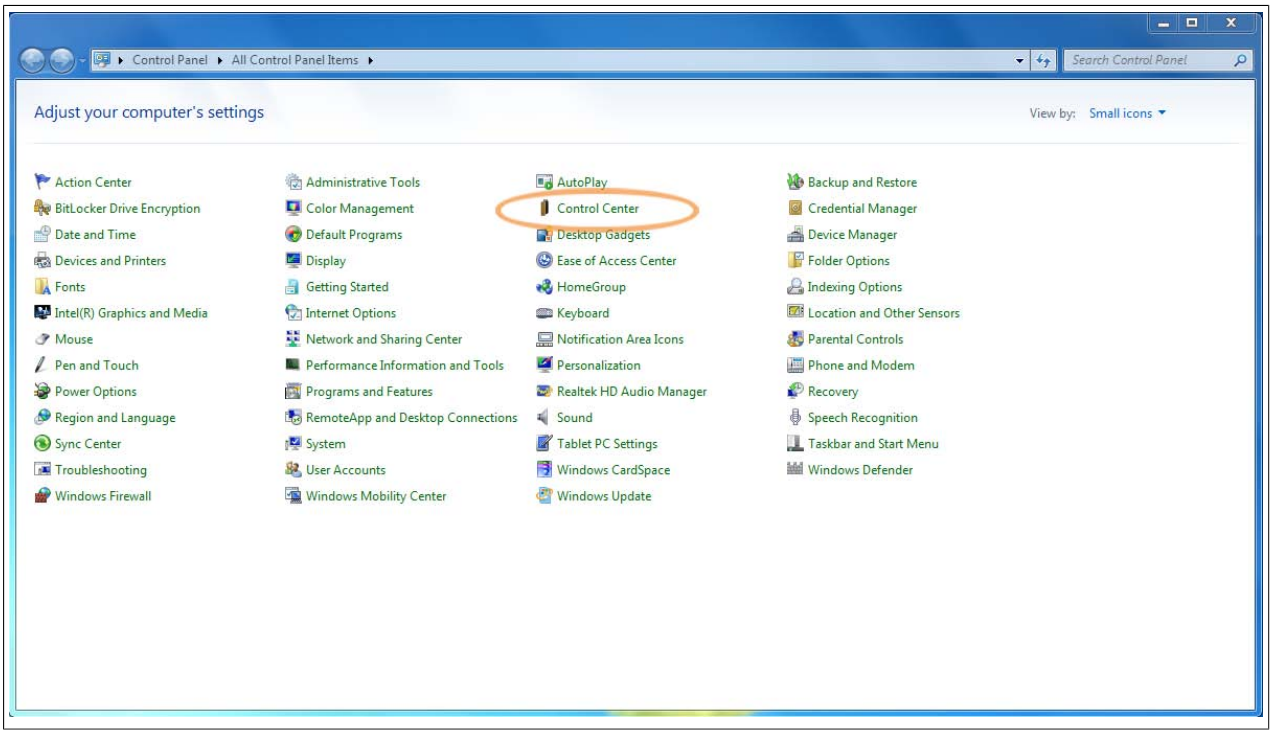


Figure 64: Selecting the Control Center

3. Use the slider to set the brightness of the panel.

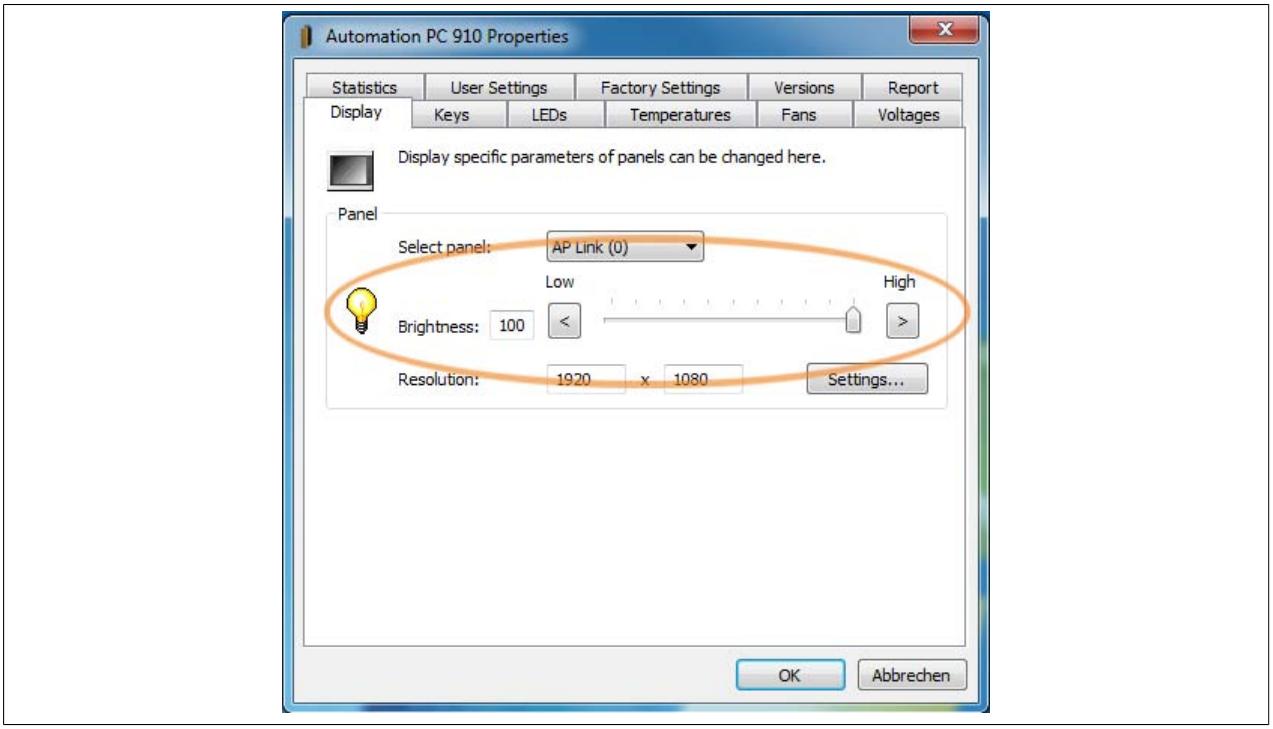


Figure 65: Adjusting the display brightness

4.2.8.2 Adjusting with a DVI connection

1. Remove the interface cover (see Figure 24 "Removing the interface cover" on page 36).
2. Use the two buttons to adjust the brightness.

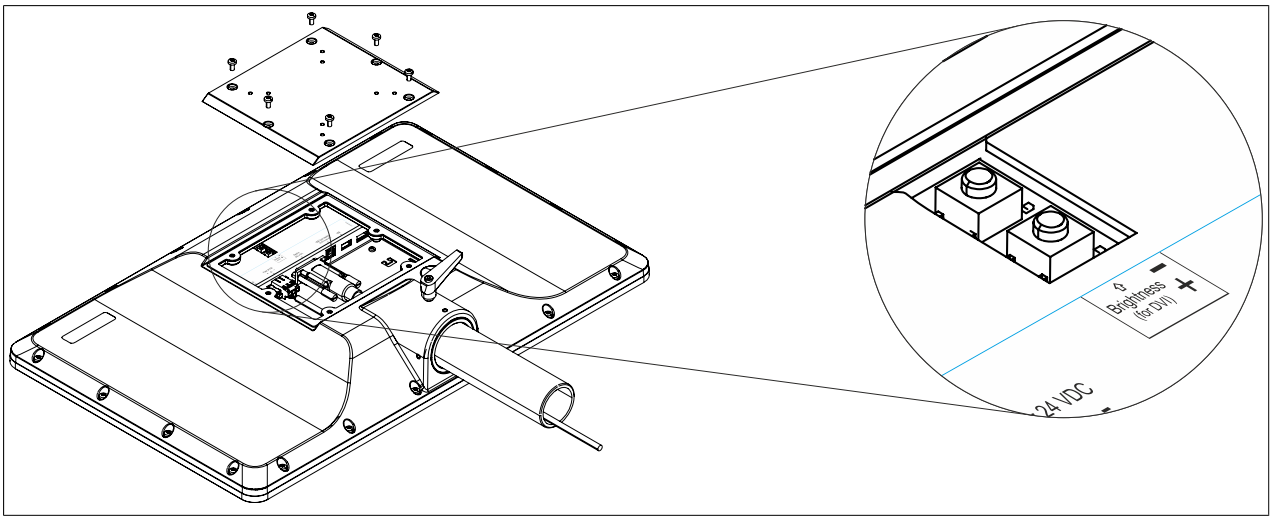


Figure 66: Buttons for adjusting the display brightness

> **Information:**
>
> **Hold down one of the buttons for at least three seconds in order to change the brightness.**

3. Once the brightness setting is satisfactory, replace the interface cover (see Figure 27 "Replacing the interface cover" on page 37).

5 Touch functionality

5.1 Introduction

The following tables list the touch functionality provided by the touch controller with respect to the operating system and touch screen driver being used.

5.2 Windows versions with a 3M touch controller

Operating system	Microsoft driver[1)]	3M driver (touch digitizer)[2)]	3M driver (HID mouse)[2)]	3M driver (legacy mouse)[2)]
Windows XP Professional SP3	**No**	**Not available**	Single touch	Single touch
Windows Embedded Standard 2009	**No**	**Not available**	Single touch	Single touch
Windows 7 Professional SP1, 32-bit	Multi-touch	Multi-touch	Single touch	Single touch
Windows 7 Ultimate SP1, 32-bit	Multi-touch	Multi-touch	Single touch	Single touch
Windows 7 Ultimate SP1, 64-bit	Multi-touch	Multi-touch	Single touch	Single touch
Windows Embedded Standard 7 SP1, 32-bit	**No**	**Not available**	Single touch	Single touch
Windows Embedded Standard 7 Premium SP1, 32-bit	Multi-touch	Multi-touch	Single touch	Single touch

Table 20: Overview of touch functionality with a 3M touch controller

1) Touch screen driver integrated in the Windows operating system.
2) 3M touch screen driver (drivers can be downloaded for approved operating systems from the Downloads section of the B&R website www.br-automation.com).

