

Power Panel C70

User's manual

Version: **1.30 (February 2019)**
Model no.: **MAPPC70-ENG**

Translation of the original documentation

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1 General information.....	5
1.1 Manual history.....	5
1.2 Safety notices.....	6
1.2.1 Introduction.....	6
1.2.2 Intended use.....	6
1.2.3 Protection against electrostatic discharge.....	6
1.2.4 Regulations and measures.....	7
1.2.5 Transport and storage.....	7
1.2.6 Installation.....	7
1.2.7 Operation.....	8
1.2.8 Environmentally friendly disposal.....	8
1.2.9 Organization of notices.....	9
1.2.10 Safety-relevant symbols.....	9
2 System characteristics.....	10
2.1 Compact solution.....	10
2.2 Simple programming.....	10
2.3 Powerful.....	11
2.4 Flexibility.....	11
2.5 Model number key.....	12
3 Device description.....	13
3.1 Type overview.....	13
3.1.1 Comparison of Power Panel C70 variants.....	14
3.2 General technical data.....	15
3.2.1 Dependencies to hardware upgrades and Automation Runtime.....	15
3.2.2 Temperature monitoring.....	15
3.2.3 Data and real-time clock buffering.....	16
3.2.4 Viewing angles.....	16
3.2.5 Surface resistance of the panel overlay.....	17
3.2.6 Surface resistance of the touch screen.....	17
3.3 Power Panel C70 - 5.7" display.....	18
3.3.1 Variants without fieldbus interfaces.....	18
3.3.2 Variants with 2x CAN bus.....	21
3.3.3 Variants with 1x CAN bus and 1x RS232.....	25
3.3.4 Variants with 1x CAN bus and 1x RS485.....	29
3.3.5 Temperature/Humidity diagram.....	33
3.3.6 Dimensions.....	34
3.4 Power Panel C70 - 7.0" display.....	35
3.4.1 Variants without fieldbus interfaces.....	35
3.4.2 Variants with 2x CAN bus.....	38
3.4.3 Variants with 1x CAN bus and 1x RS232.....	42
3.4.4 Variants with 1x CAN bus and 1x RS485.....	46
3.4.5 Temperature/Humidity diagram.....	50
3.4.6 Dimensions.....	51
3.5 Power Panel C70 - 10.1" display.....	53
3.5.1 Variants without fieldbus interfaces.....	53
3.5.2 Variants with 2x CAN bus.....	56
3.5.3 Variants with 1x CAN bus and 1x RS232.....	60
3.5.4 Variants with 1x CAN bus and 1x RS485.....	64
3.5.5 Temperature/Humidity diagram.....	68
3.5.6 Dimensions.....	69
3.6 Operating and connection elements.....	71
3.6.1 Diagnostic LEDs.....	72
3.6.2 Reset button / Operating modes.....	77
3.6.3 POWERLINK interface (IF1).....	78
3.6.4 Ethernet interface (IF2).....	78

3.6.5 USB interfaces.....	79
3.6.6 X2X Link interface.....	79
3.6.7 Fieldbus interfaces.....	80
3.6.8 Power supply.....	81
4 Commissioning.....	82
4.1 Installation.....	82
4.1.1 Installation cutout requirements.....	83
4.1.2 Mounting with retaining clips.....	83
4.1.3 Installation instructions.....	84
4.1.4 Mounting orientations.....	85
4.1.5 Grounding.....	87
4.2 Commissioning.....	89
4.3 Operating the Power Panel.....	90
4.3.1 Touch screen.....	90
5 Maintenance.....	92
5.1 Cleaning.....	92
5.2 User tips for increasing the service life of the display or touch screen.....	93
5.2.1 Service life.....	93
5.2.2 Backlight.....	93
5.2.3 Image persistence.....	93
6 Accessories.....	95
6.1 Overview.....	95
6.2 TB6102 2-pin power supply connector.....	97
6.2.1 Order data.....	97
6.2.2 Technical data.....	97
6.3 TB510x 4/6-pin terminal block.....	98
6.3.1 Order data.....	98
6.3.2 Technical data.....	98
6.4 Data storage devices.....	99
6.5 Cable accessories.....	99
7 International and national certifications.....	100
7.1 Overview of certifications.....	100
7.2 EU directives and standards (CE).....	101
7.2.1 Overview of standards.....	102
7.2.2 Requirements for immunity to disturbances.....	103
7.2.3 Emission requirements.....	105
7.2.4 Mechanical conditions.....	106
7.2.5 Electrical safety.....	107
7.3 Underwriters Laboratories (UL).....	107

1 General information

Information:

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

1.1 Manual history

Version	Date	Comment
1.30	February 2019	Content changes: <ul style="list-style-type: none"> • Added documentation for terminating resistors in hardware revision G0 and later. • Documented additional virtual key. • Changed tightening torque of the retaining clips. • Editorial changes.
1.20	January 2018	Content changes: <ul style="list-style-type: none"> • Renamed chapter "Standards and certifications" to "International and national certifications", updated. • Content- and editorial-related corrections to "Technical data". • Revised section "Grounding". • Information regarding terminating resistor for some fieldbus interfaces Restructured manual: <ul style="list-style-type: none"> • Moved section "System characteristics" to its own chapter. • Merged chapter "Power Panel C-Series" and section "C70-Series" and renamed to chapter "Device description". • Restructured chapter "Device description" and renamed individual sections. • Additional editorial changes.
1.10	November 2015	Updated chapters: "General information", "Power Panel C-Series", "Commissioning" and "Standards and certifications"
1.00	October 2014	Updated "Technical data", "Commissioning" and "Accessories".

1.2 Safety notices

Important!

If the device is not used in accordance with the manufacturer's instructions, the protection provided by the device may be impaired.

1.2.1 Introduction

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

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

All work such as installation, commissioning and servicing are only permitted to be carried out by qualified personnel. Qualified personnel are persons who are familiar with the transport, installation, assembly, commissioning and operation of the product and have the appropriate qualifications for their job (e.g. IEC 60364). National accident prevention regulations must be observed.

The safety guidelines, information about connection conditions (nameplate and documentation) and limit values specified in the technical data must be read carefully before installation and commissioning and must be strictly observed.

1.2.2 Intended use

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

1.2.3 Protection against electrostatic discharge

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

1.2.3.1 Packaging

- Electrical assemblies with housing
... Do not require special ESD packaging but must be handled properly (see "[Electrical assemblies with housing](#)" on page 6).
- Electrical assemblies without housing
... Are protected by ESD-suitable packaging.

1.2.3.2 Regulations for proper ESD handling

Electrical assemblies with housing

- Do not touch the connector contacts on the device (bus data contacts).
- Do not touch the connector contacts of connected cables.
- Do not touch the contact tips on circuit boards.

Electrical assemblies without housing

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

- All persons handling electrical assemblies and devices in which electrical assemblies are installed must be grounded.
- Assemblies are only permitted to be touched on the narrow sides or front plate.
- Always place assemblies on suitable surfaces (ESD packaging, conductive foam, etc.).

Information: Metallic surfaces are not suitable surfaces!

- Assemblies must not be subjected to electrostatic discharges (e.g. due to charged plastics).
- A minimum distance of 10 cm from monitors or television sets must be maintained.
- Measuring instruments and devices must be grounded.
- Test probes of floating potential measuring instruments must be discharged briefly on suitable grounded surfaces before measurement.

Individual components

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

1.2.4 Regulations and measures

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

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

All work such as installation, commissioning and servicing are only permitted to be carried out by qualified personnel. Qualified personnel are persons who are familiar with the transport, installation, assembly, commissioning and operation of the product and have the appropriate qualifications for their job (e.g. IEC 60364). National accident prevention regulations must be observed.

The safety guidelines, information about connection conditions (nameplate and documentation) and limit values specified in the technical data must be read carefully before installation and commissioning and must be strictly observed.

1.2.5 Transport and storage

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

Devices contain components sensitive to electrostatic charges that can be damaged by improper handling. It is therefore necessary to provide the required protective measures against electrostatic discharge when installing or removing these devices (see ["Protection against electrostatic discharge" on page 6](#)).

1.2.6 Installation

- Installation must be performed according to this documentation using suitable equipment and tools.
- Devices are only permitted to be installed by qualified personnel when the power is switched off.
- General safety regulations and national accident prevention regulations must be observed.
- The electrical installation must be carried out in accordance with relevant regulations (e.g. wire cross section, fuse protection, protective ground connection).
- Take the necessary protective measures against electrostatic discharge (see ["Protection against electrostatic discharge" on page 6](#)).

1.2.7 Operation

1.2.7.1 Protection against contact with electrical parts

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

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

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

1.2.7.2 Ambient conditions - Dust, moisture, aggressive gases

The use of operating and monitoring devices (e.g. industrial PCs, Power Panels, Mobile Panels, etc.) and uninterruptible power supplies in dusty environments must be avoided. This can otherwise lead to dust deposits that affect the functionality of the device. Sufficient cooling can then no longer be guaranteed under certain circumstances, particularly in systems with an active cooling unit (fan).

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

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

1.2.7.3 Programs, viruses and malicious programs

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

1.2.8 Environmentally friendly disposal

All programmable logic controllers, operating and monitoring devices and uninterruptible power supplies from B&R are designed to have as little impact on the environment as possible.

1.2.8.1 Separation of materials

To ensure that devices can be recycled in an environmentally friendly manner, it is necessary to separate out the different materials.

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

Table 1: Environmentally friendly disposal

Disposal must be carried out in accordance with applicable legal regulations.

1.2.9 Organization of notices

Safety notices

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

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

Table 2: Organization of safety notices

General notices


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

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

Table 3: Organization of general notices

1.2.10 Safety-relevant symbols

The following symbols may appear on the device or its packaging:

Symbol	Explanation
	<p>The operating instructions must be observed.</p> <p>This documentation contains information about types of potential hazards and enables you to identify risks and implement countermeasures.</p>

2 System characteristics

The Power Panel C70 is available with 3 different display sizes ranging from 5.7" to 10.1". In addition to POWER-LINK, Ethernet, USB and X2X Link, variants with other interfaces are possible (CAN, RS232 or RS485).



2.1 Compact solution

With an extremely compact design, minimal installation depth and intelligent cable outlet arrangement, Power Panels are extreme space-savers that are very easy to install. They also have no hard disks, fans or batteries, which makes them maintenance-free. The front of the panel provides IP65 protection, making these devices extremely well-suited for harsh industrial environments.

2.2 Simple programming

The complete integration of the HMI application in the Automation Studio development environment goes without saying. The same is true for programming in all of the IEC languages offered by B&R as well as Automation Basic and ANSI C.

2.3 Powerful

The Power Panel C70 is an HMI terminal with a built-in PLC. The Intel Atom processor provides enough performance to allow applications to achieve cycle times down to 0.4 ms. Automation Runtime, which provides up to eight task classes, is the basis for this.



2.4 Flexibility

Three different display variants are available for the Power Panel C70.

- 5.7" variant
- 7.0" variant
- 10.1" variant

A touch button is integrated in the panel overlay at the lower right corner of the display. This element can easily be incorporated into the HMI application and makes it easy to switch between HMI screens or to implement a home or help function.

Landscape and portrait formats add even more flexibility to the machine design. It is easy to switch between panel models depending on the machine. In addition to the 2 format variants, 2 pinstripe color options are available: anthracite gray and aluminum white.

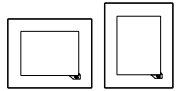
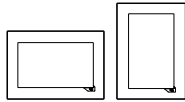
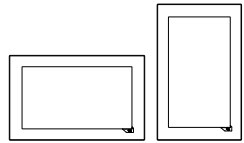

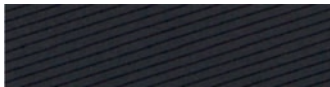
Regardless of model, size and color, what all these devices have in common is a shallow installation depth and minimized border width. At the same time, there were no compromises made with regard to stability or seal integrity.

2.5 Model number key




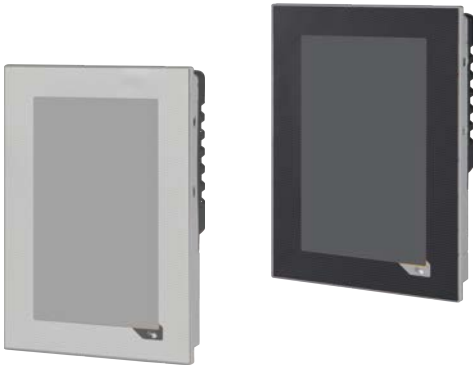


Product area															
4	Embedded PC-based automation														
Product family															
P	P	Power Panel													
Model															
C	Controller series														
Variant (processor power)															
7	0	Intel processor (Atom, single core)													
Diagonal															
.	0	5	7							5.7"					
.	0	7	0							7.0"					
.	1	0	1							10.1"					
Resolution															
2	WVGA (800 x 480) landscape														
3	VGA (640 x 480) landscape														
G	WSVGA (1024 x 600) landscape														
L	VGA (480 x 640) portrait														
M	WVGA (480 x 800) portrait														
N	WSVGA (600 x 1024) portrait														
Display / Touch screen technology															
-	2	TFT color + analog resistive touch screen													
Optional interfaces and features															
0	No optional interfaces/features														
1	2x CAN bus														
2	1x CAN bus and 1x RS232														
3	1x CAN bus and 1x RS485														
Front design															
Standard variants															
B	Anthracite gray pinstripe														
W	Aluminum white pinstripe														
Industry-specific variant															
I	.	.	.	Seq. number: I[0...Z][0...Z][0...Z]											
Customized panel overlay only															
F	.	.	.	Seq. number: F[0...Z][0...Z][0...Z]											
Complete customized variant															
C	.	.	.	Seq. number: C[0...Z][0...Z][0...Z]											
Model or I/O variants															
										Base model					
									- 0 1	Derivative: Sequential number [0...Z]					
Examples															
4	P	P	C	7	0	.	0	5	7	3	-	2	1	B	Power Panel C70, 5.7" , landscape format , fieldbus interfaces: 2x CAN bus . CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0" , 640 x 480 (VGA) resolution, analog resistive touch screen, landscape format, anthracite gray pinstripe . Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 2x CAN bus .
4	P	P	C	7	0	.	0	7	0	M	-	2	0	W	Power Panel C70, 7.0" , portrait format . CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0" , 480 x 800 (WVGA) resolution, analog resistive touch screen, portrait format, aluminum white pinstripe . Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0.
4	P	P	C	7	0	.	1	0	1	G	-	2	3	B	Power Panel C70, 10.1" , landscape format , fieldbus interfaces: 1x CAN bus, 1x RS485 . CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1" , 1024 x 600 (WSVGA) resolution, analog resistive touch screen, landscape format, anthracite gray pinstripe . Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS485 .

3 Device description

3.1 Type overview

Panel size	5.7"			7.0"			10.1"		
Model number	 4PPC70. 057 x-2xx			 4PPC70. 070 x-2xx			 4PPC70. 101 x-2xx		
Format / Resolution	Landscape						Portrait		
Resolution	VGA 640 x 480	WVGA 800 x 480	WSVGA 1024 x 600	VGA 480 x 640	WVGA 480 x 800	WSVGA 600 x 1024			
Model number	0573	0702	101G	057L	070M	101N			
	4PPC70. xxxx -2xx			4PPC70. xxxx -2xx					
Panel overlay	Pinstripe pattern in aluminum white						Pinstripe pattern in anthracite		
	 4PPC70. xxxx -2x W						 4PPC70. xxxx -2x B		
Interfaces	4PPC70. xxxx -2 xx								
	0	1	2	3					
IF1: POWERLINK	•	•	•	•					
IF2: Ethernet	•	•	•	•					
IF3: USB	•	•	•	•					
IF4: USB	•	•	•	•					
IF5: X2X Link master	•	•	•	•					
IF6: CAN bus		•	•	•					
IF7: CAN bus		•							
IF8: RS232			•						
IF9: RS485				•					

3.1.1 Comparison of Power Panel C70 variants

		Format / Panel overlay			
		Landscape		Portrait	
		Aluminum white	Anthracite	Aluminum white	Anthracite
Display size / Resolution	5.7" / VGA				
	7.0" / WVGA				
	10.1" / WSVGA				

3.2 General technical data

Name	Description
Processor	Intel processor with 333 MHz (Atom, single core)
Memory	256 MB DDRAM
All types of interfaces	All Power Panel C70 variants are equipped with the following interfaces: <ul style="list-style-type: none"> • 1 X2X Link interface • 1 POWERLINK interface • 1 Ethernet interface 10BASE-T/100BASE-TX • 2 USB 2.0 interfaces
Fieldbus interfaces	The following fieldbus interfaces are available depending on the variant: <ul style="list-style-type: none"> • 2x CAN bus • 1x CAN bus and 1x RS232 • 1x CAN bus and 1x RS485
Other	IP65 protection (front) Temperature range from 0 to 50°C Fanless Power supply 24 VDC -15% / +20%

3.2.1 Dependencies to hardware upgrades and Automation Runtime

Function	Hardware upgrade starting with version	Starting with AR version
<p>Replaceability of Power Panels:</p> <p>Starting with the specified versions, Power Panel C70 variants with the same characteristics can be replaced without having to change the Automation Studio project:</p> <ul style="list-style-type: none"> • Quantity and type of interfaces • Panel size • Display orientation <p>That means Power Panel C70 variants are interchangeable if the only difference between them is the color (panel overlay). A Power Panel C70 can therefore be replaced with a different panel overlay variant (or customized panel overlay) without having to make any changes to the Automation Studio project.</p>	1.2.0.0	AR F4.09 AR I4.10 AR B4.24 AR A4.25

3.2.2 Temperature monitoring

Automatic overtemperature shutdown

To prevent damage to the device, the inner temperature of the device is monitored continuously. If the internal temperature of the Power Panel reaches or exceeds 88°C, an automatic shutdown occurs (reset state).

The following errors are entered in the logbook in the event of cutoff:

Error number	Short error text
9204	PLC restart triggered by the PLC CPU's temperature monitoring.
9210	Warning: Halt/Service after watchdog or manual reset.

Monitoring by the application

The application can additionally monitor the temperature and, if necessary, take appropriate corrective measures before the automatic cutoff occurs.

Two data points are available for this purpose:

Data point	Description
TemperatureCPU	Temperature of the CPU housing
TemperatureENV	Inner temperature of the Power Panel

Important!

In worst case operation, the temperature of the CPU housing can achieve temperatures over 100°C.

Use case

Under certain circumstances (e.g. specified distances to ventilation cannot be observed, see "[Installation instructions](#)" on page 84), it makes sense for the application to monitor the Power Panel temperature. The application can take appropriate corrective measures if a certain temperature is exceeded.

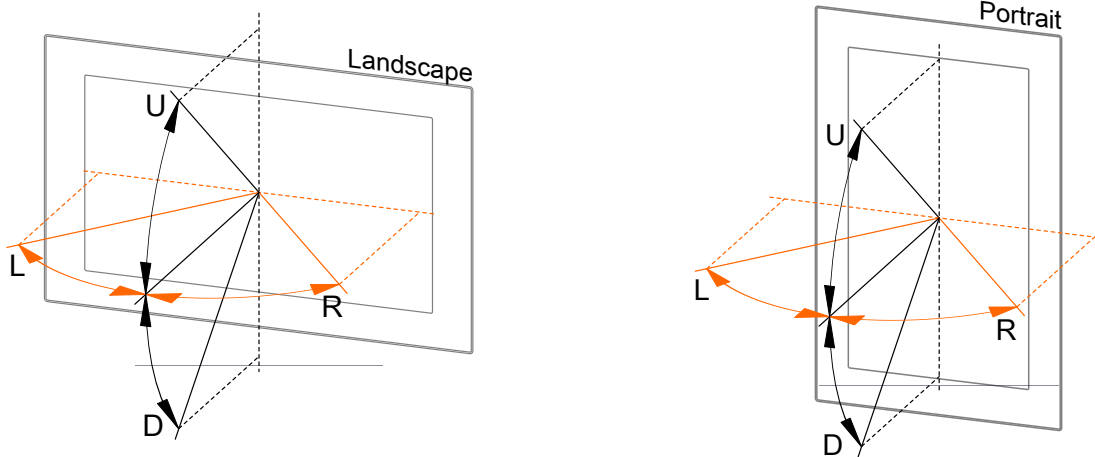
3.2.3 Data and real-time clock buffering

Power Panels are not designed for use with batteries. This makes them completely maintenance-free. The following features make operation without a backup battery possible.

Data and real-time clock buffering	Type of buffering	Note
Remanent variables	FRAM	This FRAM stores its contents ferroelectrically. Unlike normal SRAM, this does not require a battery.
Real-time clock	Gold foil capacitor	The real-time clock is buffered for approx. 1000 hours by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.

3.2.4 Viewing angles

For the viewing angles values (U, D, R, L) of the display types, see the technical data of the respective device.



Legend:	Display viewing angle
U	From top
D	From bottom
L	From left
R	From right

The viewing angles are specified for the horizontal (L, R) and vertical (U, D) axes in reference to the vertical axis of the display. The specified viewing angles above always refer to the standard mounting orientation of the respective Power Panel.

Standard mounting orientation: The Hand button is at the bottom right.

3.2.5 Surface resistance of the panel overlay

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

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

Information:

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

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

3.2.6 Surface resistance of the touch screen

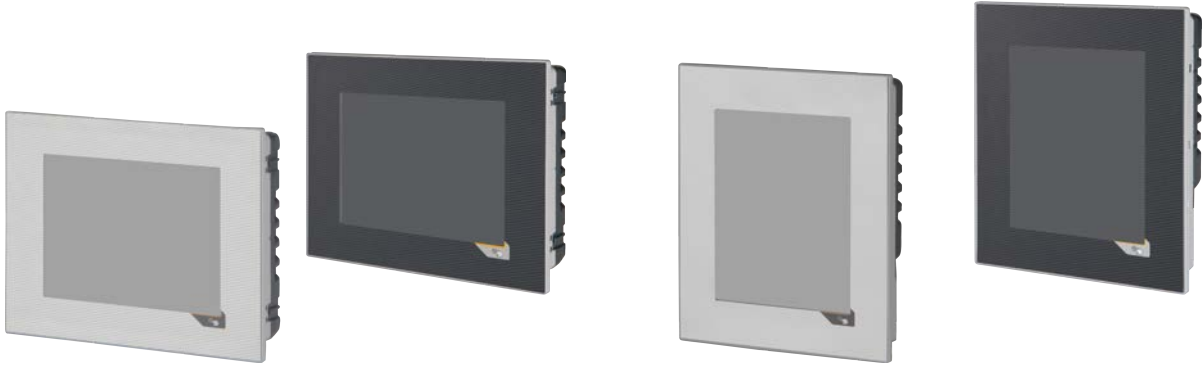
The surface of the analog resistive touch screen is resistant to the following chemicals at a temperature of 25°C for a duration of 1 hour.

- Acetone
- Methylene chloride
- Butanone
- Isopropyl alcohol
- Hexane
- Turpentine
- Mineral spirit
- Unleaded gasoline
- Diesel fuel
- Motor oil
- Transmission fluid
- Antifreeze
- Ammonia-based glass cleaner
- Washing agents
- Household cleaners
- Vinegar
- Coffee
- Tea
- Lubricating grease
- Cooking oil
- Salt

3.3 Power Panel C70 - 5.7" display

3.3.1 Variants without fieldbus interfaces

3.3.1.1 Order data



Model number	Short description
Power Panel C70	
4PPC70.0573-20W	Power Panel C70, 5.7", landscape format. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 640 x 480 (VGA) resolution, analog resistive touch screen, landscape format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0.
4PPC70.0573-20B	Power Panel C70, 5.7", landscape format. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 640 x 480 (VGA) resolution, analog resistive touch screen, landscape format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0.
4PPC70.057L-20W	Power Panel C70, 5.7", portrait format. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 480 x 640 (VGA) resolution, analog resistive touch screen, portrait format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0.
4PPC70.057L-20B	Power Panel C70, 5.7", portrait format. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 480 x 640 (VGA) resolution, analog resistive touch screen, portrait format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0.
Required accessories	
Terminal blocks	
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp, 0.5 mm ²
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²
Optional accessories	
Other	
9A0013.01	Stylus pen for resistive touch screen
Terminal blocks	
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R

Table 4: Power Panel C70 - 5.7" variants without fieldbus interfaces - Order data

3.3.1.2 Content of delivery

Name	Quantity	Description
-	1	Accessory set 5x retaining clip for securing the panel in the installation cutout

3.3.1.3 Technical data

Model number	4PPC70.0573-20W	4PPC70.0573-20B	4PPC70.057L-20W	4PPC70.057L-20B
General information				
Cooling	Fanless			
B&R ID code	0xE55D	0xE4B2	0xE561	0xE565
System requirements				
Automation Studio	4.1.4.375 and later			
Automation Runtime	K4.08 and later			
Support of X20SLX modules	Rev. B4 and later			
Power button	No			
Reset button	Yes			
Status indicators	Supply voltage OK, operating state, module status, POWERLINK, Ethernet			
Buzzer	Yes			
Controller redundancy possible	No			
ACOPOS support	Yes			
Visual Components support	Yes			
Certifications				
CE	Yes			
UL	cULus E115267 Industrial control equipment			
Controller				
Bootloader	Automation Runtime AR 4.08			
Real-time clock ¹⁾	Nonvolatile, 1 s resolution, -10 to 10 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	Atom E620T			
Clock frequency	333 MHz (compatible)			
L1 cache				
Data code	24 kB			
Program code	32 kB			
L2 cache				
-				
Mode/Node switches	No			
Remanent variables	32 kB FRAM, buffering >10 years ²⁾			
DRAM	256 MB			
Shortest task class cycle time	0.4 ms			
Typical instruction cycle time	0.01 µs			
Application memory				
Type	2 GB eMMC flash memory			
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Temperature cutoff	Yes, at >88°C			
Display				
Type	TFT color			
Diagonal	5.7"			
Colors	262,144 (RGB, 6 bits per channel)			
Resolution	VGA, 640 x 480 pixels		VGA, 480 x 640 pixels	
Contrast	Typ. 850:1			
Viewing angles				
Horizontal	Direction L / Direction R = Typ. 80°		Direction L / Direction R = Typ. 70°	
Vertical	Direction U / Direction D = Typ. 70°		Direction U / Direction D = Typ. 80°	
Backlight				
Type	LED			
Brightness	Typ. 400 cd/m ²			
Half-brightness time ³⁾	50,000 h			
Touch screen				
Type	AMT			
Technology	Analog resistive			
Controller	B&R, serial, 12-bit			
Transmittance	80% ±3%			
Screen rotation	Yes, using per Visual Components			

Table 5: Power Panel C70 - 5.7" variants without fieldbus interfaces - Technical data

Device description • Power Panel C70 - 5.7" display

Model number	4PPC70.0573-20W	4PPC70.0573-20B	4PPC70.057L-20W	4PPC70.057L-20B
Interfaces				
Interface IF1				
Fieldbus	POWERLINK V2 managing or controlled node			
Type	Type 4 ⁴⁾			
Variant	1x RJ45 shielded			
Line length	Max. 100 m between 2 nodes (segment length)			
Max. transfer rate	100 Mbit/s			
Transfer				
Physical layer	100BASE-TX			
Half-duplex	Yes			
Full-duplex	POWERLINK mode: No / Ethernet mode: Yes			
Autonegotiation	Yes			
Auto-MDI / MDIX	Yes			
Interface IF2				
Type	Ethernet			
Variant	1x RJ45 shielded			
Line length	Max. 100 m between 2 nodes (segment length)			
Max. transfer rate	10/100 Mbit/s			
Transfer				
Physical layer	10BASE-T/100BASE-TX			
Half-duplex	Yes			
Full-duplex	Yes			
Autonegotiation	Yes			
Auto-MDI / MDIX	Yes			
Interface IF3				
Type	USB 2.0			
Variant	Type A			
Current-carrying capacity	0.49 A			
Interface IF4				
Type	USB 2.0			
Variant	Type A			
Current-carrying capacity	≥Rev. E0: 0.20 A <Rev. E0: 0.10 A			
Interface IF5				
Fieldbus	X2X Link master			
Electrical properties				
Nominal voltage	24 VDC -15% / +20%			
Max. power consumption ⁵⁾	14.4 W			
Reverse polarity protection	Yes			
Electrical isolation	IF1, IF2 and IF5 with each other, with other interfaces and with the base device			
Operating conditions				
Permissible mounting orientations				
Standard mounting orientation	Vertical			
Tilt	±25°			
Rotation	In 90° increments (portrait/landscape)			
Installation elevation above sea level				
0 to 2000 m	No limitation			
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m			
Degree of protection per EN 60529	Front: IP65, Back: IP20			
Ambient conditions				
Temperature				
Operation	0 to 50°C			
Storage	-20 to 70°C			
Transport	-20 to 70°C			
Relative humidity	See temperature/humidity diagram.			
Mechanical properties				
Note	Order terminal blocks 1x 0TB5104.2110-01, 1x 0TB6102.2010-01 and 1x 0TB6102.2110-01 separately			
Front				
Design	Aluminum white pinstripe	Anthracite gray pinstripe	Aluminum white pinstripe	Anthracite gray pinstripe
Dimensions				
Width	172 mm		140 mm	
Height	140 mm		172 mm	
Depth	51 mm			
Weight	0.6 kg			

Table 5: Power Panel C70 - 5.7" variants without fieldbus interfaces - Technical data

- 1) The real-time clock is buffered for approx. 1000 hours @ 25°C by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.
- 2) The size of the memory used for remanent variables is adjustable in Automation Studio.
- 3) Value applies at an ambient temperature of 25°C. Reducing the brightness by 50% can increase the half-brightness time up to 50%.
- 4) See section "Communication ⇒ POWERLINK ⇒ General information ⇒ Hardware - IF/LS" of Automation Help
- 5) Measured while all communication interfaces in use.

3.3.2 Variants with 2x CAN bus

3.3.2.1 Order data

Model number	Short description
Power Panel C70	
4PPC70.0573-21W	Power Panel C70, 5.7", landscape format, fieldbus interfaces: 2x CAN bus. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 640 x 480 (VGA) resolution, analog resistive touch screen, landscape format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 2x CAN bus.
4PPC70.0573-21B	Power Panel C70, 5.7", landscape format, fieldbus interfaces: 2x CAN bus. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 640 x 480 (VGA) resolution, analog resistive touch screen, landscape format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 2x CAN bus.
4PPC70.057L-21W	Power Panel C70, 5.7", portrait format, fieldbus interfaces: 2x CAN bus. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 480 x 640 (VGA) resolution, analog resistive touch screen, portrait format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 2x CAN bus.
4PPC70.057L-21B	Power Panel C70, 5.7", portrait format, fieldbus interfaces: 2x CAN bus. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 480 x 640 (VGA) resolution, analog resistive touch screen, portrait format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 2x CAN bus.
Required accessories	
Terminal blocks	
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp, 0.5 mm ²
0TB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²
Optional accessories	
Other	
9A0013.01	Stylus pen for resistive touch screen
Terminal blocks	
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R

Table 6: Power Panel C70 - 5.7" variants, 2x CAN bus - Order data

3.3.2.2 Content of delivery

Name	Quantity	Description
-	1	Accessory set 5x retaining clip for securing the panel in the installation cutout

3.3.2.3 Technical data

Model number	4PPC70.0573-21W	4PPC70.0573-21B	4PPC70.057L-21W	4PPC70.057L-21B
General information				
Cooling	Fanless			
B&R ID code	0xE55E	0xE4B3	0xE562	0xE566
System requirements				
Automation Studio	4.1.4.375 and later			
Automation Runtime	K4.08 and later			
Support of X20SLX modules	Rev. B4 and later			
Power button	No			
Reset button	Yes			
Status indicators	Supply voltage OK, operating state, module status, POWERLINK, Ethernet, CAN Rx/Tx			
Buzzer	Yes			
Controller redundancy possible	No			
ACOPOS support	Yes			
Visual Components support	Yes			
Certifications				
CE	Yes			
UL	cULus E115267 Industrial control equipment			
Controller				
Bootloader	Automation Runtime AR 4.08			
Real-time clock ¹⁾	Nonvolatile, 1 s resolution, -10 to 10 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	Atom E620T			
Clock frequency	333 MHz (compatible)			
L1 cache				
Data code	24 kB			
Program code	32 kB			
L2 cache				
-				
Mode/Node switches	No			
Remanent variables	32 kB FRAM, buffering >10 years ²⁾			
DRAM	256 MB			
Shortest task class cycle time	0.4 ms			
Typical instruction cycle time	0.01 µs			
Application memory				
Type	2 GB eMMC flash memory			
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Temperature cutoff	Yes, at >88°C			
Display				
Type	TFT color			
Diagonal	5.7"			
Colors	262,144 (RGB, 6 bits per channel)			
Resolution	VGA, 640 x 480 pixels		VGA, 480 x 640 pixels	
Contrast	Typ. 850:1			
Viewing angles				
Horizontal	Direction L / Direction R = Typ. 80°		Direction L / Direction R = Typ. 70°	
Vertical	Direction U / Direction D = Typ. 70°		Direction U / Direction D = Typ. 80°	
Backlight				
Type	LED			
Brightness	Typ. 400 cd/m ²			
Half-brightness time ³⁾	50,000 h			
Touch screen				
Type	AMT			
Technology	Analog resistive			
Controller	B&R, serial, 12-bit			
Transmittance	80% ±3%			
Screen rotation	Yes, using per Visual Components			

Table 7: Power Panel C70 - 5.7" variants, 2x CAN bus - Technical data

Model number	4PPC70.0573-21W	4PPC70.0573-21B	4PPC70.057L-21W	4PPC70.057L-21B
Interfaces				
Interface IF1				
Fieldbus	POWERLINK V2 managing or controlled node			
Type	Type 4 ⁴⁾			
Variant	1x RJ45 shielded			
Line length	Max. 100 m between 2 nodes (segment length)			
Max. transfer rate	100 Mbit/s			
Transfer				
Physical layer	100BASE-TX			
Half-duplex	Yes			
Full-duplex	POWERLINK mode: No / Ethernet mode: Yes			
Autonegotiation	Yes			
Auto-MDI / MDIX	Yes			
Interface IF2				
Type	Ethernet			
Variant	1x RJ45 shielded			
Line length	Max. 100 m between 2 nodes (segment length)			
Max. transfer rate	10/100 Mbit/s			
Transfer				
Physical layer	10BASE-T/100BASE-TX			
Half-duplex	Yes			
Full-duplex	Yes			
Autonegotiation	Yes			
Auto-MDI / MDIX	Yes			
Interface IF3				
Type	USB 2.0			
Variant	Type A			
Current-carrying capacity	0.49 A			
Interface IF4				
Type	USB 2.0			
Variant	Type A			
Current-carrying capacity	≥Rev. E0: 0.20 A <Rev. E0: 0.10 A			
Interface IF5				
Fieldbus	X2X Link master			
Interface IF6				
Type	CAN bus			
Variant	3 pins of the 6-pin multipoint connector			
Max. distance	1000 m			
Max. transfer rate				
Bus length ≤25 m	1 Mbit/s			
Bus length ≤60 m	500 kbit/s			
Bus length ≤200 m	250 kbit/s			
Bus length ≤1000 m	50 kbit/s			
Terminating resistor ⁵⁾	Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally			
Interface IF7				
Type	CAN bus			
Variant	3 pins of the 6-pin multipoint connector			
Max. distance	1000 m			
Max. transfer rate				
Bus length ≤25 m	1 Mbit/s			
Bus length ≤60 m	500 kbit/s			
Bus length ≤200 m	250 kbit/s			
Bus length ≤1000 m	50 kbit/s			
Terminating resistor ⁵⁾	Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally			
Electrical properties				
Nominal voltage	24 VDC -15% / +20%			
Max. power consumption ⁶⁾	14.4 W			
Reverse polarity protection	Yes			
Electrical isolation	IF1, IF2 and IF5 with each other, with other interfaces and with the base device			
Operating conditions				
Permissible mounting orientations				
Standard mounting orientation	Vertical			
Tilt	±25°			
Rotation	In 90° increments (portrait/landscape)			
Installation elevation above sea level				
0 to 2000 m	No limitation			
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m			
Degree of protection per EN 60529	Front: IP65, Back: IP20			

Table 7: Power Panel C70 - 5.7" variants, 2x CAN bus - Technical data

Device description • Power Panel C70 - 5.7" display

Model number	4PPC70.0573-21W	4PPC70.0573-21B	4PPC70.057L-21W	4PPC70.057L-21B
Ambient conditions				
Temperature				
Operation	0 to 50°C			
Storage	-20 to 70°C			
Transport	-20 to 70°C			
Relative humidity	See temperature/humidity diagram.			
Mechanical properties				
Note	Order terminal blocks 1x 0TB5104.2110-01, 1x 0TB5106.2110-01, 1x 0TB6102.2010-01 and 1x 0TB6102.2110-01 separately			
Front				
Design	Aluminum white pinstripe	Anthracite gray pinstripe	Aluminum white pinstripe	Anthracite gray pinstripe
Dimensions				
Width	172 mm		140 mm	
Height	140 mm		172 mm	
Depth	51 mm			
Weight	0.6 kg			

Table 7: Power Panel C70 - 5.7" variants, 2x CAN bus - Technical data

- 1) The real-time clock is buffered for approx. 1000 hours @ 25°C by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.
- 2) The size of the memory used for remanent variables is adjustable in Automation Studio.
- 3) Value applies at an ambient temperature of 25°C. Reducing the brightness by 50% can increase the half-brightness time up to 50%.
- 4) See section "Communication → POWERLINK → General information → Hardware - IF/LS" of Automation Help
- 5) The functionality for switching on the internal terminating resistor using software is available starting with Automation Studio 4.3.1 and Automation Runtime A4.31.
- 6) Measured while all communication interfaces in use.