5.3 Windows versions with an EETI touch controller (DMC)

Operating system	Microsoft driver[1)]	EETI driver[2)]
Windows XP Professional SP3	Mouse	Multi-mouse instead of multi-touch
Windows Embedded Standard 2009	Mouse	Multi-mouse instead of multi-touch
Windows 7 Professional SP1, 32-bit	Multi-touch	Multi-mouse instead of multi-touch
Windows 7 Ultimate SP1, 32-bit	Multi-touch	Multi-mouse instead of multi-touch
Windows 7 Ultimate SP1, 64-bit	Multi-touch	Multi-mouse instead of multi-touch
Windows Embedded Standard 7 SP1, 32-bit	**No**	Multi-mouse instead of multi-touch
Windows Embedded Standard 7 Premium SP1, 32-bit	Multi-touch	Multi-mouse instead of multi-touch

Table 21: Overview of touch functionality with an EETI touch controller

1) Touch screen driver integrated in the Windows operating system.
2) EETI touch screen driver (drivers can be downloaded for approved operating systems from the Downloads section of the B&R website www.br-automation.com).

Chapter 3 • Installation

1 Installation

For information and instructions regarding the installation of Automation Panel devices, see "5AP830.215C-00 (hanging mount)" on page 13 and "5AP830.215C-01 (standing mount)" on page 44.

1.1 Mounting orientation

For information regarding the mounting orientation of Automation Panel 830 devices, see "5AP830.215C-00 (hanging mount)" on page 13 and "5AP830.215C-01 (standing mount)" on page 44.

2 Installing the DC mains cable

For information and instructions regarding the installation of the DC mains cable, see "5AP830.215C-00 (hanging mount)" on page 13 and "5AP830.215C-01 (standing mount)" on page 44.

3 Cable connections / Cable length

3.1 Cable connections

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

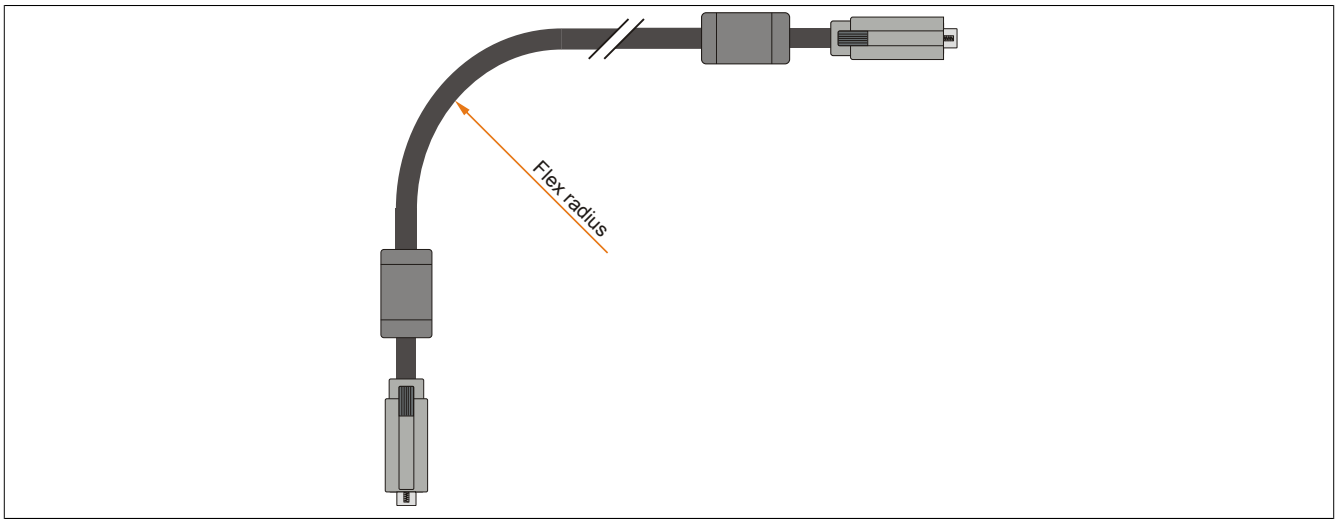


Figure 67: Flex radius - Cable connection

Information:

The specified flex radius can be found in the Automation Panel 800 or Automation Panel 900 user's manual, which can be downloaded as a PDF file from the B&R website at www.br-automation.com.

3.2 Cable lengths and resolutions for SDL transmission

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

SDL cables	Resolution					
Segment length [m]	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200	FHD 1920 x 1080
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	- - -	- - 5CASDL.0150-03
20	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	- -	- 5CASDL.0200-03
25	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	- -	- -	- -
30	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-00 5CASDL.0300-03	- 5CASDL.0300-13	- 5CASDL.0300-13	- -	- 5CASDL.0300-13
40	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	-	5CASDL.0400-13

Table 22: Cable lengths and resolutions for SDL transmission

3.3 Cable lengths and resolutions for DVI transmission

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

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

Table 23: Cable lengths and resolutions for DVI transmission

4 Multi-touch gestures

Information:

The only operating systems that support multi-touch applications are Windows® 7 Professional, Windows® 7 Ultimate and Windows® Embedded Standard 7 Premium.

Selection

A swiping motion can be used to trigger certain actions (depending on the application).

Slide one finger left or right across the screen.

Object zooming (pinch and tap)

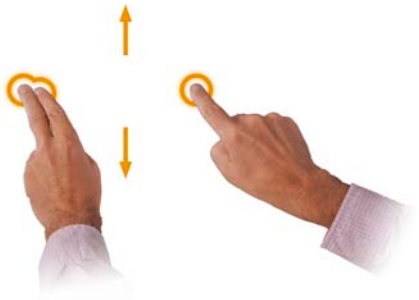
Two-finger pinch gestures are an easy way to zoom in and out of objects.

Touch the screen with two fingers and move them together or apart.

Scrolling

Scrolling on multi-touch screens is easily done by directly moving the object up or down (e.g. an alarm list).

Slide one finger up or down the screen.



Right-click shortcut menu (press and hold)

The "right-click" function is executed quickly and easily by simply touching the screen a bit longer.

Touch and hold a finger on the screen until the ring appears.

Two-finger tap

Specific operations such as zooming can be triggered with a two-finger tap.

Tap an object with two fingers at the same time.

Flick gesture

A flick gesture on the display can be used to easily move to the next page, for example.

Swipe a finger across the screen quickly in the desired direction.

Rotate

The "Rotate" function can be used to rotate an image clockwise or counterclockwise, for example.

Move two fingers in opposite directions or rotate one finger around the other.

5 Key and LED configuration

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.