3.3.3 Variants with 1x CAN bus and 1x RS232

3.3.3.1 Order data

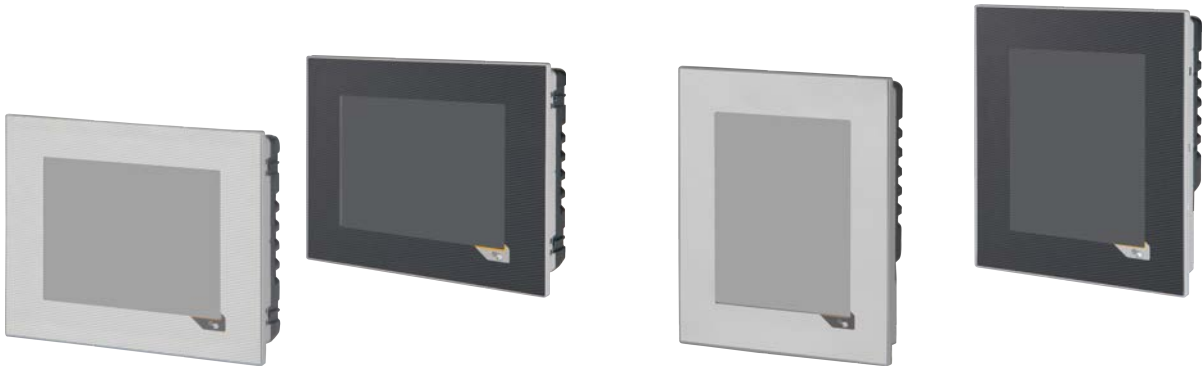
	
Model number	Short description
Power Panel C70	
4PPC70.0573-22W	Power Panel C70, 5.7", landscape format, fieldbus interfaces: 1x CAN bus, 1x RS232. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 640 x 480 (VGA) resolution, analog resistive touch screen, landscape format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS232.
4PPC70.0573-22B	Power Panel C70, 5.7", landscape format, fieldbus interfaces: 1x CAN bus, 1x RS232. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 640 x 480 (VGA) resolution, analog resistive touch screen, landscape format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS232.
4PPC70.057L-22W	Power Panel C70, 5.7", portrait format, fieldbus interfaces: 1x CAN bus, 1x RS232. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 480 x 640 (VGA) resolution, analog resistive touch screen, portrait format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS232.
4PPC70.057L-22B	Power Panel C70, 5.7", portrait format, fieldbus interfaces: 1x CAN bus, 1x RS232. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 480 x 640 (VGA) resolution, analog resistive touch screen, portrait format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS232.
Required accessories	
Terminal blocks	
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp, 0.5 mm ²
0TB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²
Optional accessories	
Other	
9A0013.01	Stylus pen for resistive touch screen
Terminal blocks	
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R

Table 8: Power Panel C70 - 5.7" variants, 1x CAN bus and 1x RS232 - Order data

3.3.3.2 Content of delivery

Name	Quantity	Description
-	1	Accessory set 5x retaining clip for securing the panel in the installation cutout

3.3.3.3 Technical data

Model number	4PPC70.0573-22W	4PPC70.0573-22B	4PPC70.057L-22W	4PPC70.057L-22B
General information				
Cooling	Fanless			
B&R ID code	0xE55F	0xE4B4	0xE563	0xE567
System requirements				
Automation Studio	4.1.4.375 and later			
Automation Runtime	K4.08 and later			
Support of X20SLX modules	Rev. B4 and later			
Power button	No			
Reset button	Yes			
Status indicators	Supply voltage OK, operating state, module status, POWERLINK, Ethernet, CAN Rx/Tx, RS232 Rx/Tx			
Buzzer	Yes			
Controller redundancy possible	No			
ACOPOS support	Yes			
Visual Components support	Yes			
Certifications				
CE	Yes			
UL	cULus E115267 Industrial control equipment			
Controller				
Bootloader	Automation Runtime AR 4.08			
Real-time clock ¹⁾	Nonvolatile, 1 s resolution, -10 to 10 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	Atom E620T			
Clock frequency	333 MHz (compatible)			
L1 cache				
Data code	24 kB			
Program code	32 kB			
L2 cache				
-				
Mode/Node switches	No			
Remanent variables	32 kB FRAM, buffering >10 years ²⁾			
DRAM	256 MB			
Shortest task class cycle time	0.4 ms			
Typical instruction cycle time	0.01 µs			
Application memory				
Type	2 GB eMMC flash memory			
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Temperature cutoff	Yes, at >88°C			
Display				
Type	TFT color			
Diagonal	5.7"			
Colors	262,144 (RGB, 6 bits per channel)			
Resolution	VGA, 640 x 480 pixels		VGA, 480 x 640 pixels	
Contrast	Typ. 850:1			
Viewing angles				
Horizontal	Direction L / Direction R = Typ. 80°		Direction L / Direction R = Typ. 70°	
Vertical	Direction U / Direction D = Typ. 70°		Direction U / Direction D = Typ. 80°	
Backlight				
Type	LED			
Brightness	Typ. 400 cd/m ²			
Half-brightness time ³⁾	50,000 h			
Touch screen				
Type	AMT			
Technology	Analog resistive			
Controller	B&R, serial, 12-bit			
Transmittance	80% ±3%			
Screen rotation	Yes, using per Visual Components			

Table 9: Power Panel C70 - 5.7" variants, 1x CAN bus and 1x RS232 - Technical data

Model number	4PPC70.0573-22W	4PPC70.0573-22B	4PPC70.057L-22W	4PPC70.057L-22B
Interfaces				
Interface IF1				
Fieldbus	POWERLINK V2 managing or controlled node			
Type	Type 4 ⁴⁾			
Variant	1x RJ45 shielded			
Line length	Max. 100 m between 2 nodes (segment length)			
Max. transfer rate	100 Mbit/s			
Transfer				
Physical layer	100BASE-TX			
Half-duplex	Yes			
Full-duplex	POWERLINK mode: No / Ethernet mode: Yes			
Autonegotiation	Yes			
Auto-MDI / MDIX	Yes			
Interface IF2				
Type	Ethernet			
Variant	1x RJ45 shielded			
Line length	Max. 100 m between 2 nodes (segment length)			
Max. transfer rate	10/100 Mbit/s			
Transfer				
Physical layer	10BASE-T/100BASE-TX			
Half-duplex	Yes			
Full-duplex	Yes			
Autonegotiation	Yes			
Auto-MDI / MDIX	Yes			
Interface IF3				
Type	USB 2.0			
Variant	Type A			
Current-carrying capacity	0.49 A			
Interface IF4				
Type	USB 2.0			
Variant	Type A			
Current-carrying capacity	≥Rev. E0: 0.20 A <Rev. E0: 0.10 A			
Interface IF5				
Fieldbus	X2X Link master			
Interface IF6				
Type	CAN bus			
Variant	3 pins of the 6-pin multipoint connector			
Max. distance	1000 m			
Max. transfer rate				
Bus length ≤25 m	1 Mbit/s			
Bus length ≤60 m	500 kbit/s			
Bus length ≤200 m	250 kbit/s			
Bus length ≤1000 m	50 kbit/s			
Terminating resistor ⁵⁾	Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally			
Interface IF8				
Type	RS232			
Variant	3 pins of the 6-pin multipoint connector			
Max. distance	900 m			
Transfer rate	Max. 115.2 kbit/s			
Electrical properties				
Nominal voltage	24 VDC -15% / +20%			
Max. power consumption ⁶⁾	14.4 W			
Reverse polarity protection	Yes			
Electrical isolation	IF1, IF2 and IF5 with each other, with other interfaces and with the base device			
Operating conditions				
Permissible mounting orientations				
Standard mounting orientation	Vertical			
Tilt	±25°			
Rotation	In 90° increments (portrait/landscape)			
Installation elevation above sea level				
0 to 2000 m	No limitation			
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m			
Degree of protection per EN 60529	Front: IP65, Back: IP20			
Ambient conditions				
Temperature				
Operation	0 to 50°C			
Storage	-20 to 70°C			
Transport	-20 to 70°C			
Relative humidity	See temperature/humidity diagram.			

Table 9: Power Panel C70 - 5.7" variants, 1x CAN bus and 1x RS232 - Technical data

Device description • Power Panel C70 - 5.7" display

Model number	4PPC70.0573-22W	4PPC70.0573-22B	4PPC70.057L-22W	4PPC70.057L-22B
Mechanical properties				
Note	Order terminal blocks 1x 0TB5104.2110-01, 1x 0TB5106.2110-01, 1x 0TB6102.2010-01 and 1x 0TB6102.2110-01 separately			
Front				
Design	Aluminum white pinstripe	Anthracite gray pinstripe	Aluminum white pinstripe	Anthracite gray pinstripe
Dimensions				
Width	172 mm		140 mm	
Height	140 mm		172 mm	
Depth	51 mm			
Weight	0.6 kg			

Table 9: Power Panel C70 - 5.7" variants, 1x CAN bus and 1x RS232 - Technical data

- 1) The real-time clock is buffered for approx. 1000 hours @ 25°C by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.
- 2) The size of the memory used for remanent variables is adjustable in Automation Studio.
- 3) Value applies at an ambient temperature of 25°C. Reducing the brightness by 50% can increase the half-brightness time up to 50%.
- 4) See section "Communication ⇒ POWERLINK ⇒ General information ⇒ Hardware - IF/LS" of Automation Help
- 5) The functionality for switching on the internal terminating resistor using software is available starting with Automation Studio 4.3.1 and Automation Runtime A4.31.
- 6) Measured while all communication interfaces in use.

3.3.4 Variants with 1x CAN bus and 1x RS485

3.3.4.1 Order data

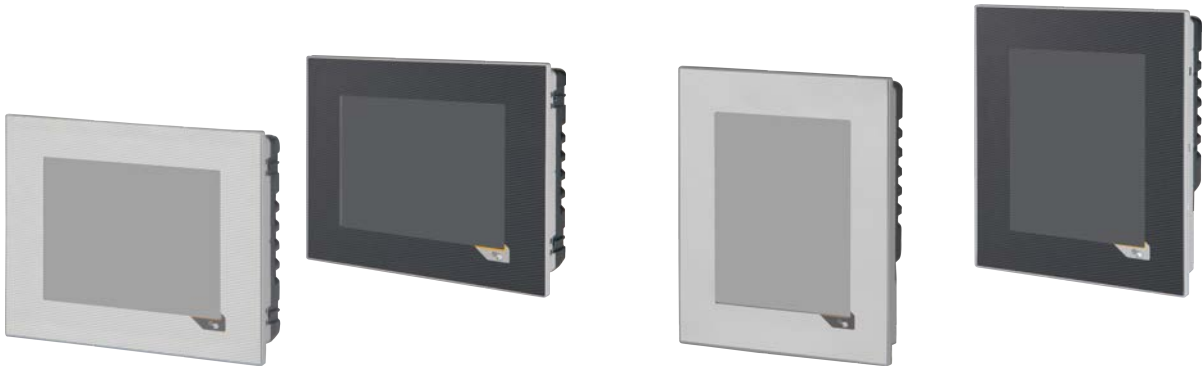
	
Model number	Short description
Power Panel C70	
4PPC70.0573-23W	Power Panel C70, 5.7", landscape format, fieldbus interfaces: 1x CAN bus, 1x RS485. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 640 x 480 (VGA) resolution, analog resistive touch screen, landscape format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS485.
4PPC70.0573-23B	Power Panel C70, 5.7", landscape format, fieldbus interfaces: 1x CAN bus, 1x RS485. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 640 x 480 (VGA) resolution, analog resistive touch screen, landscape format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS485.
4PPC70.057L-23W	Power Panel C70, 5.7", portrait format, fieldbus interfaces: 1x CAN bus, 1x RS485. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 480 x 640 (VGA) resolution, analog resistive touch screen, portrait format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS485.
4PPC70.057L-23B	Power Panel C70, 5.7", portrait format, fieldbus interfaces: 1x CAN bus, 1x RS485. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 5.0", 480 x 640 (VGA) resolution, analog resistive touch screen, portrait format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS485.
Required accessories	
Terminal blocks	
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp, 0.5 mm ²
0TB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²
Optional accessories	
Other	
9A0013.01	Stylus pen for resistive touch screen
Terminal blocks	
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R

Table 10: Power Panel C70 - 5.7" variants, 1x CAN bus and 1x RS485 - Order data

3.3.4.2 Content of delivery

Name	Quantity	Description
-	1	Accessory set 5x retaining clip for securing the panel in the installation cutout

3.3.4.3 Technical data

Model number	4PPC70.0573-23W	4PPC70.0573-23B	4PPC70.057L-23W	4PPC70.057L-23B
General information				
Cooling	Fanless			
B&R ID code	0xE560	0xE4B5	0xE564	0xE568
System requirements				
Automation Studio	4.1.4.375 and later			
Automation Runtime	K4.08 and later			
Support of X20SLX modules	Rev. B4 and later			
Power button	No			
Reset button	Yes			
Status indicators	Supply voltage OK, operating state, module status, POWERLINK, Ethernet, CAN Rx/Tx, RS485 Rx/Tx			
Buzzer	Yes			
Controller redundancy possible	No			
ACOPOS support	Yes			
Visual Components support	Yes			
Certifications				
CE	Yes			
UL	cULus E115267 Industrial control equipment			
Controller				
Bootloader	Automation Runtime AR 4.08			
Real-time clock ¹⁾	Nonvolatile, 1 s resolution, -10 to 10 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	Atom E620T			
Clock frequency	333 MHz (compatible)			
L1 cache				
Data code	24 kB			
Program code	32 kB			
L2 cache				
-				
Mode/Node switches	No			
Remanent variables	32 kB FRAM, buffering >10 years ²⁾			
DRAM	256 MB			
Shortest task class cycle time	0.4 ms			
Typical instruction cycle time	0.01 µs			
Application memory				
Type	2 GB eMMC flash memory			
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Temperature cutoff	Yes, at >88°C			
Display				
Type	TFT color			
Diagonal	5.7"			
Colors	262,144 (RGB, 6 bits per channel)			
Resolution	VGA, 640 x 480 pixels		VGA, 480 x 640 pixels	
Contrast	Typ. 850:1			
Viewing angles				
Horizontal	Direction L / Direction R = Typ. 80°		Direction L / Direction R = Typ. 70°	
Vertical	Direction U / Direction D = Typ. 70°		Direction U / Direction D = Typ. 80°	
Backlight				
Type	LED			
Brightness	Typ. 400 cd/m ²			
Half-brightness time ³⁾	50,000 h			
Touch screen				
Type	AMT			
Technology	Analog resistive			
Controller	B&R, serial, 12-bit			
Transmittance	80% ±3%			
Screen rotation	Yes, using per Visual Components			

Table 11: Power Panel C70 - 5.7" variants, 1x CAN bus and 1x RS485 - Technical data

Model number	4PPC70.0573-23W	4PPC70.0573-23B	4PPC70.057L-23W	4PPC70.057L-23B
Interfaces				
Interface IF1				
Fieldbus		POWERLINK V2 managing or controlled node		
Type		Type 4 ⁴⁾		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		100 Mbit/s		
Transfer				
Physical layer		100BASE-TX		
Half-duplex		Yes		
Full-duplex		POWERLINK mode: No / Ethernet mode: Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF2				
Type		Ethernet		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		10/100 Mbit/s		
Transfer				
Physical layer		10BASE-T/100BASE-TX		
Half-duplex		Yes		
Full-duplex		Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF3				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		0.49 A		
Interface IF4				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		≥Rev. E0: 0.20 A <Rev. E0: 0.10 A		
Interface IF5				
Fieldbus		X2X Link master		
Interface IF6				
Type		CAN bus		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		1000 m		
Max. transfer rate				
Bus length ≤25 m		1 Mbit/s		
Bus length ≤60 m		500 kbit/s		
Bus length ≤200 m		250 kbit/s		
Bus length ≤1000 m		50 kbit/s		
Terminating resistor ⁵⁾		Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally		
Interface IF9				
Type		RS485		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		1200 m		
Transfer rate		Max. 115.2 kbit/s		
Terminating resistor ⁵⁾		Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally		
Electrical properties				
Nominal voltage		24 VDC -15% / +20%		
Max. power consumption ⁶⁾		14.4 W		
Reverse polarity protection		Yes		
Electrical isolation		IF1, IF2 and IF5 with each other, with other interfaces and with the base device		
Operating conditions				
Permissible mounting orientations				
Standard mounting orientation		Vertical		
Tilt		±25°		
Rotation		In 90° increments (portrait/landscape)		
Installation elevation above sea level				
0 to 2000 m		No limitation		
>2000 m		Reduction of ambient temperature by 0.5°C per 100 m		
Degree of protection per EN 60529		Front: IP65, Back: IP20		
Ambient conditions				
Temperature				
Operation		0 to 50°C		
Storage		-20 to 70°C		
Transport		-20 to 70°C		
Relative humidity		See temperature/humidity diagram.		

Table 11: Power Panel C70 - 5.7" variants, 1x CAN bus and 1x RS485 - Technical data

Device description • Power Panel C70 - 5.7" display

Model number	4PPC70.0573-23W	4PPC70.0573-23B	4PPC70.057L-23W	4PPC70.057L-23B
Mechanical properties				
Note	Order terminal blocks 1x 0TB5104.2110-01, 1x 0TB5106.2110-01, 1x 0TB6102.2010-01 and 1x 0TB6102.2110-01 separately			
Front				
Design	Aluminum white pinstripe	Anthracite gray pinstripe	Aluminum white pinstripe	Anthracite gray pinstripe
Dimensions				
Width	172 mm		140 mm	
Height	140 mm		172 mm	
Depth	51 mm			
Weight	0.6 kg			

Table 11: Power Panel C70 - 5.7" variants, 1x CAN bus and 1x RS485 - Technical data

- 1) The real-time clock is buffered for approx. 1000 hours @ 25°C by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.
- 2) The size of the memory used for remanent variables is adjustable in Automation Studio.
- 3) Value applies at an ambient temperature of 25°C. Reducing the brightness by 50% can increase the half-brightness time up to 50%.
- 4) See section "Communication ⇒ POWERLINK ⇒ General information ⇒ Hardware - IF/LS" of Automation Help
- 5) The functionality for switching on the internal terminating resistor using software is available starting with Automation Studio 4.3.1 and Automation Runtime A4.31.
- 6) Measured while all communication interfaces in use.

3.3.5 Temperature/Humidity diagram

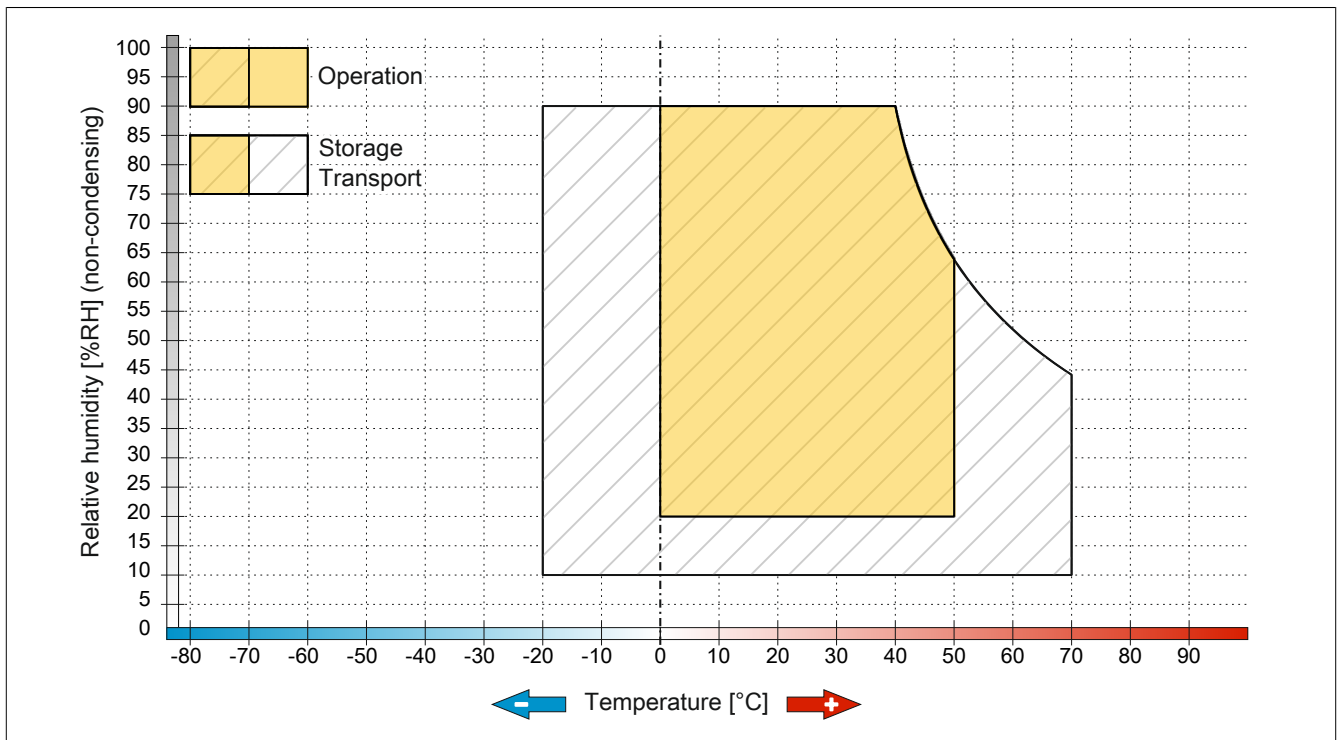
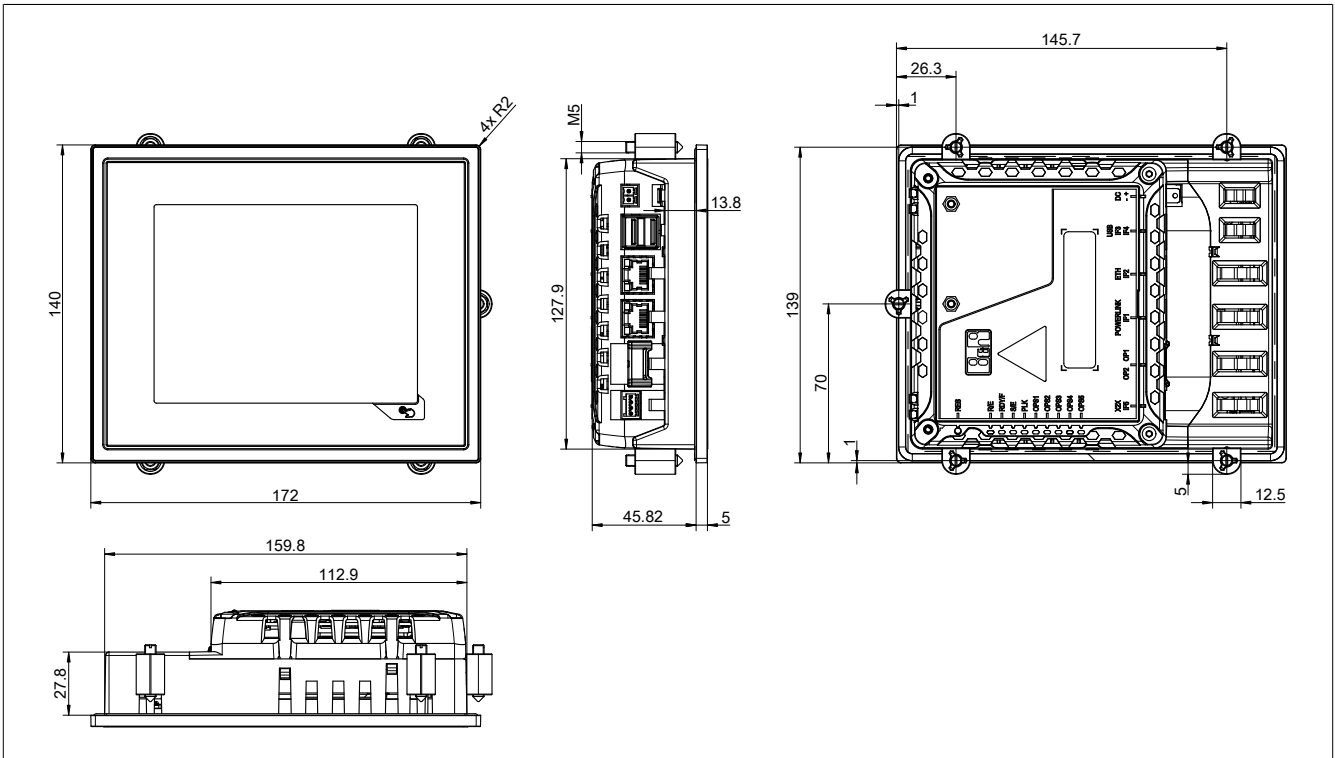


Figure: Power Panel C70 - 5.7" display - Temperature/Humidity diagram

3.3.6 Dimensions

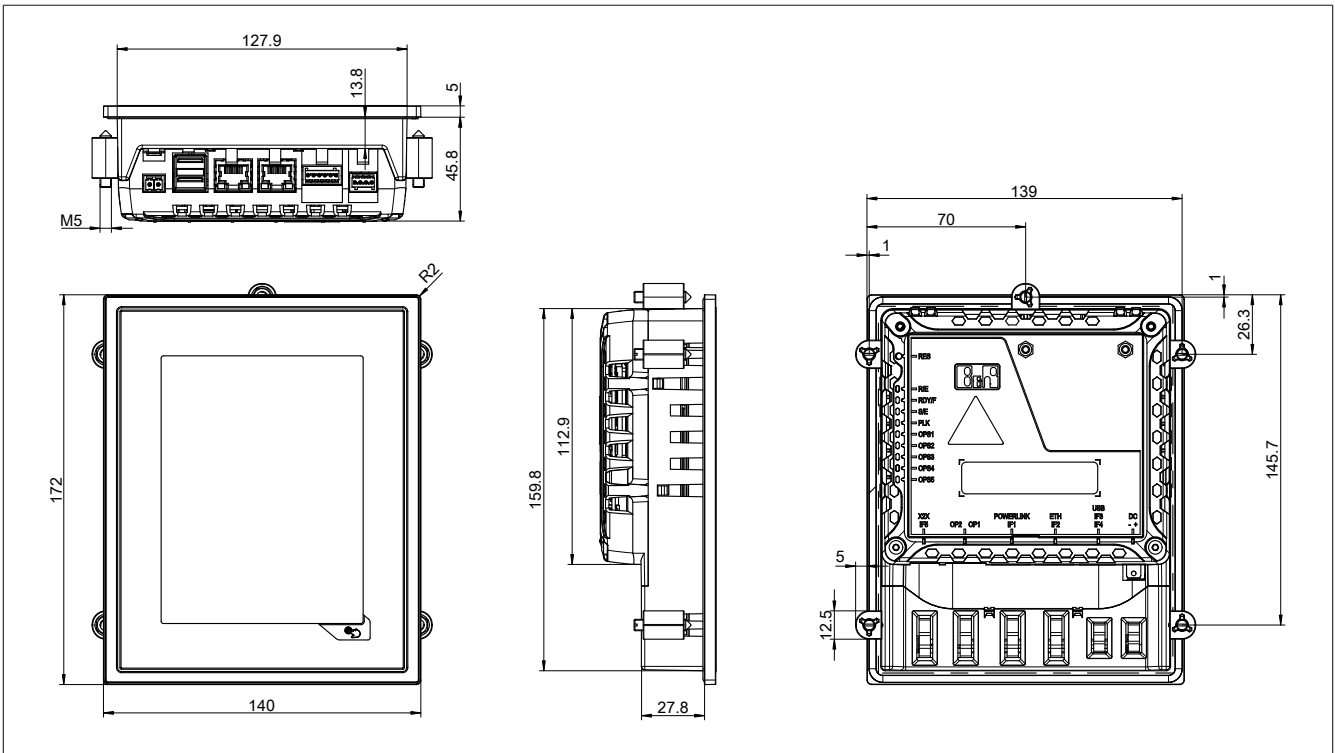
Landscape format for 5.7" variants



Dimensions of the installation cutout for this Power Panel variant: 161.8 ±1 mm x 129.9 ±1 mm

See also "Installation cutout requirements" on page 83.

Portrait format for 5.7" variants



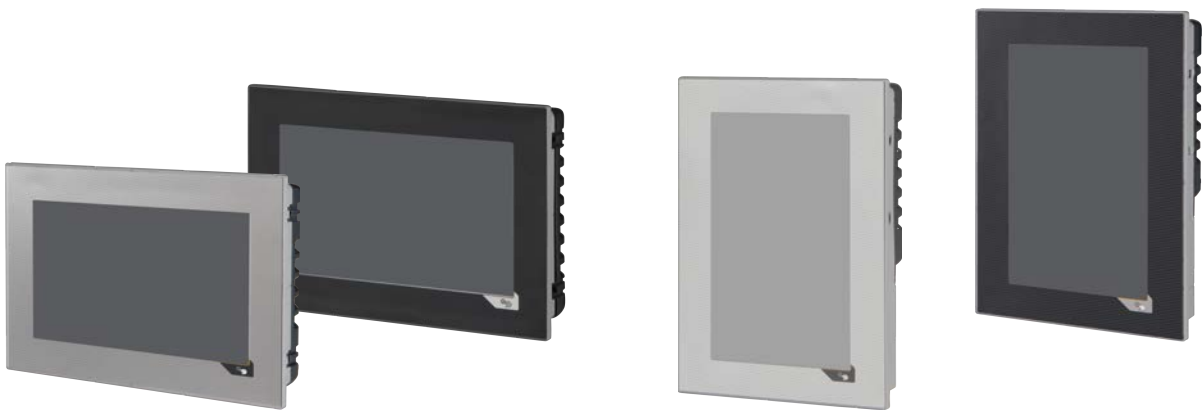
Dimensions of the installation cutout for this Power Panel variant: 129.9 ±1 mm x 161.8 ±1 mm

See also "Installation cutout requirements" on page 83.

3.4 Power Panel C70 - 7.0" display

3.4.1 Variants without fieldbus interfaces

3.4.1.1 Order data



Model number	Short description
	Power Panel C70
4PPC70.0702-20W	Power Panel C70, 7.0", landscape format. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 800 x 480 (WVGA) resolution, analog resistive touch screen, landscape format, aluminum white pin-stripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0.
4PPC70.0702-20B	Power Panel C70, 7.0", landscape format. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 800 x 480 (WVGA) resolution, analog resistive touch screen, landscape format, anthracite gray pin-stripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0.
4PPC70.070M-20W	Power Panel C70, 7.0", portrait format. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 480 x 800 (WVGA) resolution, analog resistive touch screen, portrait format, aluminum white pin-stripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0.
4PPC70.070M-20B	Power Panel C70, 7.0", portrait format. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 480 x 800 (WVGA) resolution, analog resistive touch screen, portrait format, anthracite gray pin-stripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0.
	Required accessories
	Terminal blocks
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp, 0.5 mm ²
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²
	Optional accessories
	Other
9A0013.01	Stylus pen for resistive touch screen
	Terminal blocks
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
	USB accessories
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R

Table 12: Power Panel C70 - 7.0" variants without fieldbus interfaces - Order data

3.4.1.2 Content of delivery

Name	Quantity	Description
-	1	Accessory set 5x retaining clip for securing the panel in the installation cutout

3.4.1.3 Technical data

Model number	4PPC70.0702-20W	4PPC70.0702-20B	4PPC70.070M-20W	4PPC70.070M-20B
General information				
Cooling	Fanless			
B&R ID code	0xE569	0xE56D	0xE571	0xE575
System requirements				
Automation Studio	4.1.4.375 and later			
Automation Runtime	K4.08 and later			
Support of X20SLX modules	Rev. B4 and later			
Power button	No			
Reset button	Yes			
Status indicators	Supply voltage OK, operating state, module status, POWERLINK, Ethernet	Supply voltage OK, operating state, module status, POWERLINK, Ethernet	Supply voltage OK, operating state, module status, POWERLINK, Ethernet	
Buzzer	Yes			
Controller redundancy possible	No			
ACOPOS support	Yes			
Visual Components support	Yes			
Certifications				
CE	Yes			
UL	cULus E115267 Industrial control equipment			
Controller				
Bootloader	Automation Runtime AR 4.08			
Real-time clock ¹⁾	Nonvolatile, 1 s resolution, -10 to 10 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	Atom E620T			
Clock frequency	333 MHz (compatible)			
L1 cache				
Data code	24 kB			
Program code	32 kB			
L2 cache				
-				
Mode/Node switches	No			
Remanent variables	32 kB FRAM, buffering >10 years ²⁾			
DRAM	256 MB			
Shortest task class cycle time	0.4 ms			
Typical instruction cycle time	0.01 µs			
Application memory				
Type	2 GB eMMC flash memory			
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Temperature cutoff	Yes, at >88°C			
Display				
Type	TFT color			
Diagonal	7.0"			
Colors	16.7 million (RGB, 8 bits per channel)			
Resolution	WVGA, 800 x 480 pixels		WVGA, 480 x 800 pixels	
Contrast	Typ. 600:1			
Viewing angles				
Horizontal	Direction L / Direction R = Typ. 70°		Direction L / Direction R = Typ. 60°	
Vertical	Direction U / Direction D = Typ. 60°		Direction U / Direction D = Typ. 70°	
Backlight				
Type	LED			
Brightness	Typ. 500 cd/m ²			
Half-brightness time ³⁾	50,000 h			
Touch screen				
Type	AMT			
Technology	Analog resistive			
Controller	B&R, serial, 12-bit			
Transmittance	80% ±3%			
Screen rotation	Yes, using per Visual Components			