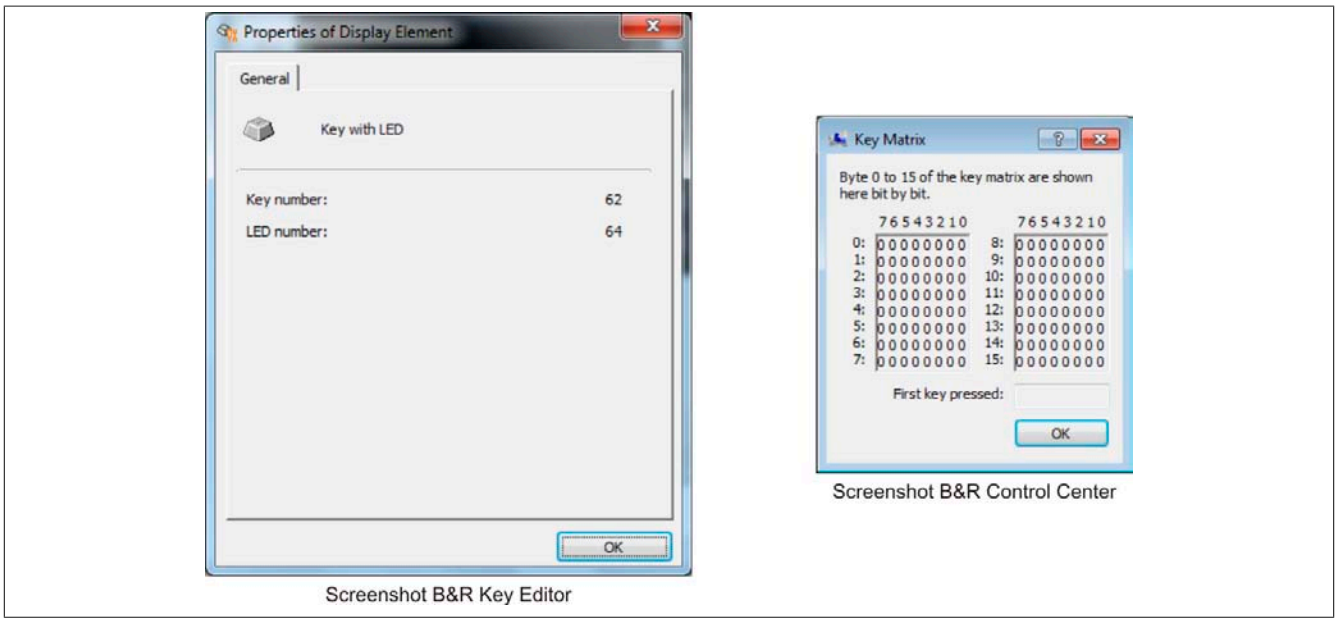


Figure 68: Hardware numbers in the B&R Key Editor and the B&R Control Center

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

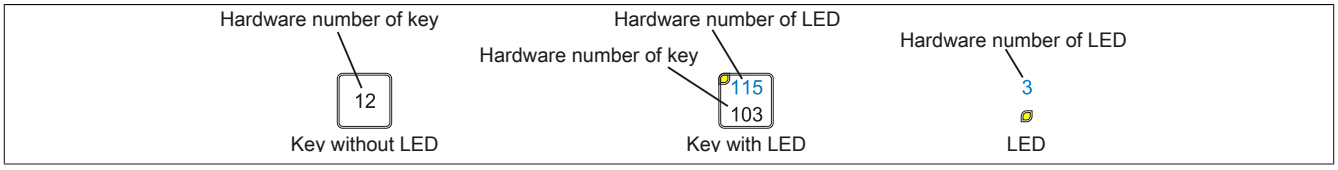


Figure 69: Display - Keys and LEDs

5.1 5AP830.215C-00 / 5AP830.215C-01

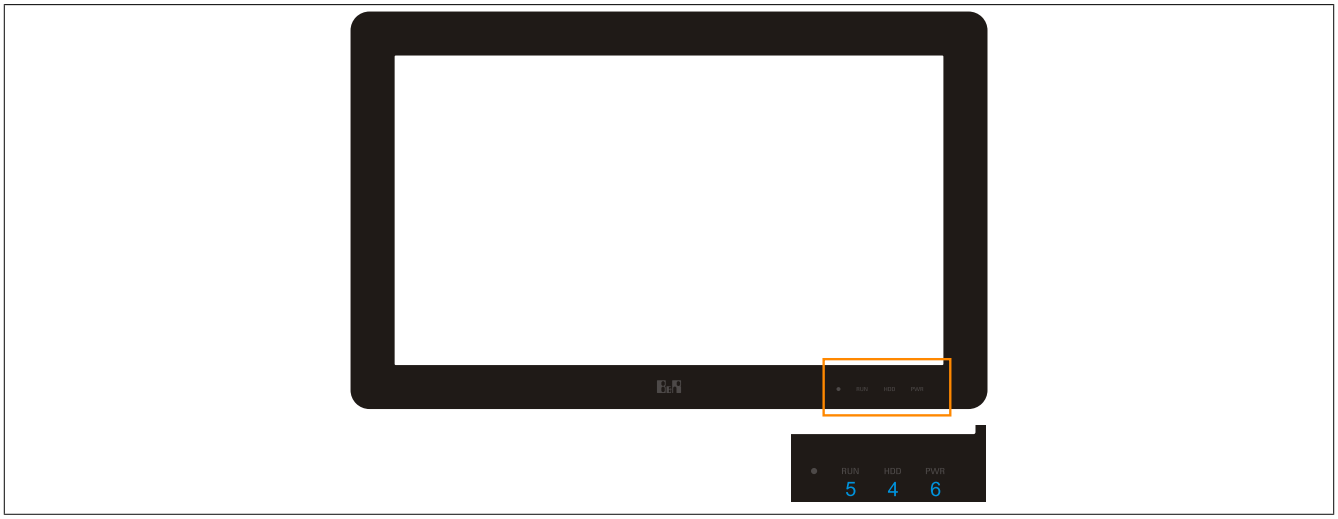


Figure 70: 5AP830.215C-00 / 5AP830.215C-01 - Key and LED configuration

6 Tips for extending the service life of the display

6.1 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.

6.1.1 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

6.2 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.

6.2.1 What causes screen burn-in?

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

6.2.2 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

7 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 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.

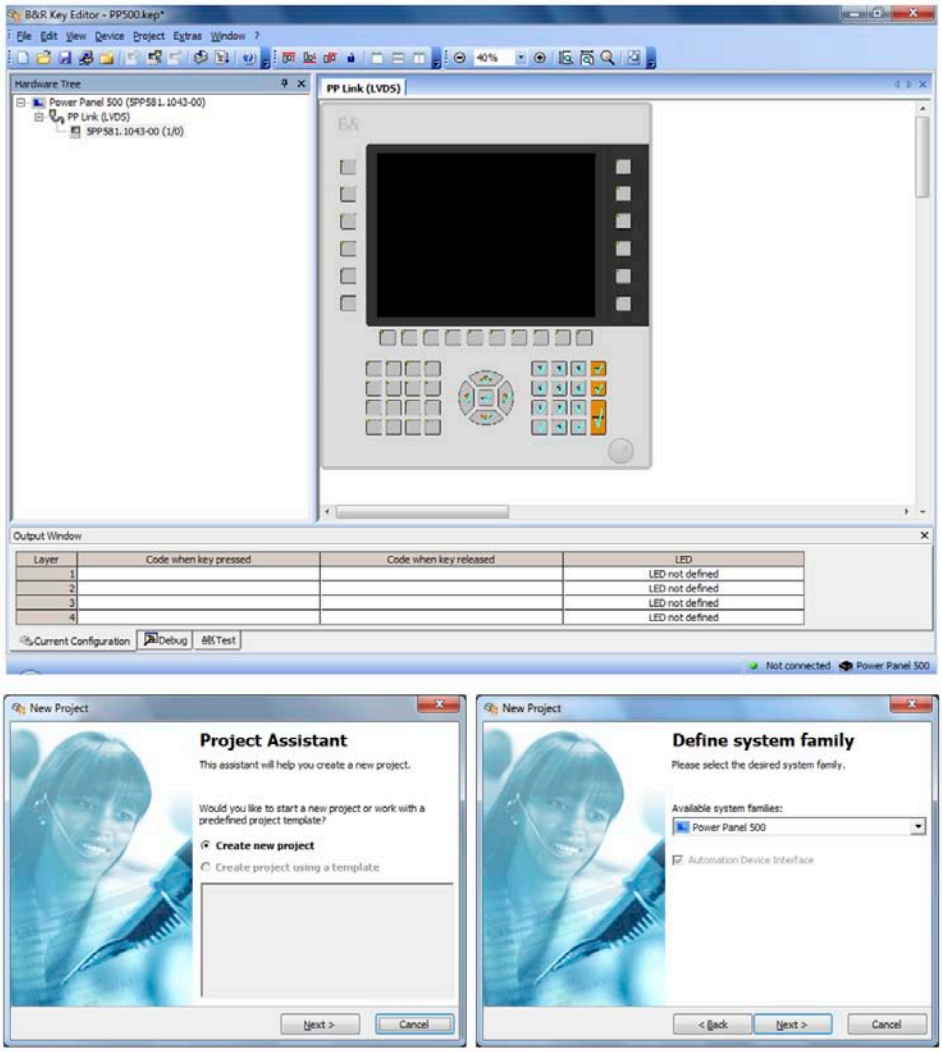


Figure 71: B&R Key Editor screenshots (version 3.30)

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.

Supports the following systems (version 3.30):

- Automation PC 510
- Automation PC 511
- Automation PC 620

- Automation PC 810
- Automation PC 820
- Automation PC 910
- Automation Panel 800
- Automation Panel 830
- Automation Panel 900
- IPC2000, IPC2001, IPC2002
- IPC5000, IPC5600
- IPC5000C, IPC5600C
- Mobile Panel 40/50
- Mobile Panel 100/200
- Panel PC 300
- Panel PC 700
- Panel PC 800
- 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 online help documentation. 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 • 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 Cables

1.1 DVI cables

1.1.1 5CADVI.0xxx-00

1.1.1.1 General information

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

Caution!

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

1.1.1.2 Order data

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

Table 24: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Order data

1.1.1.3 Technical data

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

Table 25: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Technical data

1.1.1.4 Flex radius specifications

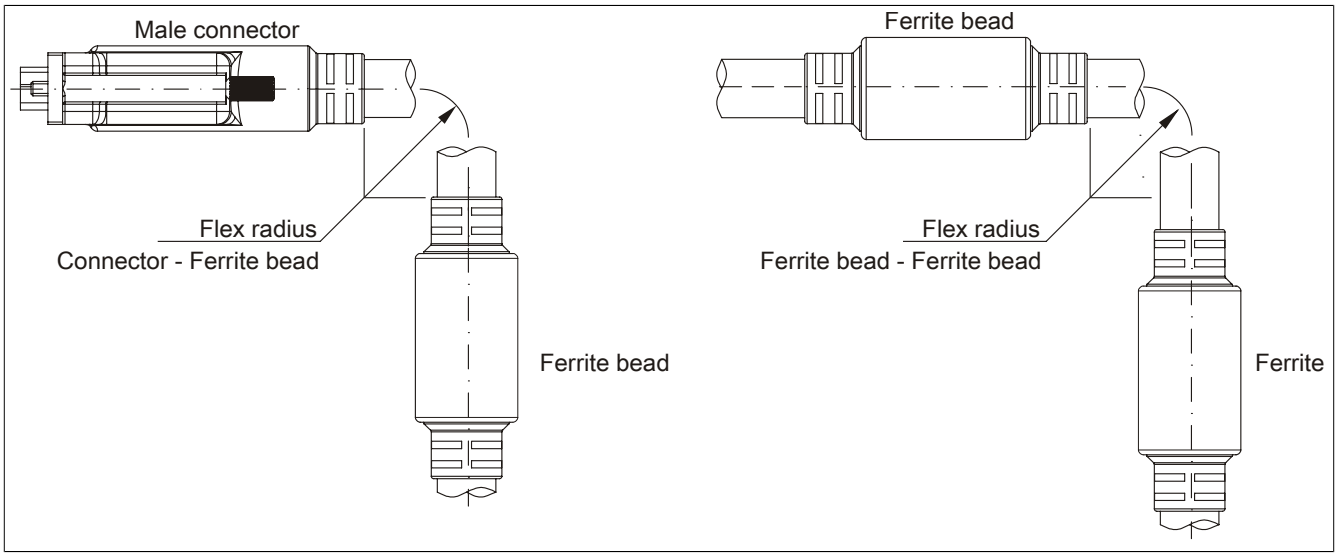


Figure 72: Flex radius specifications

1.1.1.5 Dimensions

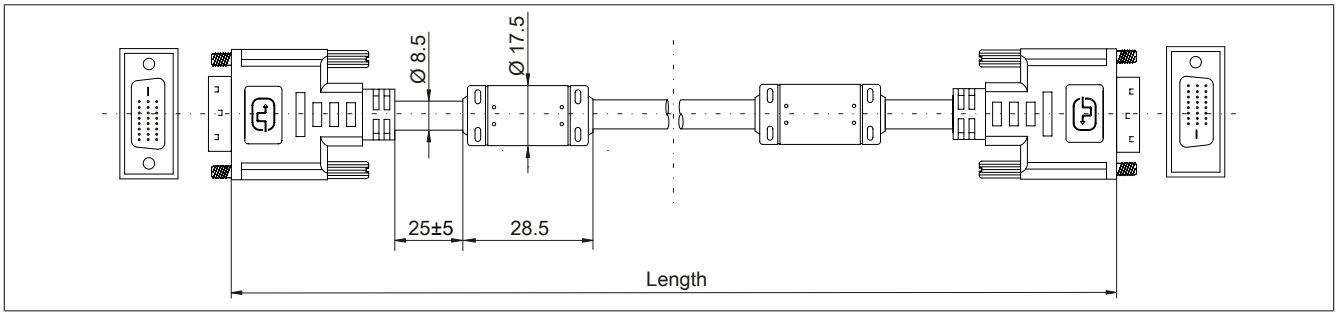


Figure 73: 5CADVI.0xxx-00 - Dimensions

1.1.1.6 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.

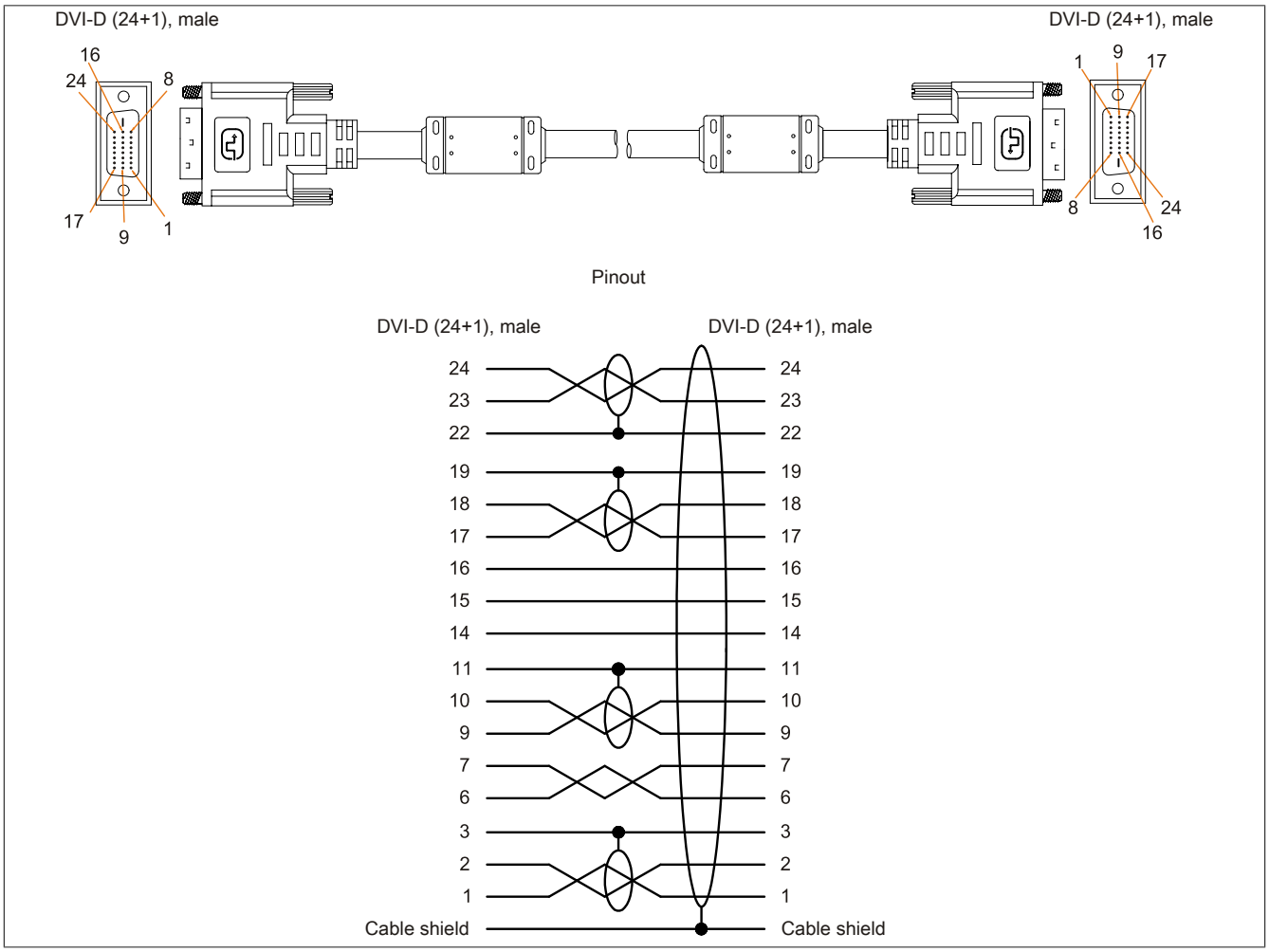


Figure 74: 5CADVI.0xxx-00 - Pinout

1.2 SDL cables

1.2.1 5CASDL.0xxx-00

1.2.1.1 General information

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

Caution!

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

1.2.1.2 Order data

Model number	Short description	Figure
	SDL cables	
5CASDL.0018-00	SDL cable, 1.8 m	
5CASDL.0050-00	SDL cable, 5 m	
5CASDL.0100-00	SDL cable, 10 m	
5CASDL.0150-00	SDL cable, 15 m	
5CASDL.0200-00	SDL cable, 20 m	
5CASDL.0250-00	SDL cable, 25 m	
5CASDL.0300-00	SDL cable, 30 m	

Table 26: 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Order data

1.2.1.3 Technical data

Product ID	5CASDL. 0018-00	5CASDL. 0050-00	5CASDL. 0100-00	5CASDL. 0150-00	5CASDL. 0200-00	5CASDL. 0250-00	5CASDL. 0300-00
General information							
Certification							
CE				Yes			
cULus				Yes			
GL	Yes		Yes [1]	Yes			
Cable structure							
Wire cross section	AWG 28		AWG 24				
Shield	Individual cable pairs and entire cable						
Cable shielding	Tinned copper mesh, optical coverage >85%						
Outer sheathing							
Material	PVC						
Color	Black						
Labeling	E74020-C (UL) AWM STYLE 20176 80°C 30V VW-1 DVI DIGITAL LINK						
Connector							
Type	2x DVI-D (24+1), male						
Connection cycles	100						
Contacts	Gold-plated						
Mechanical protection	Metal cover with crimped stress relief						
Electrical characteristics							
Conductor resistance							
AWG 24	-		≤93 Ω/km				
AWG 28	≤237 Ω/km		-				
Insulation resistance	Min. 10 MΩ/km						
Mechanical characteristics							
Dimensions							
Length	1.8 m ±30 mm	5 m ±30 mm	10 m ±50 mm	15 m ±100 mm	20 m ±100 mm	25 m ±100 mm	30 m ±100 mm
Diameter	Typ. 8.6 ±0.2 mm Max. 9 mm		Typ. 11 ±0.2 mm Max. 11.5 mm	Typ. 11 ±0.2 mm Max. 11.5 mm			
Flex radius	≥5x cable diameter (connector - ferrite bead and ferrite bead - ferrite bead)						
Flexibility	Limited flexibility; valid for ferrite bead - ferrite bead (tested 100 cycles with 5x cable diameter, 20 cycles / minute)						
Weight	Approx. 300 g	Approx. 580 g	Approx. 1500 g	Approx. 2250 g	Approx. 2880 g	Approx. 4800 g	Approx. 5520 g

Table 27: 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Technical data

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

1.2.1.4 Flex radius specifications

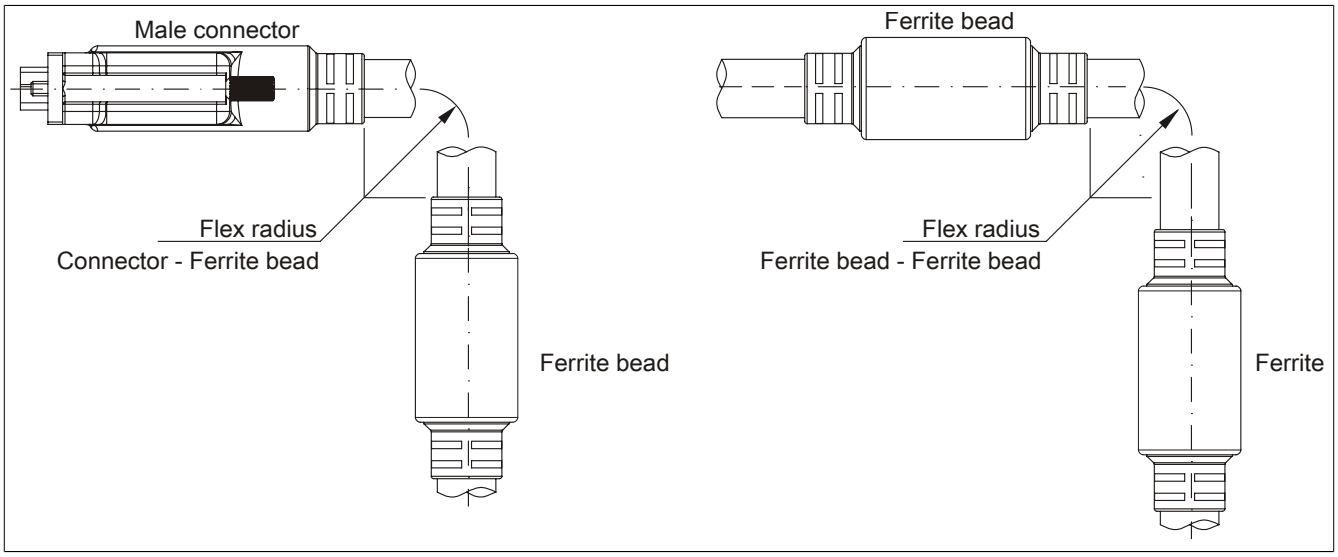


Figure 75: Flex radius specifications

1.2.1.5 Dimensions

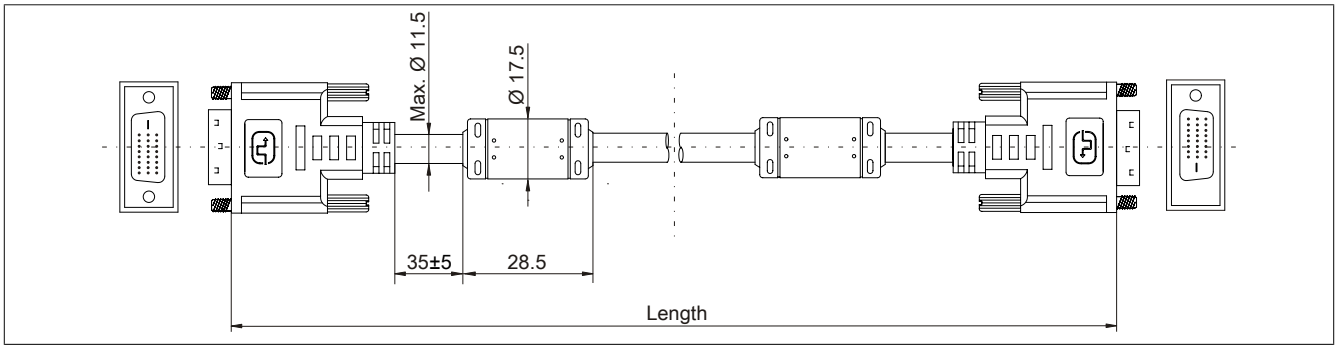


Figure 76: 5CASDL.0xxx-00- Dimensions

1.2.1.6 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.