Table 13: Power Panel C70 - 7.0" variants without fieldbus interfaces - Technical data

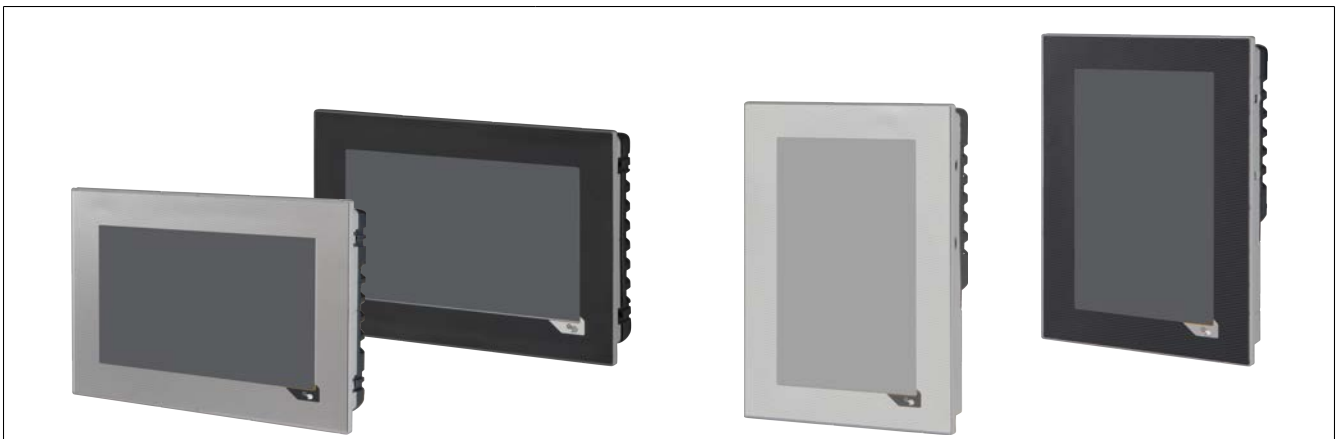
Model number	4PPC70.0702-20W	4PPC70.0702-20B	4PPC70.070M-20W	4PPC70.070M-20B
Interfaces				
Interface IF1				
Fieldbus	POWERLINK V2 managing or controlled node			
Type	Type 4 ⁴⁾			
Variant	1x RJ45 shielded			
Line length	Max. 100 m between 2 nodes (segment length)			
Max. transfer rate	100 Mbit/s			
Transfer				
Physical layer	100BASE-TX			
Half-duplex	Yes			
Full-duplex	POWERLINK mode: No / Ethernet mode: Yes			
Autonegotiation	Yes			
Auto-MDI / MDIX	Yes			
Interface IF2				
Type	Ethernet			
Variant	1x RJ45 shielded			
Line length	Max. 100 m between 2 nodes (segment length)			
Max. transfer rate	10/100 Mbit/s			
Transfer				
Physical layer	10BASE-T/100BASE-TX			
Half-duplex	Yes			
Full-duplex	Yes			
Autonegotiation	Yes			
Auto-MDI / MDIX	Yes			
Interface IF3				
Type	USB 2.0			
Variant	Type A			
Current-carrying capacity	0.49 A			
Interface IF4				
Type	USB 2.0			
Variant	Type A			
Current-carrying capacity	≥Rev. E0: 0.20 A <Rev. E0: 0.10 A			
Interface IF5				
Fieldbus	X2X Link master			
Electrical properties				
Nominal voltage	24 VDC -15% / +20%			
Max. power consumption ⁵⁾	15 W			
Reverse polarity protection	Yes			
Electrical isolation	IF1, IF2 and IF5 with each other, with other interfaces and with the base device			
Operating conditions				
Permissible mounting orientations				
Standard mounting orientation	Vertical			
Tilt	±25°			
Rotation	In 90° increments (portrait/landscape)			
Installation elevation above sea level				
0 to 2000 m	No limitation			
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m			
Degree of protection per EN 60529	Front: IP65, Back: IP20			
Ambient conditions				
Temperature				
Operation	0 to 50°C			
Storage	-20 to 70°C			
Transport	-20 to 70°C			
Relative humidity	See temperature/humidity diagram.			
Mechanical properties				
Note	Order terminal blocks 1x 0TB5104.2110-01, 1x 0TB6102.2010-01 and 1x 0TB6102.2110-01 separately			
Front				
Design	Aluminum white pinstripe	Anthracite gray pinstripe	Aluminum white pinstripe	Anthracite gray pinstripe
Dimensions				
Width	197 mm		140 mm	
Height	140 mm		197 mm	
Depth	51 mm			
Weight	0.65 kg			

Table 13: Power Panel C70 - 7.0" variants without fieldbus interfaces - Technical data

- 1) The real-time clock is buffered for approx. 1000 hours @ 25°C by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.
- 2) The size of the memory used for remanent variables is adjustable in Automation Studio.
- 3) Value applies at an ambient temperature of 25°C. Reducing the brightness by 50% can increase the half-brightness time up to 50%.
- 4) See section "Communication ⇒ POWERLINK ⇒ General information ⇒ Hardware - IF/LS" of Automation Help
- 5) Measured while all communication interfaces in use.

3.4.2 Variants with 2x CAN bus

3.4.2.1 Order data



Model number	Short description
Power Panel C70	
4PPC70.0702-21W	Power Panel C70, 7.0", landscape format, fieldbus interfaces: 2x CAN bus. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 800 x 480 (WVGA) resolution, analog resistive touch screen, landscape format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 2x CAN bus.
4PPC70.0702-21B	Power Panel C70, 7.0", landscape format, fieldbus interfaces: 2x CAN bus. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 800 x 480 (WVGA) resolution, analog resistive touch screen, landscape format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 2x CAN bus.
4PPC70.070M-21W	Power Panel C70, 7.0", portrait format, fieldbus interfaces: 2x CAN bus. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 480 x 800 (WVGA) resolution, analog resistive touch screen, portrait format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 2x CAN bus.
4PPC70.070M-21B	Power Panel C70, 7.0", portrait format, fieldbus interfaces: 2x CAN bus. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 480 x 800 (WVGA) resolution, analog resistive touch screen, portrait format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 2x CAN bus.
Required accessories	
Terminal blocks	
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp, 0.5 mm ²
0TB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²
Optional accessories	
Other	
9A0013.01	Stylus pen for resistive touch screen
Terminal blocks	
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R

Table 14: Power Panel C70 - 7.0" variants, 2x CAN bus - Order data

3.4.2.2 Content of delivery

Name	Quantity	Description
-	1	Accessory set 5x retaining clip for securing the panel in the installation cutout

3.4.2.3 Technical data

Model number	4PPC70.0702-21W	4PPC70.0702-21B	4PPC70.070M-21W	4PPC70.070M-21B
General information				
Cooling	Fanless			
B&R ID code	0xE56A	0xE56E	0xE572	0xE576
System requirements				
Automation Studio	4.1.4.375 and later			
Automation Runtime	K4.08 and later			
Support of X20SLX modules	Rev. B4 and later			
Power button	No			
Reset button	Yes			
Status indicators	Supply voltage OK, operating state, module status, POWERLINK, Ethernet, CAN Rx/Tx			
Buzzer	Yes			
Controller redundancy possible	No			
ACOPOS support	Yes			
Visual Components support	Yes			
Certifications				
CE	Yes			
UL	cULus E115267 Industrial control equipment			
Controller				
Bootloader	Automation Runtime AR 4.08			
Real-time clock ¹⁾	Nonvolatile, 1 s resolution, -10 to 10 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	Atom E620T			
Clock frequency	333 MHz (compatible)			
L1 cache				
Data code	24 kB			
Program code	32 kB			
L2 cache				
-				
Mode/Node switches	No			
Remanent variables	32 kB FRAM, buffering >10 years ²⁾			
DRAM	256 MB			
Shortest task class cycle time	0.4 ms			
Typical instruction cycle time	0.01 µs			
Application memory				
Type	2 GB eMMC flash memory			
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Temperature cutoff	Yes, at >88°C			
Display				
Type	TFT color			
Diagonal	7.0"			
Colors	16.7 million (RGB, 8 bits per channel)			
Resolution	WVGA, 800 x 480 pixels		WVGA, 480 x 800 pixels	
Contrast	Typ. 600:1			
Viewing angles				
Horizontal	Direction L / Direction R = Typ. 70°		Direction L / Direction R = Typ. 60°	
Vertical	Direction U / Direction D = Typ. 60°		Direction U / Direction D = Typ. 70°	
Backlight				
Type	LED			
Brightness	Typ. 500 cd/m ²			
Half-brightness time ³⁾	50,000 h			
Touch screen				
Type	AMT			
Technology	Analog resistive			
Controller	B&R, serial, 12-bit			
Transmittance	80% ±3%			
Screen rotation	Yes, using per Visual Components			

Table 15: Power Panel C70 - 7.0" variants, 2x CAN bus - Technical data

Device description • Power Panel C70 - 7.0" display

Model number	4PPC70.0702-21W	4PPC70.0702-21B	4PPC70.070M-21W	4PPC70.070M-21B
Interfaces				
Interface IF1				
Fieldbus		POWERLINK V2 managing or controlled node		
Type		Type 4 ⁴⁾		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		100 Mbit/s		
Transfer				
Physical layer		100BASE-TX		
Half-duplex		Yes		
Full-duplex		POWERLINK mode: No / Ethernet mode: Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF2				
Type		Ethernet		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		10/100 Mbit/s		
Transfer				
Physical layer		10BASE-T/100BASE-TX		
Half-duplex		Yes		
Full-duplex		Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF3				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		0.49 A		
Interface IF4				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		≥Rev. E0: 0.20 A <Rev. E0: 0.10 A		
Interface IF5				
Fieldbus		X2X Link master		
Interface IF6				
Type		CAN bus		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		1000 m		
Max. transfer rate				
Bus length ≤25 m		1 Mbit/s		
Bus length ≤60 m		500 kbit/s		
Bus length ≤200 m		250 kbit/s		
Bus length ≤1000 m		50 kbit/s		
Terminating resistor ⁵⁾		Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally		
Interface IF7				
Type		CAN bus		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		1000 m		
Max. transfer rate				
Bus length ≤25 m		1 Mbit/s		
Bus length ≤60 m		500 kbit/s		
Bus length ≤200 m		250 kbit/s		
Bus length ≤1000 m		50 kbit/s		
Terminating resistor ⁵⁾		Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally		
Electrical properties				
Nominal voltage		24 VDC -15% / +20%		
Max. power consumption ⁶⁾		15 W		
Reverse polarity protection		Yes		
Electrical isolation		IF1, IF2 and IF5 with each other, with other interfaces and with the base device		
Operating conditions				
Permissible mounting orientations				
Standard mounting orientation		Vertical		
Tilt		±25°		
Rotation		In 90° increments (portrait/landscape)		
Installation elevation above sea level				
0 to 2000 m		No limitation		
>2000 m		Reduction of ambient temperature by 0.5°C per 100 m		
Degree of protection per EN 60529		Front: IP65, Back: IP20		

Table 15: Power Panel C70 - 7.0" variants, 2x CAN bus - Technical data

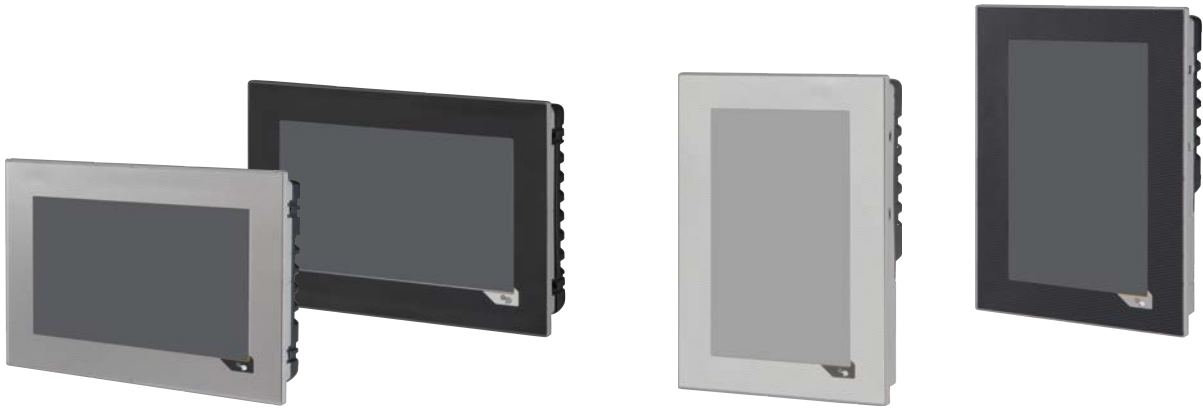
Model number	4PPC70.0702-21W	4PPC70.0702-21B	4PPC70.070M-21W	4PPC70.070M-21B
Ambient conditions				
Temperature				
Operation	0 to 50°C			
Storage	-20 to 70°C			
Transport	-20 to 70°C			
Relative humidity	See temperature/humidity diagram.			
Mechanical properties				
Note	Order terminal blocks 1x 0TB5104.2110-01, 1x 0TB5106.2110-01, 1x 0TB6102.2010-01 and 1x 0TB6102.2110-01 separately			
Front				
Design	Aluminum white pinstripe	Anthracite gray pinstripe	Aluminum white pinstripe	Anthracite gray pinstripe
Dimensions				
Width	197 mm		140 mm	
Height	140 mm		197 mm	
Depth	51 mm			
Weight	0.65 kg			

Table 15: Power Panel C70 - 7.0" variants, 2x CAN bus - Technical data

- 1) The real-time clock is buffered for approx. 1000 hours @ 25°C by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.
- 2) The size of the memory used for remanent variables is adjustable in Automation Studio.
- 3) Value applies at an ambient temperature of 25°C. Reducing the brightness by 50% can increase the half-brightness time up to 50%.
- 4) See section "Communication → POWERLINK → General information → Hardware - IF/LS" of Automation Help
- 5) The functionality for switching on the internal terminating resistor using software is available starting with Automation Studio 4.3.1 and Automation Runtime A4.31.
- 6) Measured while all communication interfaces in use.

3.4.3 Variants with 1x CAN bus and 1x RS232

3.4.3.1 Order data



Model number	Short description
Power Panel C70	
4PPC70.0702-22W	Power Panel C70, 7.0", landscape format, fieldbus interfaces: 1x CAN bus, 1x RS232. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 800 x 480 (WVGA) resolution, analog resistive touch screen, landscape format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS232.
4PPC70.0702-22B	Power Panel C70, 7.0", landscape format, fieldbus interfaces: 1x CAN bus, 1x RS232. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 800 x 480 (WVGA) resolution, analog resistive touch screen, landscape format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS232.
4PPC70.070M-22W	Power Panel C70, 7.0", portrait format, fieldbus interfaces: 1x CAN bus, 1x RS232. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 480 x 800 (WVGA) resolution, analog resistive touch screen, portrait format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS232.
4PPC70.070M-22B	Power Panel C70, 7.0", portrait format, fieldbus interfaces: 1x CAN bus, 1x RS232. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 480 x 800 (WVGA) resolution, analog resistive touch screen, portrait format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS232.
Required accessories	
Terminal blocks	
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp, 0.5 mm ²
0TB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²
Optional accessories	
Other	
9A0013.01	Stylus pen for resistive touch screen
Terminal blocks	
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R

Table 16: Power Panel C70 - 7.0" variants, 1x CAN bus and 1x RS232 - Order data

3.4.3.2 Content of delivery

Name	Quantity	Description
-	1	Accessory set 5x retaining clip for securing the panel in the installation cutout

3.4.3.3 Technical data

Model number	4PPC70.0702-22W	4PPC70.0702-22B	4PPC70.070M-22W	4PPC70.070M-22B
General information				
Cooling	Fanless			
B&R ID code	0xE56B	0xE56F	0xE573	0xE577
System requirements				
Automation Studio	4.1.4.375 and later			
Automation Runtime	K4.08 and later			
Support of X20SLX modules	Rev. B4 and later			
Power button	No			
Reset button	Yes			
Status indicators	Supply voltage OK, operating state, module status, POWERLINK, Ethernet, CAN Rx/Tx, RS232 Rx/Tx			
Buzzer	Yes			
Controller redundancy possible	No			
ACOPOS support	Yes			
Visual Components support	Yes			
Certifications				
CE	Yes			
UL	cULus E115267 Industrial control equipment			
Controller				
Bootloader	Automation Runtime AR 4.08			
Real-time clock ¹⁾	Nonvolatile, 1 s resolution, -10 to 10 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	Atom E620T			
Clock frequency	333 MHz (compatible)			
L1 cache				
Data code	24 kB			
Program code	32 kB			
L2 cache				
-				
Mode/Node switches	No			
Remanent variables	32 kB FRAM, buffering >10 years ²⁾			
DRAM	256 MB			
Shortest task class cycle time	0.4 ms			
Typical instruction cycle time	0.01 µs			
Application memory				
Type	2 GB eMMC flash memory			
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Temperature cutoff	Yes, at >88°C			
Display				
Type	TFT color			
Diagonal	7.0"			
Colors	16.7 million (RGB, 8 bits per channel)			
Resolution	WVGA, 800 x 480 pixels		WVGA, 480 x 800 pixels	
Contrast	Typ. 600:1			
Viewing angles				
Horizontal	Direction L / Direction R = Typ. 70°		Direction L / Direction R = Typ. 60°	
Vertical	Direction U / Direction D = Typ. 60°		Direction U / Direction D = Typ. 70°	
Backlight				
Type	LED			
Brightness	Typ. 500 cd/m ²			
Half-brightness time ³⁾	50,000 h			
Touch screen				
Type	AMT			
Technology	Analog resistive			
Controller	B&R, serial, 12-bit			
Transmittance	80% ±3%			
Screen rotation	Yes, using per Visual Components			

Table 17: Power Panel C70 - 7.0" variants, 1x CAN bus and 1x RS232 - Technical data

Device description • Power Panel C70 - 7.0" display

Model number	4PPC70.0702-22W	4PPC70.0702-22B	4PPC70.070M-22W	4PPC70.070M-22B
Interfaces				
Interface IF1				
Fieldbus		POWERLINK V2 managing or controlled node		
Type		Type 4 ⁴⁾		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		100 Mbit/s		
Transfer				
Physical layer		100BASE-TX		
Half-duplex		Yes		
Full-duplex		POWERLINK mode: No / Ethernet mode: Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF2				
Type		Ethernet		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		10/100 Mbit/s		
Transfer				
Physical layer		10BASE-T/100BASE-TX		
Half-duplex		Yes		
Full-duplex		Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF3				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		0.49 A		
Interface IF4				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		≥Rev. E0: 0.20 A <Rev. E0: 0.10 A		
Interface IF5				
Fieldbus		X2X Link master		
Interface IF6				
Type		CAN bus		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		1000 m		
Max. transfer rate				
Bus length ≤25 m		1 Mbit/s		
Bus length ≤60 m		500 kbit/s		
Bus length ≤200 m		250 kbit/s		
Bus length ≤1000 m		50 kbit/s		
Terminating resistor ⁵⁾		Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally		
Interface IF8				
Type		RS232		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		900 m		
Transfer rate		Max. 115.2 kbit/s		
Electrical properties				
Nominal voltage		24 VDC -15% / +20%		
Max. power consumption ⁶⁾		15 W		
Reverse polarity protection		Yes		
Electrical isolation		IF1, IF2 and IF5 with each other, with other interfaces and with the base device		
Operating conditions				
Permissible mounting orientations				
Standard mounting orientation		Vertical		
Tilt		±25°		
Rotation		In 90° increments (portrait/landscape)		
Installation elevation above sea level				
0 to 2000 m		No limitation		
>2000 m		Reduction of ambient temperature by 0.5°C per 100 m		
Degree of protection per EN 60529		Front: IP65, Back: IP20		
Ambient conditions				
Temperature				
Operation		0 to 50°C		
Storage		-20 to 70°C		
Transport		-20 to 70°C		
Relative humidity		See temperature/humidity diagram.		

Table 17: Power Panel C70 - 7.0" variants, 1x CAN bus and 1x RS232 - Technical data

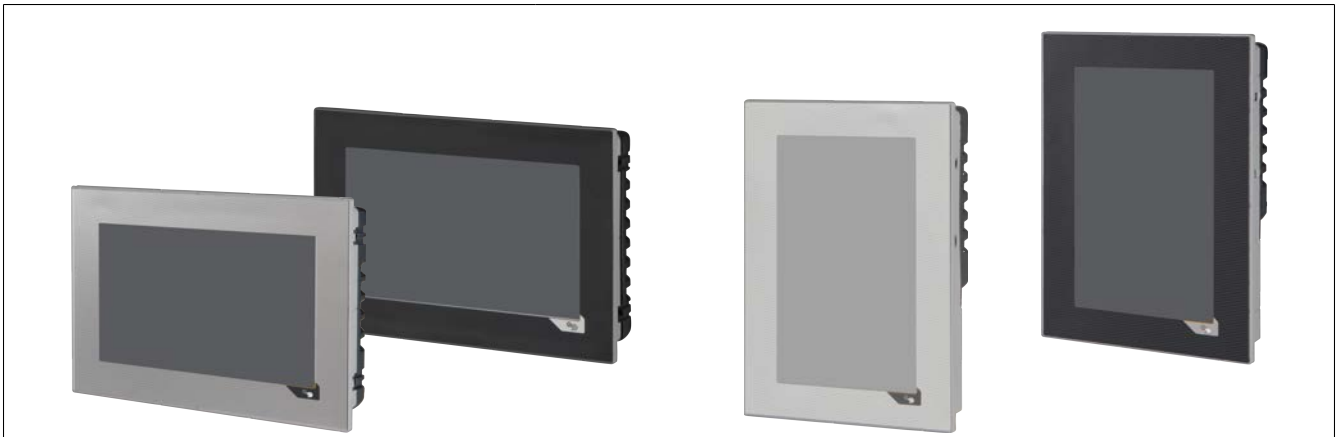
Model number	4PPC70.0702-22W	4PPC70.0702-22B	4PPC70.070M-22W	4PPC70.070M-22B
Mechanical properties				
Note	Order terminal blocks 1x 0TB5104.2110-01, 1x 0TB5106.2110-01, 1x 0TB6102.2010-01 and 1x 0TB6102.2110-01 separately			
Front				
Design	Aluminum white pinstripe	Anthracite gray pinstripe	Aluminum white pinstripe	Anthracite gray pinstripe
Dimensions				
Width	197 mm		140 mm	
Height	140 mm		197 mm	
Depth	51 mm			
Weight	0.65 kg			

Table 17: Power Panel C70 - 7.0" variants, 1x CAN bus and 1x RS232 - Technical data

- 1) The real-time clock is buffered for approx. 1000 hours @ 25°C by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.
- 2) The size of the memory used for remanent variables is adjustable in Automation Studio.
- 3) Value applies at an ambient temperature of 25°C. Reducing the brightness by 50% can increase the half-brightness time up to 50%.
- 4) See section "Communication ⇒ POWERLINK ⇒ General information ⇒ Hardware - IF/LS" of Automation Help
- 5) The functionality for switching on the internal terminating resistor using software is available starting with Automation Studio 4.3.1 and Automation Runtime A4.31.
- 6) Measured while all communication interfaces in use.

3.4.4 Variants with 1x CAN bus and 1x RS485

3.4.4.1 Order data



Model number	Short description
Power Panel C70	
4PPC70.0702-23W	Power Panel C70, 7.0", landscape format, fieldbus interfaces: 1x CAN bus, 1x RS485. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 800 x 480 (WVGA) resolution, analog resistive touch screen, landscape format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS485.
4PPC70.0702-23B	Power Panel C70, 7.0", landscape format, fieldbus interfaces: 1x CAN bus, 1x RS485. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 800 x 480 (WVGA) resolution, analog resistive touch screen, landscape format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS485.
4PPC70.070M-23W	Power Panel C70, 7.0", portrait format, fieldbus interfaces: 1x CAN bus, 1x RS485. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 480 x 800 (WVGA) resolution, analog resistive touch screen, portrait format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS485.
4PPC70.070M-23B	Power Panel C70, 7.0", portrait format, fieldbus interfaces: 1x CAN bus, 1x RS485. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 7.0", 480 x 800 (WVGA) resolution, analog resistive touch screen, portrait format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS485.
Required accessories	
Terminal blocks	
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp, 0.5 mm ²
0TB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²
Optional accessories	
Other	
9A0013.01	Stylus pen for resistive touch screen
Terminal blocks	
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R

Table 18: Power Panel C70 - 7.0" variants, 1x CAN bus and 1x RS485 - Order data

3.4.4.2 Content of delivery

Name	Quantity	Description
-	1	Accessory set 5x retaining clip for securing the panel in the installation cutout

3.4.4.3 Technical data

Model number	4PPC70.0702-23W	4PPC70.0702-23B	4PPC70.070M-23W	4PPC70.070M-23B
General information				
Cooling	Fanless			
B&R ID code	0xE56C	0xE570	0xE574	0xE578
System requirements				
Automation Studio	4.1.4.375 and later			
Automation Runtime	K4.08 and later			
Support of X20SLX modules	Rev. B4 and later			
Power button	No			
Reset button	Yes			
Status indicators	Supply voltage OK, operating state, module status, POWERLINK, Ethernet, CAN Rx/Tx, RS485 Rx/Tx			
Buzzer	Yes			
Controller redundancy possible	No			
ACOPOS support	Yes			
Visual Components support	Yes			
Certifications				
CE	Yes			
UL	cULus E115267 Industrial control equipment			
Controller				
Bootloader	Automation Runtime AR 4.08			
Real-time clock ¹⁾	Nonvolatile, 1 s resolution, -10 to 10 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	Atom E620T			
Clock frequency	333 MHz (compatible)			
L1 cache				
Data code	24 kB			
Program code	32 kB			
L2 cache				
-				
Mode/Node switches	No			
Remanent variables	32 kB FRAM, buffering >10 years ²⁾			
DRAM	256 MB			
Shortest task class cycle time	0.4 ms			
Typical instruction cycle time	0.01 µs			
Application memory				
Type	2 GB eMMC flash memory			
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Temperature cutoff	Yes, at >88°C			
Display				
Type	TFT color			
Diagonal	7.0"			
Colors	16.7 million (RGB, 8 bits per channel)			
Resolution	WVGA, 800 x 480 pixels		WVGA, 480 x 800 pixels	
Contrast	Typ. 600:1			
Viewing angles				
Horizontal	Direction L / Direction R = Typ. 70°		Direction L / Direction R = Typ. 60°	
Vertical	Direction U / Direction D = Typ. 60°		Direction U / Direction D = Typ. 70°	
Backlight				
Type	LED			
Brightness	Typ. 500 cd/m ²			
Half-brightness time ³⁾	50,000 h			
Touch screen				
Type	AMT			
Technology	Analog resistive			
Controller	B&R, serial, 12-bit			
Transmittance	80% ±3%			
Screen rotation	Yes, using per Visual Components			

Table 19: Power Panel C70 - 7.0" variants, 1x CAN bus and 1x RS485 - Technical data

Device description • Power Panel C70 - 7.0" display

Model number	4PPC70.0702-23W	4PPC70.0702-23B	4PPC70.070M-23W	4PPC70.070M-23B
Interfaces				
Interface IF1				
Fieldbus		POWERLINK V2 managing or controlled node		
Type		Type 4 ⁴⁾		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		100 Mbit/s		
Transfer				
Physical layer		100BASE-TX		
Half-duplex		Yes		
Full-duplex		POWERLINK mode: No / Ethernet mode: Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF2				
Type		Ethernet		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		10/100 Mbit/s		
Transfer				
Physical layer		10BASE-T/100BASE-TX		
Half-duplex		Yes		
Full-duplex		Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF3				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		0.49 A		
Interface IF4				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		≥Rev. E0: 0.20 A <Rev. E0: 0.10 A		
Interface IF5				
Fieldbus		X2X Link master		
Interface IF6				
Type		CAN bus		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		1000 m		
Max. transfer rate				
Bus length ≤25 m		1 Mbit/s		
Bus length ≤60 m		500 kbit/s		
Bus length ≤200 m		250 kbit/s		
Bus length ≤1000 m		50 kbit/s		
Terminating resistor ⁵⁾		Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally		
Interface IF9				
Type		RS485		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		1200 m		
Transfer rate		Max. 115.2 kbit/s		
Terminating resistor ⁵⁾		Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally		
Electrical properties				
Nominal voltage		24 VDC -15% / +20%		
Max. power consumption ⁶⁾		15 W		
Reverse polarity protection		Yes		
Electrical isolation		IF1, IF2 and IF5 with each other, with other interfaces and with the base device		
Operating conditions				
Permissible mounting orientations				
Standard mounting orientation		Vertical		
Tilt		±25°		
Rotation		In 90° increments (portrait/landscape)		
Installation elevation above sea level				
0 to 2000 m		No limitation		
>2000 m		Reduction of ambient temperature by 0.5°C per 100 m		
Degree of protection per EN 60529		Front: IP65, Back: IP20		
Ambient conditions				
Temperature				
Operation		0 to 50°C		
Storage		-20 to 70°C		
Transport		-20 to 70°C		
Relative humidity		See temperature/humidity diagram.		

Table 19: Power Panel C70 - 7.0" variants, 1x CAN bus and 1x RS485 - Technical data

Model number	4PPC70.0702-23W	4PPC70.0702-23B	4PPC70.070M-23W	4PPC70.070M-23B
Mechanical properties				
Note	Order terminal blocks 1x 0TB5104.2110-01, 1x 0TB5106.2110-01, 1x 0TB6102.2010-01 and 1x 0TB6102.2110-01 separately			
Front				
Design	Aluminum white pinstripe	Anthracite gray pinstripe	Aluminum white pinstripe	Anthracite gray pinstripe
Dimensions				
Width	197 mm		140 mm	
Height	140 mm		197 mm	
Depth	51 mm			
Weight	0.65 kg			

Table 19: Power Panel C70 - 7.0" variants, 1x CAN bus and 1x RS485 - Technical data

- 1) The real-time clock is buffered for approx. 1000 hours @ 25°C by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.
- 2) The size of the memory used for remanent variables is adjustable in Automation Studio.
- 3) Value applies at an ambient temperature of 25°C. Reducing the brightness by 50% can increase the half-brightness time up to 50%.
- 4) See section "Communication ⇒ POWERLINK ⇒ General information ⇒ Hardware - IF/LS" of Automation Help
- 5) The functionality for switching on the internal terminating resistor using software is available starting with Automation Studio 4.3.1 and Automation Runtime A4.31.
- 6) Measured while all communication interfaces in use.

3.4.5 Temperature/Humidity diagram

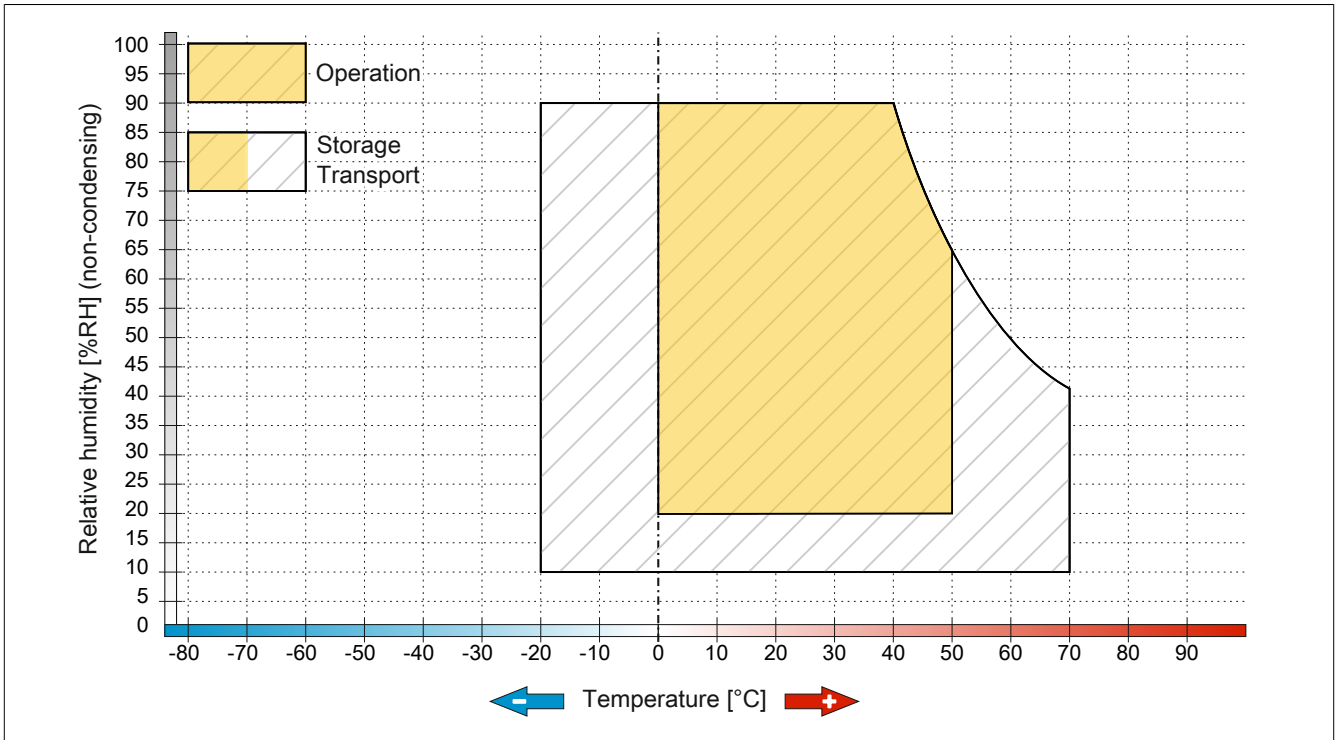
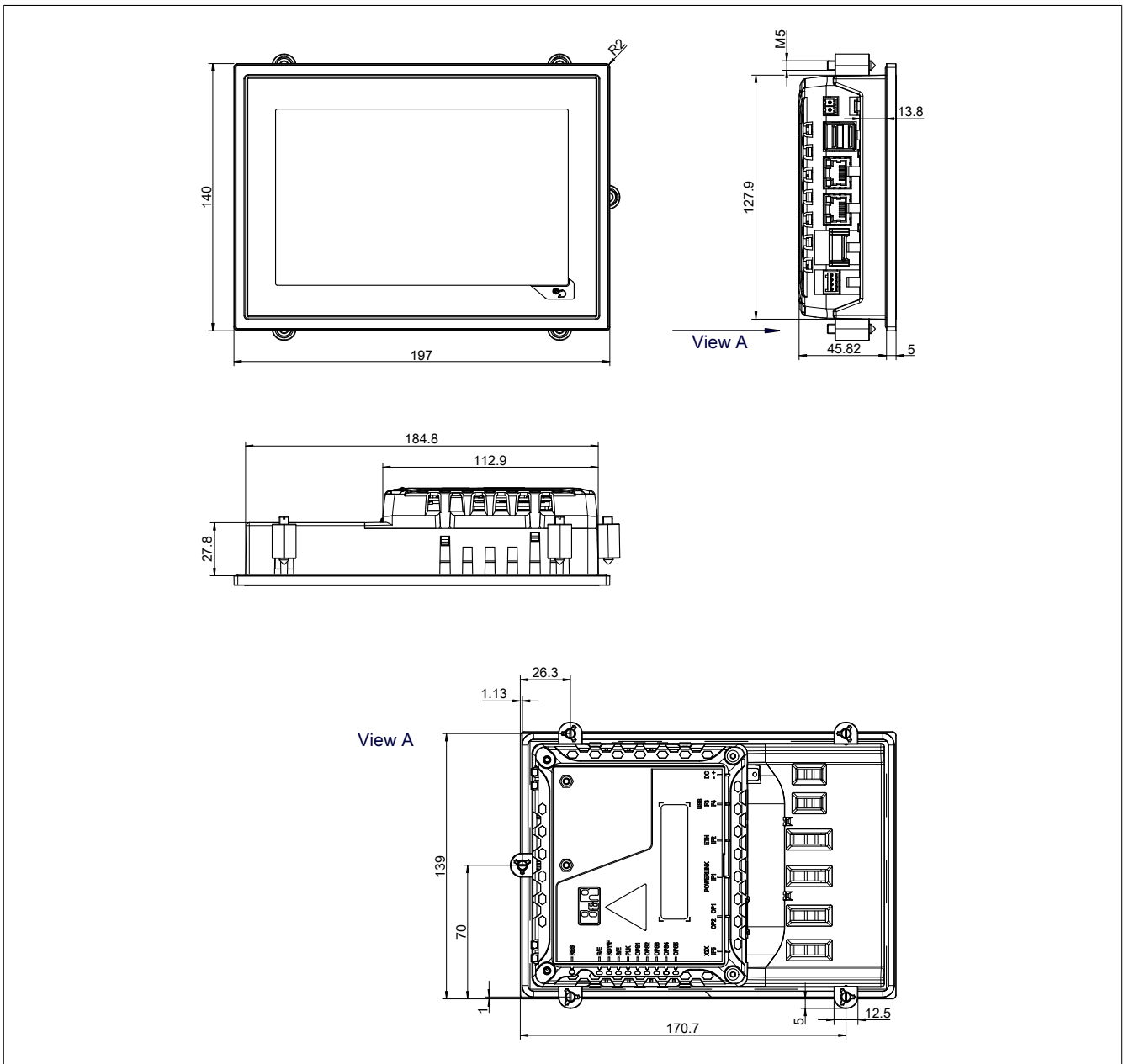