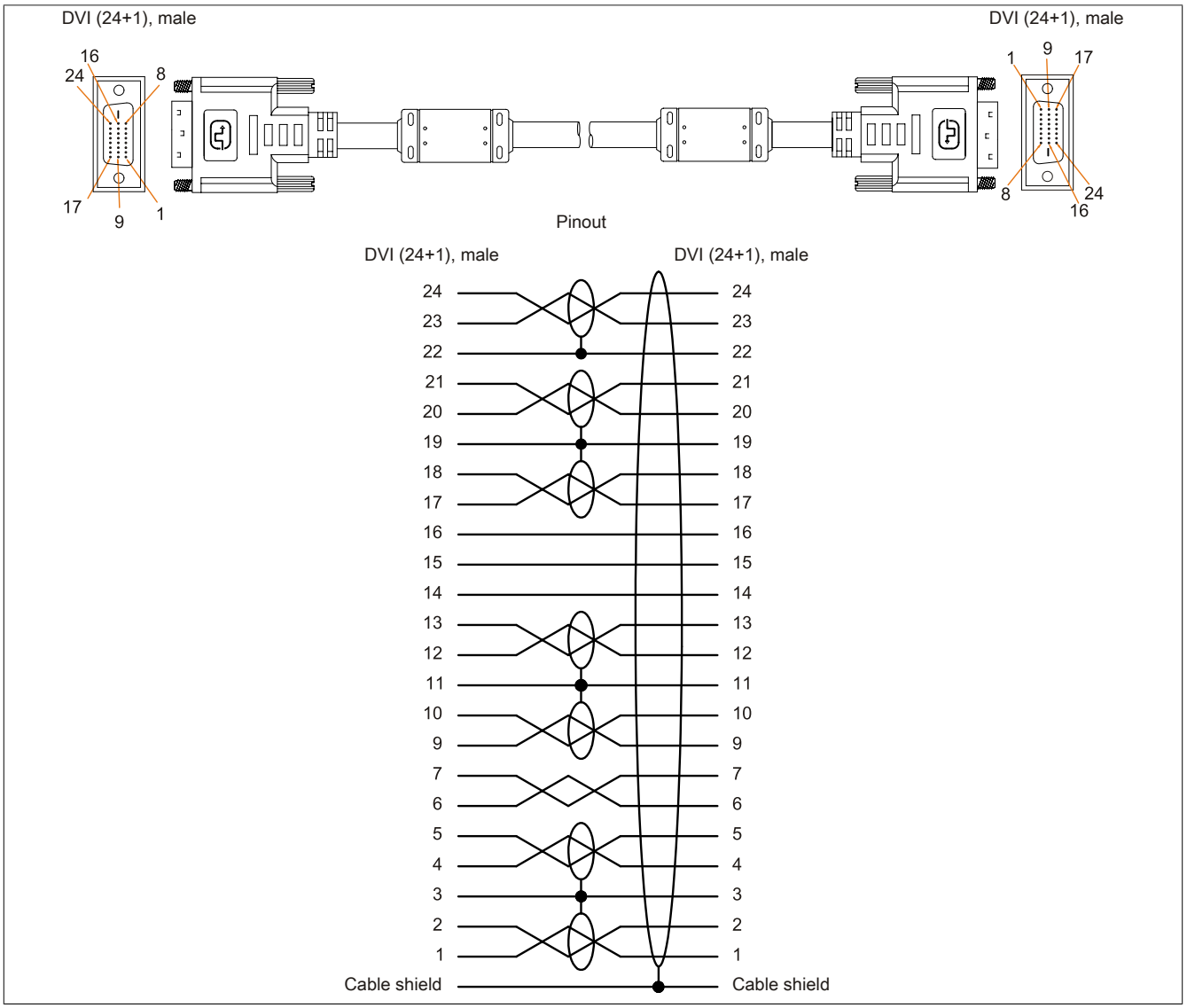


Figure 77: 5CASDL.0xxx-00 - Pinout

1.3 SDL cables with 45° male connector

1.3.1 5CASDL.0xxx-01

1.3.1.1 General information

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

Caution!

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

1.3.1.2 Order data

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

Table 28: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Order data

1.3.1.3 Technical data

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

Table 29: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Technical data

1.3.1.4 Flex radius specifications

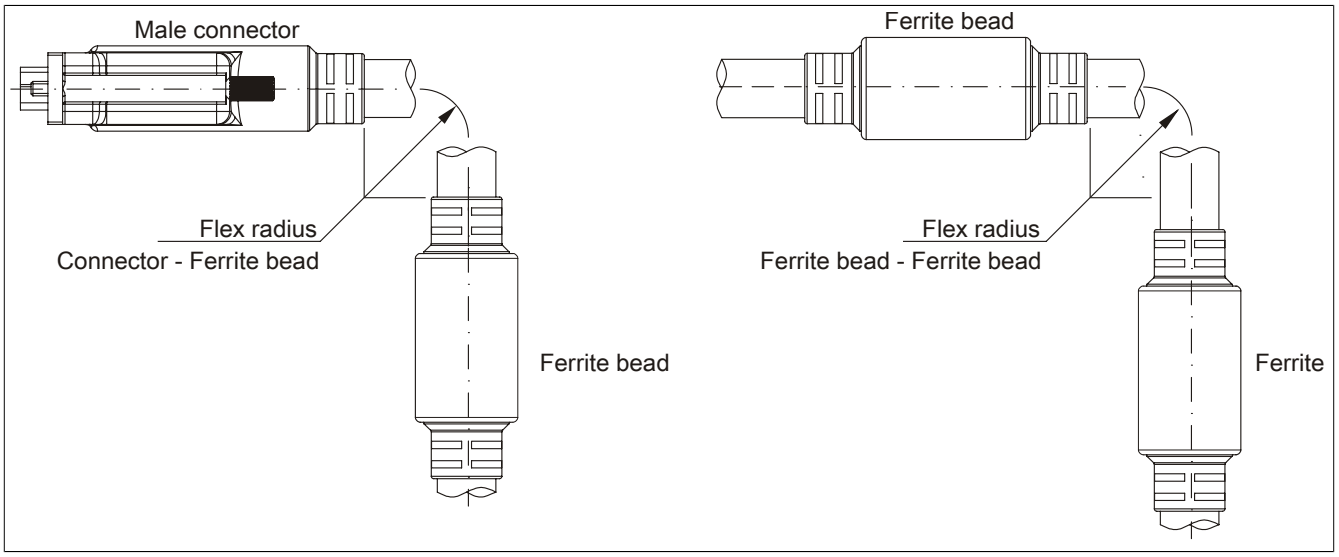


Figure 78: Flex radius specifications

1.3.1.5 Dimensions

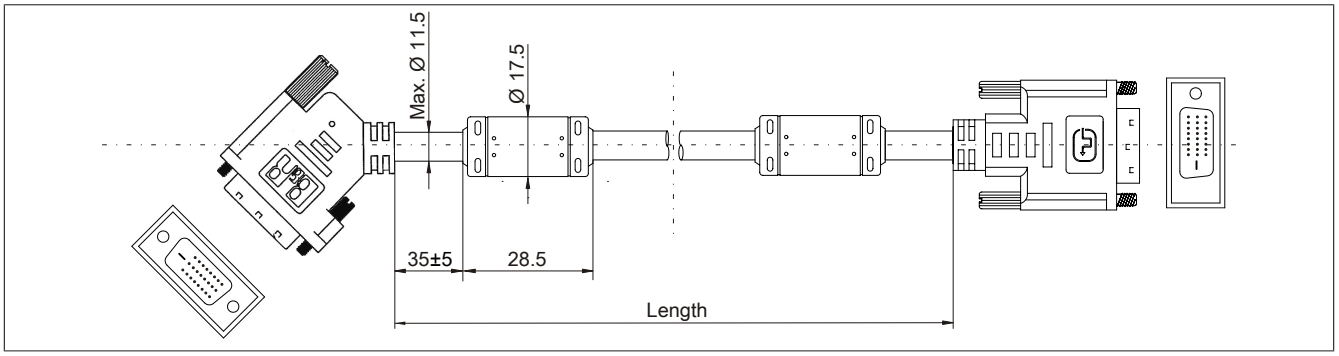


Figure 79: 5CASDL.0xxx-01 - Dimensions

1.3.1.6 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.