Figure: Power Panel C70 - 7.0" display - Temperature/Humidity diagram

3.4.6 Dimensions

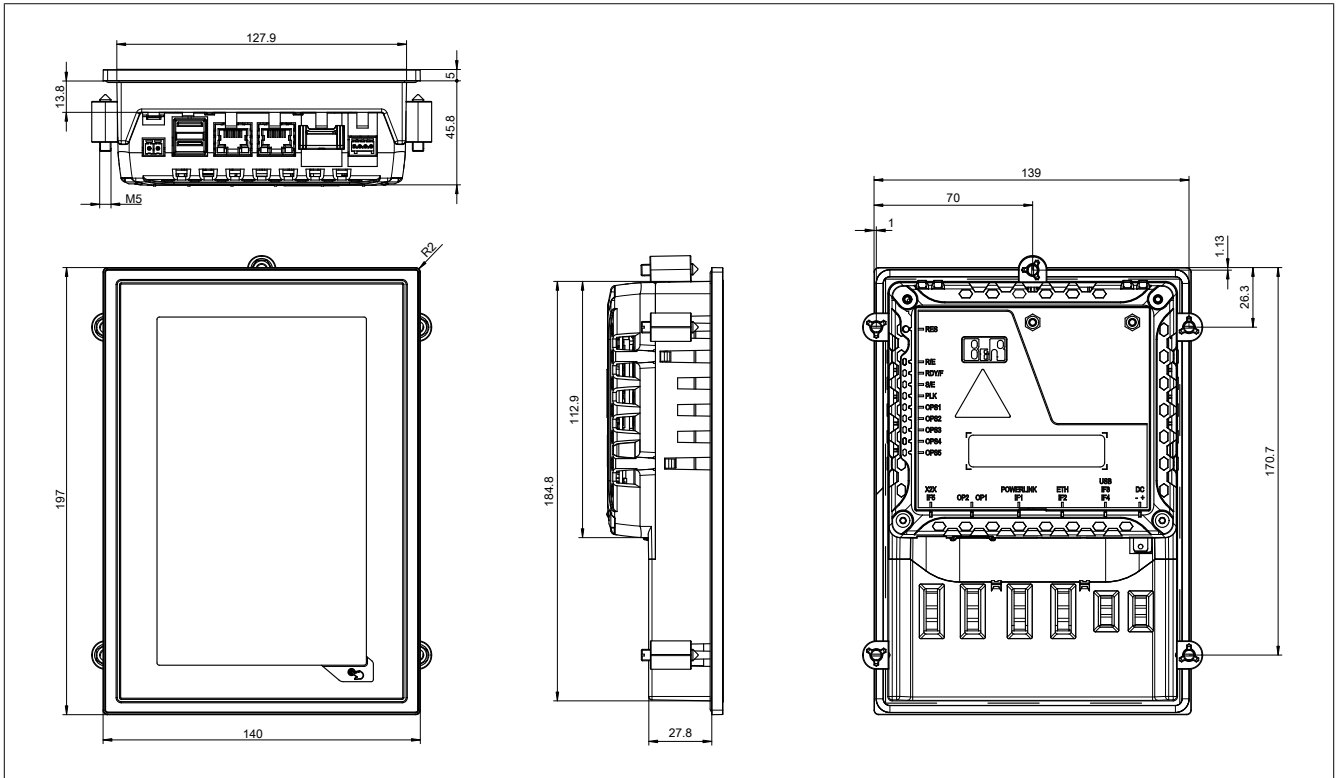
Landscape format for 7.0" variants



Dimensions of the installation cutout for this Power Panel variant: 186.8 ±1 mm x 129.9 ±1 mm

See also "Installation cutout requirements" on page 83.

Portrait format for 7.0" variants



Dimensions of the installation cutout for this Power Panel variant: 129.9 ±1 mm x 186.8 ±1 mm

See also "Installation cutout requirements" on page 83.

3.5 Power Panel C70 - 10.1" display

3.5.1 Variants without fieldbus interfaces

3.5.1.1 Order data



Model number	Short description
Power Panel C70	
4PPC70.101G-20W	Power Panel C70, 10.1", landscape format. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 1024 x 600 (WSVGA) resolution, analog resistive touch screen, landscape format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0.
4PPC70.101G-20B	Power Panel C70, 10.1", landscape format. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 1024 x 600 (WSVGA) resolution, analog resistive touch screen, landscape format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0.
4PPC70.101N-20W	Power Panel C70, 10.1", portrait format. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 600 x 1024 (WSVGA) resolution, analog resistive touch screen, portrait format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0.
4PPC70.101N-20B	Power Panel C70, 10.1", portrait format. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 600 x 1024 (WSVGA) resolution, analog resistive touch screen, portrait format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0.
Required accessories	
Terminal blocks	
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp, 0.5 mm ²
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²
Optional accessories	
Other	
9A0013.01	Stylus pen for resistive touch screen
Terminal blocks	
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R

Table 20: Power Panel C70 - 10.1" variants without fieldbus interfaces - Order data

3.5.1.2 Content of delivery

Name	Quantity	Description
-	1	Accessory set 6x retaining clip for fastening the panel in the installation cutout

3.5.1.3 Technical data

Model number	4PPC70.101G-20W	4PPC70.101G-20B	4PPC70.101N-20W	4PPC70.101N-20B
General information				
Cooling	Fanless			
B&R ID code	0xE579	0xE57D	0xE581	0xE585
System requirements				
Automation Studio	4.1.4.375 and later			
Automation Runtime	K4.08 and later			
Support of X20SLX modules	Rev. B4 and later			
Power button	No			
Reset button	Yes			
Status indicators	Supply voltage OK, operating state, module status, POWERLINK, Ethernet			
Buzzer	Yes			
Controller redundancy possible	No			
ACOPOS support	Yes			
Visual Components support	Yes			
Certifications				
CE	Yes			
UL	cULus E115267 Industrial control equipment			
Controller				
Bootloader	Automation Runtime AR 4.08			
Real-time clock ¹⁾	Nonvolatile, 1 s resolution, -10 to 10 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	Atom E620T			
Clock frequency	333 MHz (compatible)			
L1 cache				
Data code	24 kB			
Program code	32 kB			
L2 cache	-			
Mode/Node switches	No			
Remanent variables	32 kB FRAM, buffering >10 years ²⁾			
DRAM	256 MB			
Shortest task class cycle time	0.4 ms			
Typical instruction cycle time	0.01 µs			
Application memory				
Type	2 GB eMMC flash memory			
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Temperature cutoff	Yes, at >88°C			
Display				
Type	TFT color			
Diagonal	10.1"			
Colors	16.7 million (RGB, 8 bits per channel)			
Resolution	WSVGA, 1024 x 600 pixels		WSVGA, 600 x 1024 pixels	
Contrast	Typ. 500:1			
Viewing angles				
Horizontal	Direction L / Direction R = Typ. 80°			
Vertical	Direction U / Direction D = Typ. 80°			
Backlight				
Type	LED			
Brightness	Typ. 500 cd/m ²			
Half-brightness time ³⁾	50,000 h			
Touch screen				
Type	AMT			
Technology	Analog resistive			
Controller	B&R, serial, 12-bit			
Transmittance	80% ±3%			
Screen rotation	Yes, using per Visual Components			

Table 21: Power Panel C70 - 10.1" variants without fieldbus interfaces - Technical data

Model number	4PPC70.101G-20W	4PPC70.101G-20B	4PPC70.101N-20W	4PPC70.101N-20B
Interfaces				
Interface IF1				
Fieldbus	POWERLINK V2 managing or controlled node			
Type	Type 4 ⁴⁾			
Variant	1x RJ45 shielded			
Line length	Max. 100 m between 2 nodes (segment length)			
Max. transfer rate	100 Mbit/s			
Transfer				
Physical layer	100BASE-TX			
Half-duplex	Yes			
Full-duplex	POWERLINK mode: No / Ethernet mode: Yes			
Autonegotiation	Yes			
Auto-MDI / MDIX	Yes			
Interface IF2				
Type	Ethernet			
Variant	1x RJ45 shielded			
Line length	Max. 100 m between 2 nodes (segment length)			
Max. transfer rate	10/100 Mbit/s			
Transfer				
Physical layer	10BASE-T/100BASE-TX			
Half-duplex	Yes			
Full-duplex	Yes			
Autonegotiation	Yes			
Auto-MDI / MDIX	Yes			
Interface IF3				
Type	USB 2.0			
Variant	Type A			
Current-carrying capacity	0.49 A			
Interface IF4				
Type	USB 2.0			
Variant	Type A			
Current-carrying capacity	≥Rev. E0: 0.20 A <Rev. E0: 0.10 A			
Interface IF5				
Fieldbus	X2X Link master			
Electrical properties				
Nominal voltage	24 VDC -15% / +20%			
Max. power consumption ⁵⁾	14.5 W			
Reverse polarity protection	Yes			
Electrical isolation	IF1, IF2 and IF5 with each other, with other interfaces and with the base device			
Operating conditions				
Permissible mounting orientations				
Standard mounting orientation	Vertical			
Tilt	±25°			
Rotation	In 90° increments (portrait/landscape)			
Installation elevation above sea level				
0 to 2000 m	No limitation			
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m			
Degree of protection per EN 60529	Front: IP65, Back: IP20			
Ambient conditions				
Temperature				
Operation	0 to 50°C			
Storage	-20 to 70°C			
Transport	-20 to 70°C			
Relative humidity	See temperature/humidity diagram.			
Mechanical properties				
Note	Order terminal blocks 1x 0TB5104.2110-01, 1x 0TB6102.2010-01 and 1x 0TB6102.2110-01 separately			
Front				
Design	Aluminum white pinstripe	Anthracite gray pinstripe	Aluminum white pinstripe	Anthracite gray pinstripe
Dimensions				
Width	276 mm		172 mm	
Height	172 mm		276 mm	
Depth	51 mm			
Weight	1.05 kg			

Table 21: Power Panel C70 - 10.1" variants without fieldbus interfaces - Technical data

- 1) The real-time clock is buffered for approx. 1000 hours @ 25°C by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.
- 2) The size of the memory used for remanent variables is adjustable in Automation Studio.
- 3) Value applies at an ambient temperature of 25°C. Reducing the brightness by 50% can increase the half-brightness time up to 50%.
- 4) See section "Communication ⇒ POWERLINK ⇒ General information ⇒ Hardware - IF/LS" of Automation Help
- 5) Measured while all communication interfaces in use.

3.5.2 Variants with 2x CAN bus

3.5.2.1 Order data



Model number	Short description
	Power Panel C70
4PPC70.101G-21W	Power Panel C70, 10.1", landscape format, fieldbus interfaces: 2x CAN bus. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 1024 x 600 (WSVGA) resolution, analog resistive touch screen, landscape format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 2x CAN bus.
4PPC70.101G-21B	Power Panel C70, 10.1", landscape format, fieldbus interfaces: 2x CAN bus. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 1024 x 600 (WSVGA) resolution, analog resistive touch screen, landscape format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 2x CAN bus.
4PPC70.101N-21W	Power Panel C70, 10.1", portrait format, fieldbus interfaces: 2x CAN bus. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 600 x 1024 (WSVGA) resolution, analog resistive touch screen, portrait format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 2x CAN bus.
4PPC70.101N-21B	Power Panel C70, 10.1", portrait format, fieldbus interfaces: 2x CAN bus. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 600 x 1024 (WSVGA) resolution, analog resistive touch screen, portrait format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 2x CAN bus.
	Required accessories
	Terminal blocks
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp, 0.5 mm ²
0TB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²
	Optional accessories
	Other
9A0013.01	Stylus pen for resistive touch screen
	Terminal blocks
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
	USB accessories
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R

Table 22: Power Panel C70 - 10.1" variants, 2x CAN bus - Order data

3.5.2.2 Content of delivery

Name	Quantity	Description
-	1	Accessory set 6x retaining clip for fastening the panel in the installation cutout

3.5.2.3 Technical data

Model number	4PPC70.101G-21W	4PPC70.101G-21B	4PPC70.101N-21W	4PPC70.101N-21B
General information				
Cooling	Fanless			
B&R ID code	0xE57A	0xE57E	0xE582	0xE586
System requirements				
Automation Studio	4.1.4.375 and later			
Automation Runtime	K4.08 and later			
Support of X20SLX modules	Rev. B4 and later			
Power button	No			
Reset button	Yes			
Status indicators	Supply voltage OK, operating state, module status, POWERLINK, Ethernet, CAN Rx/Tx			
Buzzer	Yes			
Controller redundancy possible	No			
ACOPOS support	Yes			
Visual Components support	Yes			
Certifications				
CE	Yes			
UL	cULus E115267 Industrial control equipment			
Controller				
Bootloader	Automation Runtime AR 4.08			
Real-time clock ¹⁾	Nonvolatile, 1 s resolution, -10 to 10 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	Atom E620T			
Clock frequency	333 MHz (compatible)			
L1 cache				
Data code	24 kB			
Program code	32 kB			
L2 cache				
-				
Mode/Node switches	No			
Remanent variables	32 kB FRAM, buffering >10 years ²⁾			
DRAM	256 MB			
Shortest task class cycle time	0.4 ms			
Typical instruction cycle time	0.01 µs			
Application memory				
Type	2 GB eMMC flash memory			
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Temperature cutoff	Yes, at >88°C			
Display				
Type	TFT color			
Diagonal	10.1"			
Colors	16.7 million (RGB, 8 bits per channel)			
Resolution	WSVGA, 1024 x 600 pixels		WSVGA, 600 x 1024 pixels	
Contrast	Typ. 500:1			
Viewing angles				
Horizontal	Direction L / Direction R = Typ. 80°			
Vertical	Direction U / Direction D = Typ. 80°			
Backlight				
Type	LED			
Brightness	Typ. 500 cd/m ²			
Half-brightness time ³⁾	50,000 h			
Touch screen				
Type	AMT			
Technology	Analog resistive			
Controller	B&R, serial, 12-bit			
Transmittance	80% ±3%			
Screen rotation	Yes, using per Visual Components			

Table 23: Power Panel C70 - 10.1" variants, 2x CAN bus - Technical data

Device description • Power Panel C70 - 10.1" display

Model number	4PPC70.101G-21W	4PPC70.101G-21B	4PPC70.101N-21W	4PPC70.101N-21B
Interfaces				
Interface IF1				
Fieldbus		POWERLINK V2 managing or controlled node		
Type		Type 4 ⁴⁾		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		100 Mbit/s		
Transfer				
Physical layer		100BASE-TX		
Half-duplex		Yes		
Full-duplex		POWERLINK mode: No / Ethernet mode: Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF2				
Type		Ethernet		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		10/100 Mbit/s		
Transfer				
Physical layer		10BASE-T/100BASE-TX		
Half-duplex		Yes		
Full-duplex		Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF3				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		0.49 A		
Interface IF4				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		≥Rev. E0: 0.20 A <Rev. E0: 0.10 A		
Interface IF5				
Fieldbus		X2X Link master		
Interface IF6				
Type		CAN bus		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		1000 m		
Max. transfer rate				
Bus length ≤25 m		1 Mbit/s		
Bus length ≤60 m		500 kbit/s		
Bus length ≤200 m		250 kbit/s		
Bus length ≤1000 m		50 kbit/s		
Terminating resistor ⁵⁾		Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally		
Interface IF7				
Type		CAN bus		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		1000 m		
Max. transfer rate				
Bus length ≤25 m		1 Mbit/s		
Bus length ≤60 m		500 kbit/s		
Bus length ≤200 m		250 kbit/s		
Bus length ≤1000 m		50 kbit/s		
Terminating resistor ⁵⁾		Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally		
Electrical properties				
Nominal voltage		24 VDC -15% / +20%		
Max. power consumption ⁶⁾		14.5 W		
Reverse polarity protection		Yes		
Electrical isolation		IF1, IF2 and IF5 with each other, with other interfaces and with the base device		
Operating conditions				
Permissible mounting orientations				
Standard mounting orientation		Vertical		
Tilt		±25°		
Rotation		In 90° increments (portrait/landscape)		
Installation elevation above sea level				
0 to 2000 m		No limitation		
>2000 m		Reduction of ambient temperature by 0.5°C per 100 m		
Degree of protection per EN 60529		Front: IP65, Back: IP20		

Table 23: Power Panel C70 - 10.1" variants, 2x CAN bus - Technical data

Model number	4PPC70.101G-21W	4PPC70.101G-21B	4PPC70.101N-21W	4PPC70.101N-21B
Ambient conditions				
Temperature				
Operation	0 to 50°C			
Storage	-20 to 70°C			
Transport	-20 to 70°C			
Relative humidity	See temperature/humidity diagram.			
Mechanical properties				
Note	Order terminal blocks 1x 0TB5104.2110-01, 1x 0TB5106.2110-01, 1x 0TB6102.2010-01 and 1x 0TB6102.2110-01 separately			
Front				
Design	Aluminum white pinstripe	Anthracite gray pinstripe	Aluminum white pinstripe	Anthracite gray pinstripe
Dimensions				
Width	276 mm		172 mm	
Height	172 mm		276 mm	
Depth	51 mm			
Weight	1.05 kg			

Table 23: Power Panel C70 - 10.1" variants, 2x CAN bus - Technical data

- 1) The real-time clock is buffered for approx. 1000 hours @ 25°C by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.
- 2) The size of the memory used for remanent variables is adjustable in Automation Studio.
- 3) Value applies at an ambient temperature of 25°C. Reducing the brightness by 50% can increase the half-brightness time up to 50%.
- 4) See section "Communication → POWERLINK → General information → Hardware - IF/LS" of Automation Help
- 5) The functionality for switching on the internal terminating resistor using software is available starting with Automation Studio 4.3.1 and Automation Runtime A4.31.
- 6) Measured while all communication interfaces in use.