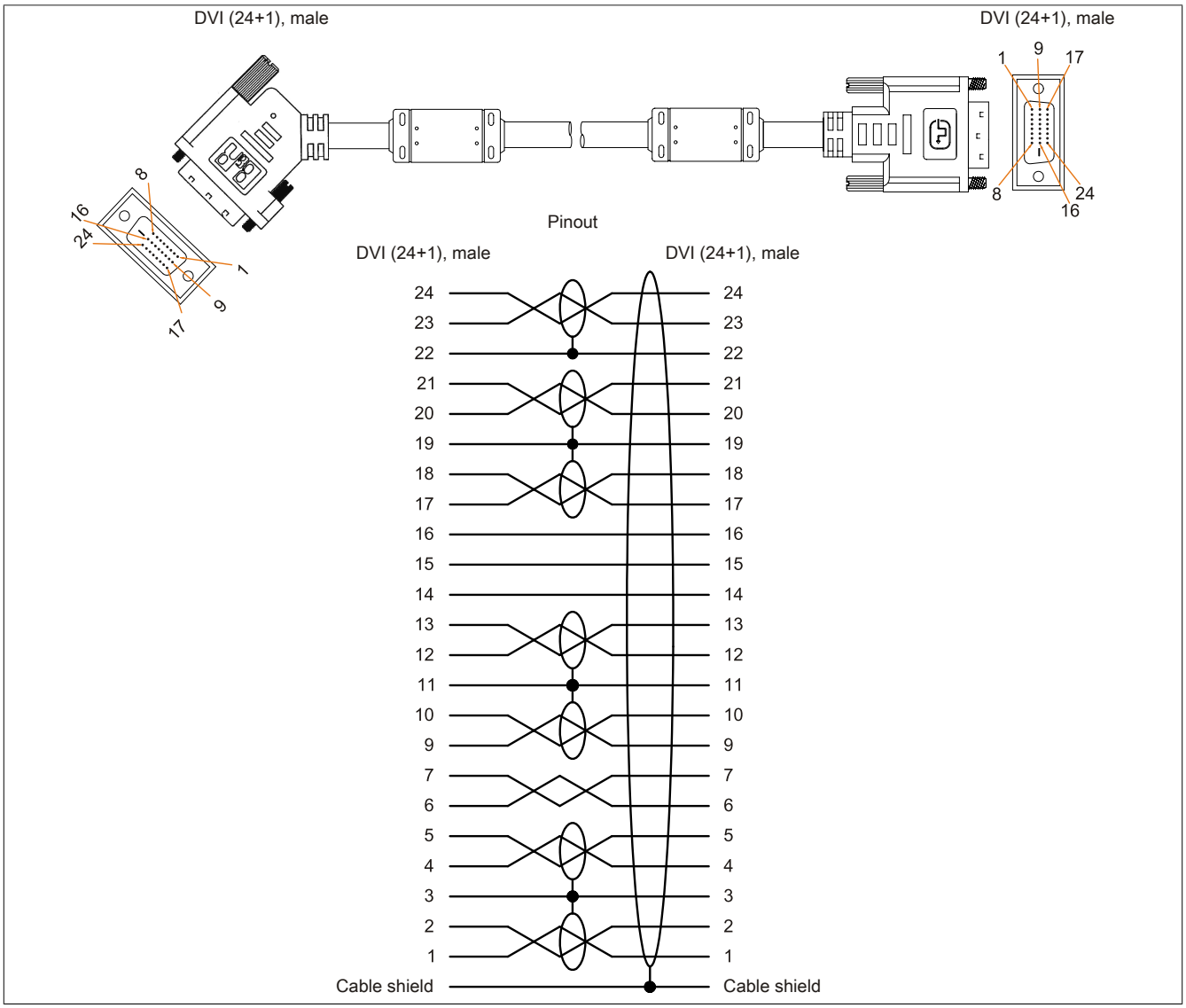


Figure 80: 5CASDL.0xxx-01 - Pinout

1.4 SDL flex cables

1.4.1 5CASDL.0xxx-03

1.4.1.1 General information

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

Caution!

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

1.4.1.2 Order data

Model number	Short description	Figure
	SDL flex cable	
5CASDL.0018-03	SDL flex cable, 1.8 m	
5CASDL.0050-03	SDL flex cable, 5 m	
5CASDL.0100-03	SDL flex cable, 10 m	
5CASDL.0150-03	SDL flex cable, 15 m	
5CASDL.0200-03	SDL flex cable, 20 m	
5CASDL.0250-03	SDL flex cable, 25 m	
5CASDL.0300-03	SDL flex cable, 30 m	

Table 30: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Order data

1.4.1.3 Technical data

Product ID	5CASDL. 0018-03	5CASDL. 0050-03	5CASDL. 0100-03	5CASDL. 0150-03	5CASDL. 0200-03	5CASDL. 0250-03	5CASDL. 0300-03
General information							
Certification							
CE	Yes						
cULus	Yes						
GL	Yes						
Cable structure							
Wire cross section	AWG 24 (control wires) AWG 26 (DVI, USB, data)						
Properties	Silicone- and halogen-free						
Shield	Individual cable pairs and entire cable						
Cable 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 E 63216						
Connector							
Type	2x DVI-D (24+1), male						
Connection cycles	Min. 200						
Contacts	Gold-plated						
Mechanical protection	Metal cover with crimped stress relief						
Electrical characteristics							
Operating voltage	≤30 V						
Test voltage							
Wire/Wire	1 kV						
Wire/Shield	0.5 kV						
Wave impedance	100 ±10 Ω						
Conductor resistance							
AWG 24	≤95 Ω/km						
AWG 26	≤145 Ω/km						
Insulation resistance	>200 MΩ/km						
Operating conditions							
Approbation	UL AWM 20236 80°C 30 V						
Flame resistant	In accordance with UL758 (cable vertical flame test)						
Oil and hydrolysis resistance	According to VDE 0282-10						

Table 31: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Technical data

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

Table 31: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Technical data

1.4.1.4 Flex radius specifications

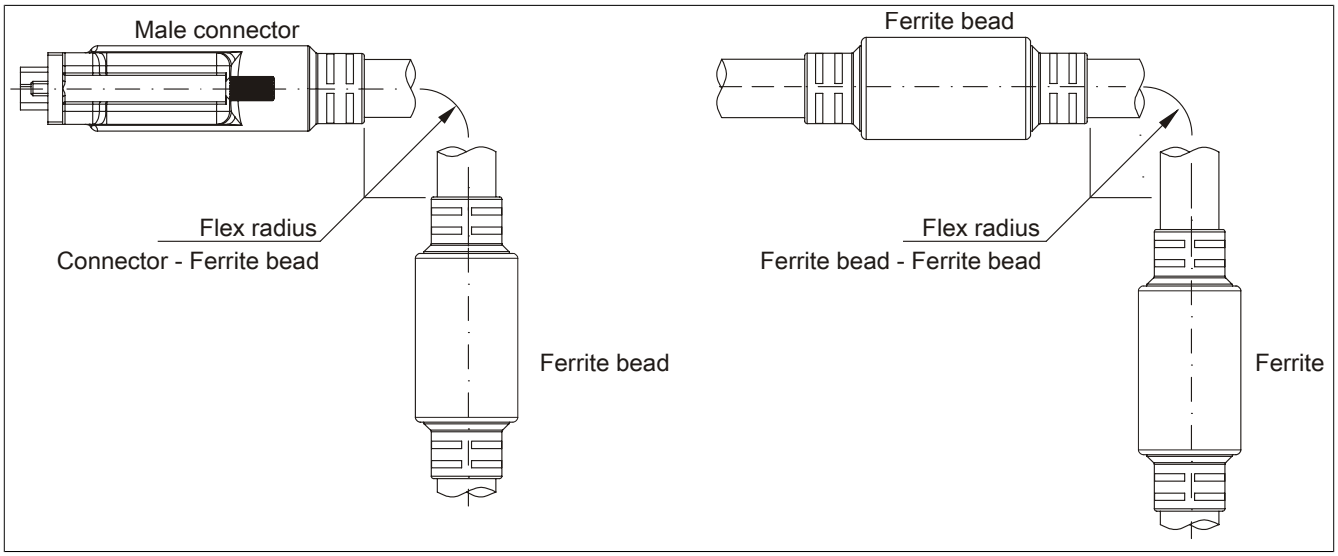


Figure 81: Flex radius specifications

1.4.1.5 Dimensions

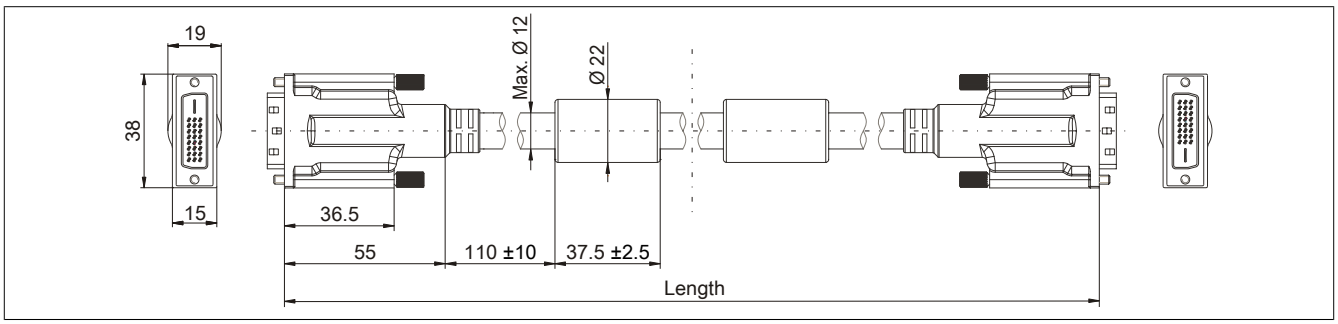


Figure 82: 5CASDL.0xxx-03 - Dimensions

1.4.1.6 Structure

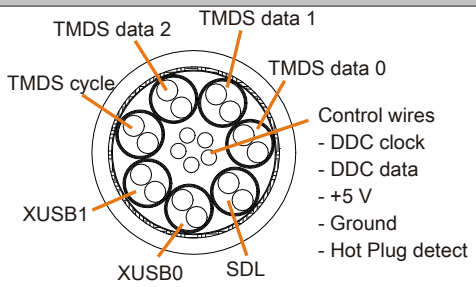
Element	Assignment	Cross section	
DVI	TMDS data 0	26 AWG	
	TMDS data 1	26 AWG	
	TMDS data 2	26 AWG	
	TMDS cycle	26 AWG	
USB	XUSB0	26 AWG	
	XUSB1	26 AWG	
Data	SDL	26 AWG	
Control wires	DDC cycle	24 AWG	
	DDC data	24 AWG	
	+5 V	24 AWG	
	Mass	24 AWG	
	Hot plug detect	24 AWG	

Table 32: 5CASDL.0xxx-03 SDL flex cables - Structure

1.4.1.7 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.

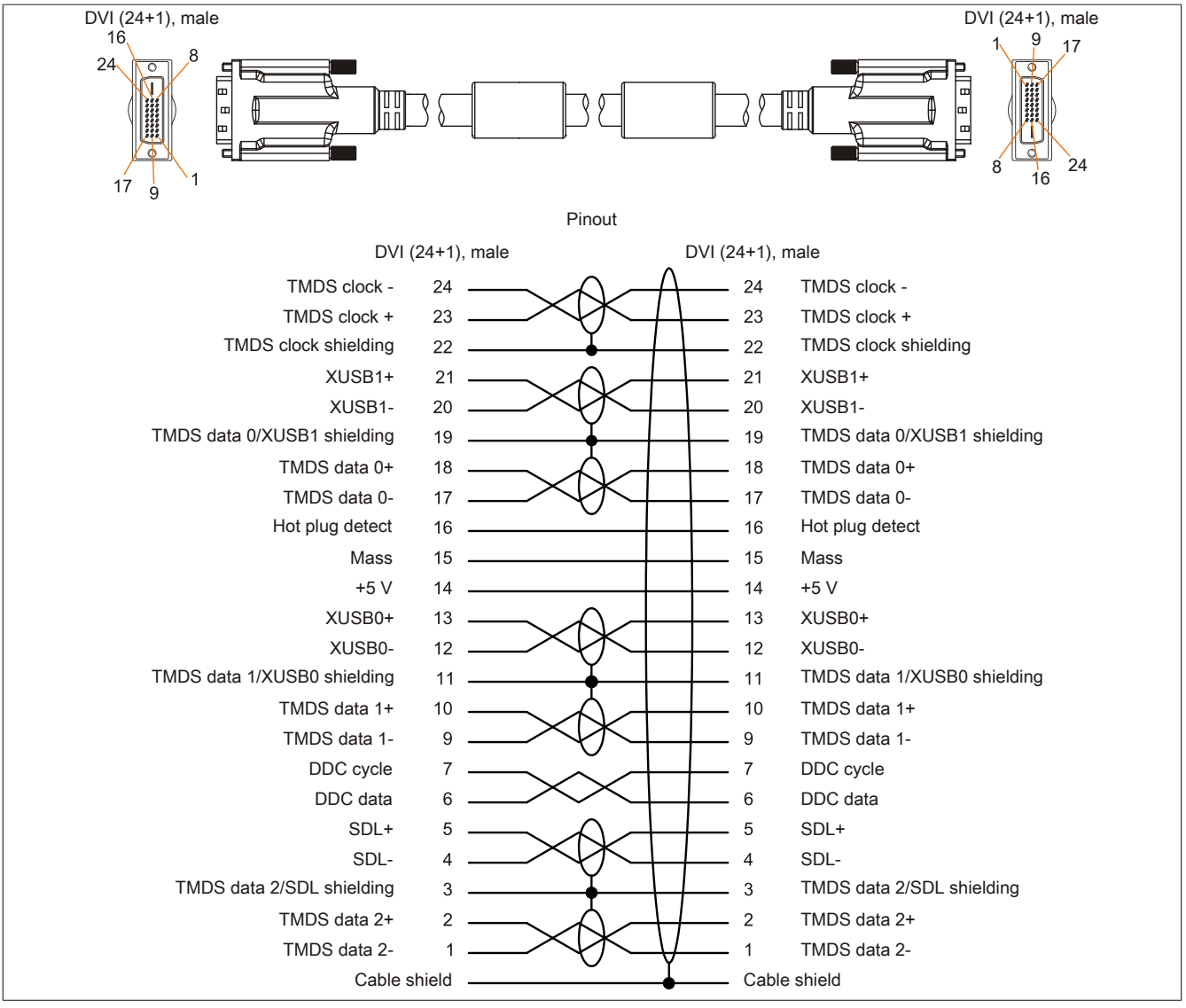


Figure 83: 5CASDL.0xxx-03 - Pinout

1.5 SDL flex cables with extender

1.5.1 5CASDL.0xx0-13

1.5.1.1 General information

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

> **Caution!**
>
> **Power must be turned off before plugging in and unplugging cables.**

1.5.1.2 Order data

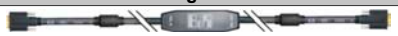
Model number	Short description	Figure
	SDL flex cable	
5CASDL.0300-13	SDL flex cable with extender, 30 m	
5CASDL.0400-13	SDL flex cable with extender, 40 m	
5CASDL.0430-13	SDL flex cable with extender, 43 m	

Table 33: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Order data

1.5.1.3 Technical data

Product ID	5CASDL.0300-13	5CASDL.0400-13	5CASDL.0430-13
General information			
Certification			
CE	Yes		
cULus	Yes		
GL	Yes		
Cable structure			
Wire cross section	AWG 24 (control wires) AWG 26 (DVI, USB, data)		
Properties	Silicone- and halogen-free		
Shield	Individual cable pairs and entire cable		
Cable 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	2x DVI-D (24+1), male		
Connection cycles	Min. 200		
Contacts	Gold-plated		
Mechanical protection	Metal cover with crimped stress relief		
Electrical characteristics			
Operating voltage	≤30 V		
Test voltage			
Wire/Wire	1 kV		
Wire/Shield	0.5 kV		
Wave impedance	100 ±10 Ω		
Conductor resistance			
AWG 24	≤95 Ω/km		
AWG 26	≤145 Ω/km		
Insulation resistance	>200 MΩ/km		
Operating conditions			
Approbation	UL AWM 20236 80°C 30 V		
Flame resistant	In accordance with UL758 (cable vertical flame test)		
Oil and hydrolysis resistance	According to VDE 0282-10		
Environmental conditions			
Temperature			
Storage	-20 to 60°C		
Moving	-5 to 60°C		
Fixed installation	-20 to 60°C		

Table 34: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

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

Table 34: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

1.5.1.4 Flex radius specifications

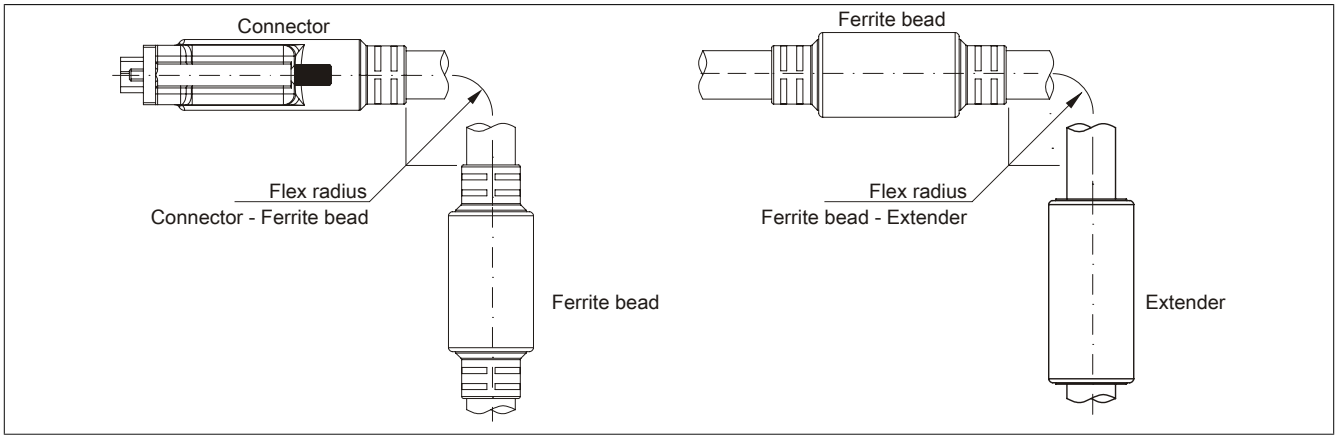


Figure 84: Flex radius specification with extender

1.5.1.5 Dimensions

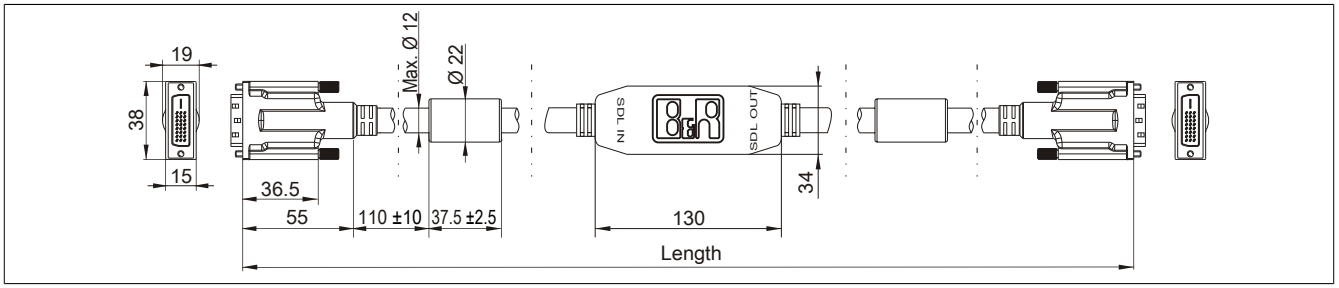


Figure 85: 5CASDL.0xx0-13 - Dimensions

1.5.1.6 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.

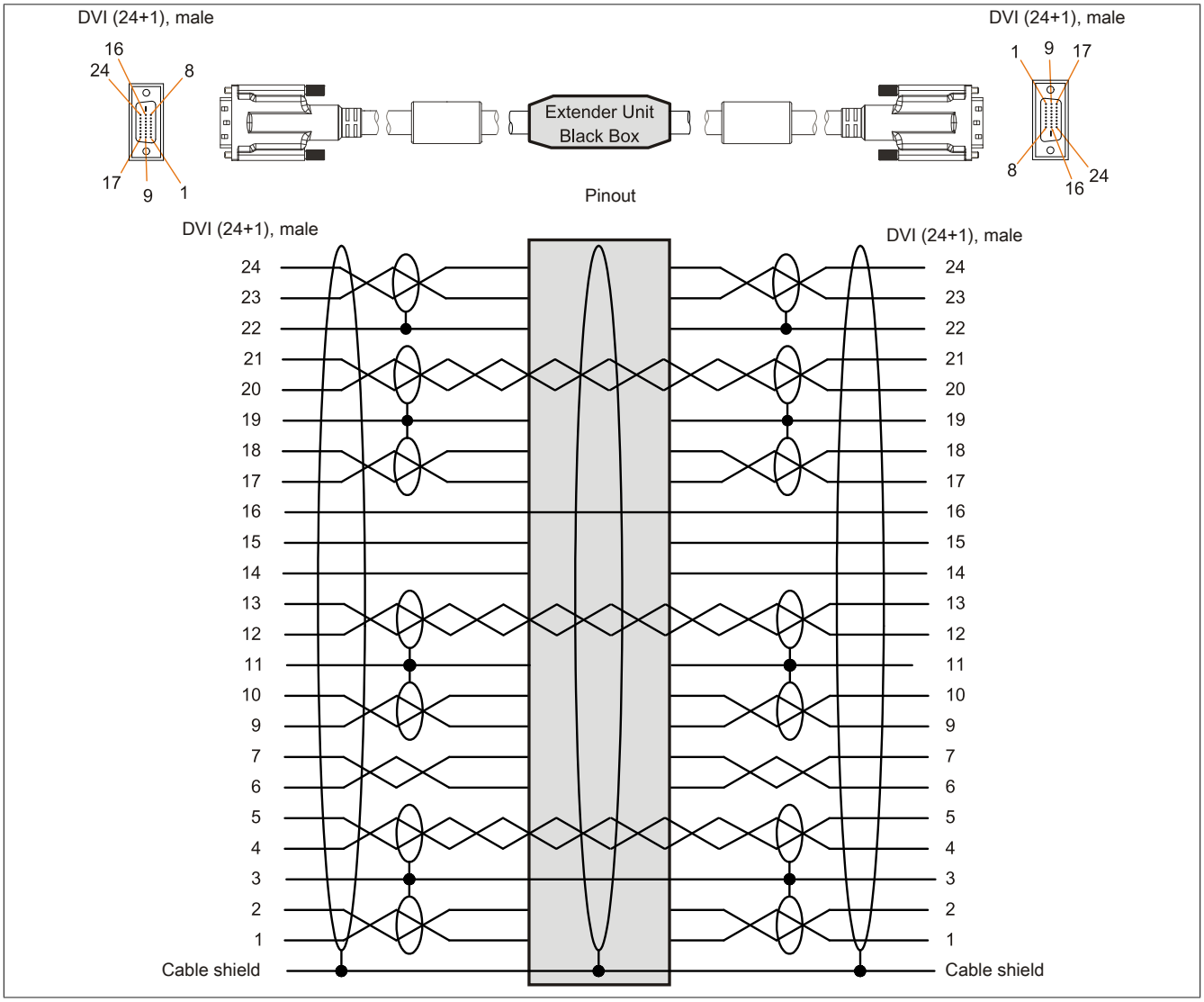


Figure 86: 5CASDL.0xx0-13 - Pinout

1.5.1.7 Cable connection

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

- Connect the end labeled "SDL IN" with the video output of the APC910 (monitor/panel output).
- Connect the "SDL OUT" end to the display unit (e.g. Automation Panel 830).

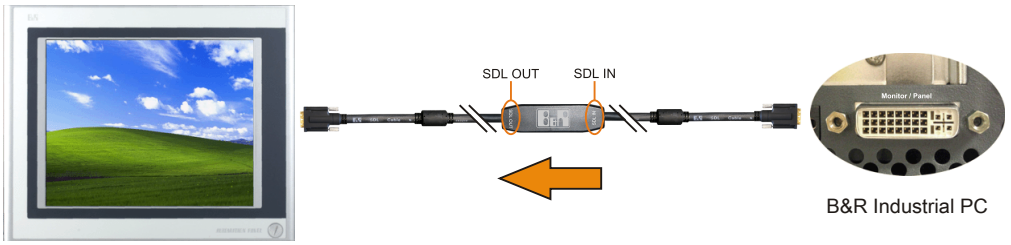


Figure 87: Example of the signal direction for an SDL flex cable with extender

1.6 USB cables

1.6.1 5CAUSB.00xx-00

1.6.1.1 General information

USB cables are designed to achieve USB 2.0 transfer speeds.

1.6.1.2 Order data

Model number	Short description	Figure
	USB cable	
5CAUSB.0018-00	USB 2.0 connection cable type A - type B, 1.8 m	
5CAUSB.0050-00	USB 2.0 connection cable type A - type B, 5 m	

Table 35: 5CAUSB.0018-00, 5CAUSB.0050-00 - Order data

1.6.1.3 Technical data

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

Table 36: 5CAUSB.0018-00, 5CAUSB.0050-00 - Technical data

1.6.1.4 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.

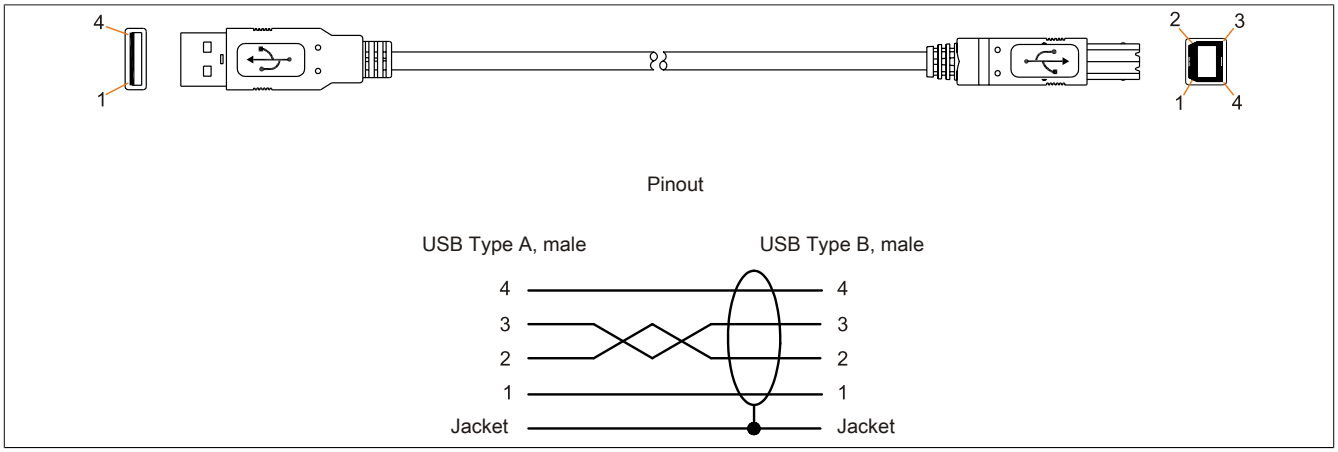


Figure 88: 5CAUSB.00xx-00 USB cables - Pinout

2 Power connectors

2.1 0TB103.9x

2.1.1 General information

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

2.1.2 Order data

Model number	Short description	Figure
	Terminal blocks	
0TB103.9	Connector, 24 VDC, 3-pin female, 3.31 mm² screw clamp, protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange	

Table 37: 0TB103.9, 0TB103.91 - Order data

2.1.3 Technical data

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

Product ID	0TB103.9	0TB103.91
General information		
Certification		
CE	Yes	
cULus	Yes	
cULus HazLoc Class 1 Division 2	Yes [1]	
GL	Yes [1]	
Terminal block		
Note	Protected against vibration by the screw flange Nominal values according to UL	
Number of pins	3 (female)	
Type of terminal clamp	Screw clamps	Cage clamps [3]
Cable type	Only copper wires (no aluminum wires!)	
Distance between contacts	5.08 mm	
Connection cross section		
AWG wire	26 to 14 AWG	26 to 12 AWG
Wire end sleeves with plastic covering	0.20 to 1.50 mm²	
Solid wires	0.20 to 2.50 mm²	
Fine strand wires	0.20 to 1.50 mm²	0.20 to 2.50 mm²
With wire end sleeves	0.20 to 1.50 mm²	
Fastening torque	0.4 Nm	-
Electrical characteristics		
Nominal voltage	300 V	
Nominal current [2]	10 A / contact	
Contact resistance	≤5 mΩ	

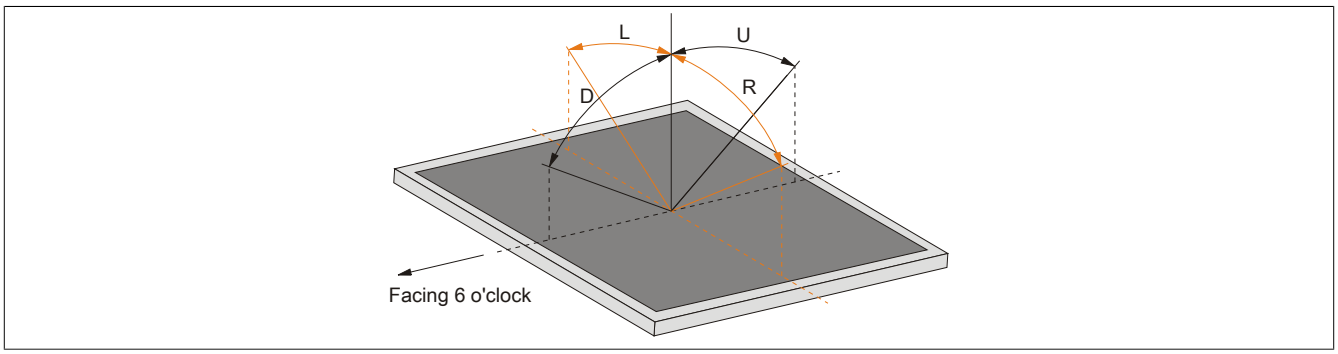
Table 38: 0TB103.9, 0TB103.91 - Technical data

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

Appendix A

1 Viewing angles

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



2 Abbreviations

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

Table 39: Abbreviations used in this user's manual

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