3.5.3 Variants with 1x CAN bus and 1x RS232

3.5.3.1 Order data



Model number	Short description
Power Panel C70	
4PPC70.101G-22W	Power Panel C70, 10.1", landscape format, fieldbus interfaces: 1x CAN bus, 1x RS232. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 1024 x 600 (WSVGA) resolution, analog resistive touch screen, landscape format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS232.
4PPC70.101G-22B	Power Panel C70, 10.1", landscape format, fieldbus interfaces: 1x CAN bus, 1x RS232. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 1024 x 600 (WSVGA) resolution, analog resistive touch screen, landscape format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS232.
4PPC70.101N-22W	Power Panel C70, 10.1", portrait format, fieldbus interfaces: 1x CAN bus, 1x RS232. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 600 x 1024 (WSVGA) resolution, analog resistive touch screen, portrait format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS232.
4PPC70.101N-22B	Power Panel C70, 10.1", portrait format, fieldbus interfaces: 1x CAN bus, 1x RS232. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 600 x 1024 (WSVGA) resolution, analog resistive touch screen, portrait format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS232.
Required accessories	
Terminal blocks	
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp, 0.5 mm ²
0TB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²
Optional accessories	
Other	
9A0013.01	Stylus pen for resistive touch screen
Terminal blocks	
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R

Table 24: Power Panel C70 - 10.1" variants, 1x CAN bus and 1x RS232 - Order data

3.5.3.2 Content of delivery

Name	Quantity	Description
-	1	Accessory set 6x retaining clip for fastening the panel in the installation cutout

3.5.3.3 Technical data

Model number	4PPC70.101G-22W	4PPC70.101G-22B	4PPC70.101N-22W	4PPC70.101N-22B
General information				
Cooling	Fanless			
B&R ID code	0xE57B	0xE57F	0xE583	0xE587
System requirements				
Automation Studio	4.1.4.375 and later			
Automation Runtime	K4.08 and later			
Support of X20SLX modules	Rev. B4 and later			
Power button	No			
Reset button	Yes			
Status indicators	Supply voltage OK, operating state, module status, POWERLINK, Ethernet, CAN Rx/Tx, RS232 Rx/Tx			
Buzzer	Yes			
Controller redundancy possible	No			
ACOPOS support	Yes			
Visual Components support	Yes			
Certifications				
CE	Yes			
UL	cULus E115267 Industrial control equipment			
Controller				
Bootloader	Automation Runtime AR 4.08			
Real-time clock ¹⁾	Nonvolatile, 1 s resolution, -10 to 10 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	Atom E620T			
Clock frequency	333 MHz (compatible)			
L1 cache				
Data code	24 kB			
Program code	32 kB			
L2 cache				
-				
Mode/Node switches	No			
Remanent variables	32 kB FRAM, buffering >10 years ²⁾			
DRAM	256 MB			
Shortest task class cycle time	0.4 ms			
Typical instruction cycle time	0.01 µs			
Application memory				
Type	2 GB eMMC flash memory			
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Temperature cutoff	Yes, at >88°C			
Display				
Type	TFT color			
Diagonal	10.1"			
Colors	16.7 million (RGB, 8 bits per channel)			
Resolution	WSVGA, 1024 x 600 pixels		WSVGA, 600 x 1024 pixels	
Contrast	Typ. 500:1			
Viewing angles				
Horizontal	Direction L / Direction R = Typ. 80°			
Vertical	Direction U / Direction D = Typ. 80°			
Backlight				
Type	LED			
Brightness	Typ. 500 cd/m ²			
Half-brightness time ³⁾	50,000 h			
Touch screen				
Type	AMT			
Technology	Analog resistive			
Controller	B&R, serial, 12-bit			
Transmittance	80% ±3%			
Screen rotation	Yes, using per Visual Components			

Table 25: Power Panel C70 - 10.1" variants, 1x CAN bus and 1x RS232 - Technical data

Device description • Power Panel C70 - 10.1" display

Model number	4PPC70.101G-22W	4PPC70.101G-22B	4PPC70.101N-22W	4PPC70.101N-22B
Interfaces				
Interface IF1				
Fieldbus		POWERLINK V2 managing or controlled node		
Type		Type 4 ⁴⁾		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		100 Mbit/s		
Transfer				
Physical layer		100BASE-TX		
Half-duplex		Yes		
Full-duplex		POWERLINK mode: No / Ethernet mode: Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF2				
Type		Ethernet		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		10/100 Mbit/s		
Transfer				
Physical layer		10BASE-T/100BASE-TX		
Half-duplex		Yes		
Full-duplex		Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF3				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		0.49 A		
Interface IF4				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		≥Rev. E0: 0.20 A <Rev. E0: 0.10 A		
Interface IF5				
Fieldbus		X2X Link master		
Interface IF6				
Type		CAN bus		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		1000 m		
Max. transfer rate				
Bus length ≤25 m		1 Mbit/s		
Bus length ≤60 m		500 kbit/s		
Bus length ≤200 m		250 kbit/s		
Bus length ≤1000 m		50 kbit/s		
Terminating resistor ⁵⁾		Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally		
Interface IF8				
Type		RS232		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		900 m		
Transfer rate		Max. 115.2 kbit/s		
Electrical properties				
Nominal voltage		24 VDC -15% / +20%		
Max. power consumption ⁶⁾		14.5 W		
Reverse polarity protection		Yes		
Electrical isolation		IF1, IF2 and IF5 with each other, with other interfaces and with the base device		
Operating conditions				
Permissible mounting orientations				
Standard mounting orientation		Vertical		
Tilt		±25°		
Rotation		In 90° increments (portrait/landscape)		
Installation elevation above sea level				
0 to 2000 m		No limitation		
>2000 m		Reduction of ambient temperature by 0.5°C per 100 m		
Degree of protection per EN 60529		Front: IP65, Back: IP20		
Ambient conditions				
Temperature				
Operation		0 to 50°C		
Storage		-20 to 70°C		
Transport		-20 to 70°C		
Relative humidity		See temperature/humidity diagram.		

Table 25: Power Panel C70 - 10.1" variants, 1x CAN bus and 1x RS232 - Technical data

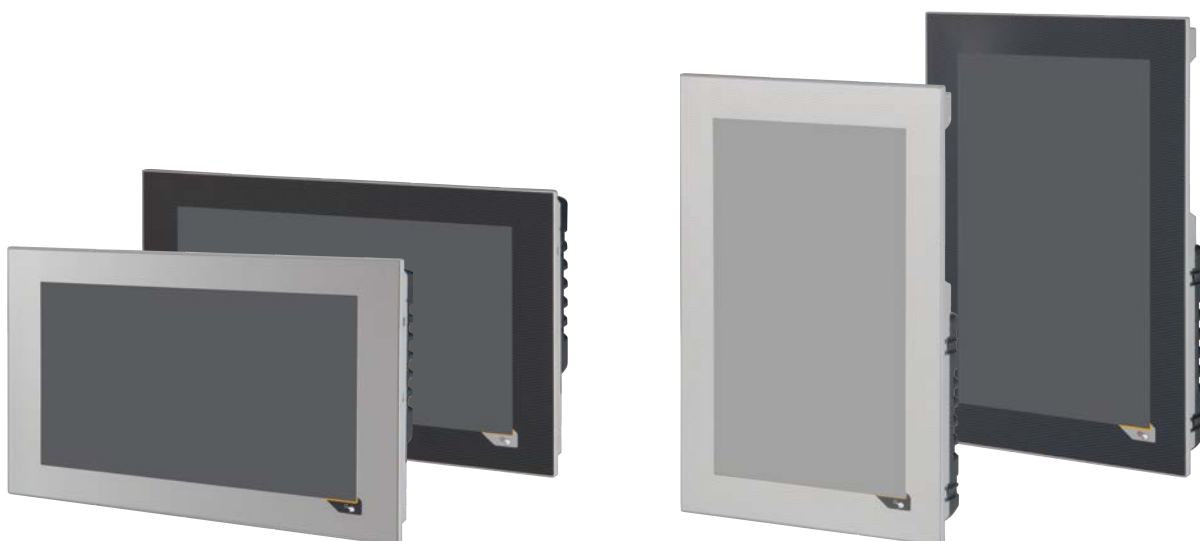
Model number	4PPC70.101G-22W	4PPC70.101G-22B	4PPC70.101N-22W	4PPC70.101N-22B
Mechanical properties				
Note	Order terminal blocks 1x 0TB5104.2110-01, 1x 0TB5106.2110-01, 1x 0TB6102.2010-01 and 1x 0TB6102.2110-01 separately			
Front				
Design	Aluminum white pinstripe	Anthracite gray pinstripe	Aluminum white pinstripe	Anthracite gray pinstripe
Dimensions				
Width	276 mm		172 mm	
Height	172 mm		276 mm	
Depth	51 mm			
Weight	1.05 kg			

Table 25: Power Panel C70 - 10.1" variants, 1x CAN bus and 1x RS232 - Technical data

- 1) The real-time clock is buffered for approx. 1000 hours @ 25°C by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.
- 2) The size of the memory used for remanent variables is adjustable in Automation Studio.
- 3) Value applies at an ambient temperature of 25°C. Reducing the brightness by 50% can increase the half-brightness time up to 50%.
- 4) See section "Communication ⇒ POWERLINK ⇒ General information ⇒ Hardware - IF/LS" of Automation Help
- 5) The functionality for switching on the internal terminating resistor using software is available starting with Automation Studio 4.3.1 and Automation Runtime A4.31.
- 6) Measured while all communication interfaces in use.

3.5.4 Variants with 1x CAN bus and 1x RS485

3.5.4.1 Order data



Model number	Short description
Power Panel C70	
4PPC70.101G-23W	Power Panel C70, 10.1", landscape format, fieldbus interfaces: 1x CAN bus, 1x RS485. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 1024 x 600 (WSVGA) resolution, analog resistive touch screen, landscape format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS485.
4PPC70.101G-23B	Power Panel C70, 10.1", landscape format, fieldbus interfaces: 1x CAN bus, 1x RS485. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 1024 x 600 (WSVGA) resolution, analog resistive touch screen, landscape format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS485.
4PPC70.101N-23W	Power Panel C70, 10.1", portrait format, fieldbus interfaces: 1x CAN bus, 1x RS485. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 600 x 1024 (WSVGA) resolution, analog resistive touch screen, portrait format, aluminum white pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS485.
4PPC70.101N-23B	Power Panel C70, 10.1", portrait format, fieldbus interfaces: 1x CAN bus, 1x RS485. CPU and memory: Intel Atom 333 MHz (compatible), 256 MB DDRAM, 32 kB FRAM, 2 GB onboard flash drive. Display and touch screen: 10.1", 600 x 1024 (WSVGA) resolution, analog resistive touch screen, portrait format, anthracite gray pinstripe. Interfaces: 1x POWERLINK, 1x Ethernet 10/100 Mbit/s, 1x X2X Link, 2x USB 2.0, 1x CAN bus, 1x RS485.
Required accessories	
Terminal blocks	
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp, 0.5 mm ²
0TB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²
Optional accessories	
Other	
9A0013.01	Stylus pen for resistive touch screen
Terminal blocks	
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R

Table 26: Power Panel C70 - 10.1" variants, 1x CAN bus and 1x RS485 - Order data

3.5.4.2 Content of delivery

Name	Quantity	Description
-	1	Accessory set 6x retaining clip for fastening the panel in the installation cutout

3.5.4.3 Technical data

Model number	4PPC70.101G-23W	4PPC70.101G-23B	4PPC70.101N-23W	4PPC70.101N-23B
General information				
Cooling	Fanless			
B&R ID code	0xE57C	0xE580	0xE584	0xE588
System requirements				
Automation Studio	4.1.4.375 and later			
Automation Runtime	K4.08 and later			
Support of X20SLX modules	Rev. B4 and later			
Power button	No			
Reset button	Yes			
Status indicators	Supply voltage OK, operating state, module status, POWERLINK, Ethernet, CAN Rx/Tx, RS485 Rx/Tx			
Buzzer	Yes			
Controller redundancy possible	No			
ACOPOS support	Yes			
Visual Components support	Yes			
Certifications				
CE	Yes			
UL	cULus E115267 Industrial control equipment			
Controller				
Bootloader	Automation Runtime AR 4.08			
Real-time clock ¹⁾	Nonvolatile, 1 s resolution, -10 to 10 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	Atom E620T			
Clock frequency	333 MHz (compatible)			
L1 cache				
Data code	24 kB			
Program code	32 kB			
L2 cache	-			
Mode/Node switches	No			
Remanent variables	32 kB FRAM, buffering >10 years ²⁾			
DRAM	256 MB			
Shortest task class cycle time	0.4 ms			
Typical instruction cycle time	0.01 µs			
Application memory				
Type	2 GB eMMC flash memory			
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Temperature cutoff	Yes, at >88°C			
Display				
Type	TFT color			
Diagonal	10.1"			
Colors	16.7 million (RGB, 8 bits per channel)			
Resolution	WSVGA, 1024 x 600 pixels		WSVGA, 600 x 1024 pixels	
Contrast	Typ. 500:1			
Viewing angles				
Horizontal	Direction L / Direction R = Typ. 80°			
Vertical	Direction U / Direction D = Typ. 80°			
Backlight				
Type	LED			
Brightness	Typ. 500 cd/m ²			
Half-brightness time ³⁾	50,000 h			
Touch screen				
Type	AMT			
Technology	Analog resistive			
Controller	B&R, serial, 12-bit			
Transmittance	80% ±3%			
Screen rotation	Yes, using per Visual Components			

Table 27: Power Panel C70 - 10.1" variants, 1x CAN bus and 1x RS485 - Technical data

Device description • Power Panel C70 - 10.1" display

Model number	4PPC70.101G-23W	4PPC70.101G-23B	4PPC70.101N-23W	4PPC70.101N-23B
Interfaces				
Interface IF1				
Fieldbus		POWERLINK V2 managing or controlled node		
Type		Type 4 ⁴⁾		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		100 Mbit/s		
Transfer				
Physical layer		100BASE-TX		
Half-duplex		Yes		
Full-duplex		POWERLINK mode: No / Ethernet mode: Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF2				
Type		Ethernet		
Variant		1x RJ45 shielded		
Line length		Max. 100 m between 2 nodes (segment length)		
Max. transfer rate		10/100 Mbit/s		
Transfer				
Physical layer		10BASE-T/100BASE-TX		
Half-duplex		Yes		
Full-duplex		Yes		
Autonegotiation		Yes		
Auto-MDI / MDIX		Yes		
Interface IF3				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		0.49 A		
Interface IF4				
Type		USB 2.0		
Variant		Type A		
Current-carrying capacity		≥Rev. E0: 0.20 A <Rev. E0: 0.10 A		
Interface IF5				
Fieldbus		X2X Link master		
Interface IF6				
Type		CAN bus		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		1000 m		
Max. transfer rate				
Bus length ≤25 m		1 Mbit/s		
Bus length ≤60 m		500 kbit/s		
Bus length ≤200 m		250 kbit/s		
Bus length ≤1000 m		50 kbit/s		
Terminating resistor ⁵⁾		Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally		
Interface IF9				
Type		RS485		
Variant		3 pins of the 6-pin multipoint connector		
Max. distance		1200 m		
Transfer rate		Max. 115.2 kbit/s		
Terminating resistor ⁵⁾		Hardware revision ≥ G0: Integrated, can be switched on using software Hardware revision < G0: Must be wired externally		
Electrical properties				
Nominal voltage		24 VDC -15% / +20%		
Max. power consumption ⁶⁾		14.5 W		
Reverse polarity protection		Yes		
Electrical isolation		IF1, IF2 and IF5 with each other, with other interfaces and with the base device		
Operating conditions				
Permissible mounting orientations				
Standard mounting orientation		Vertical		
Tilt		±25°		
Rotation		In 90° increments (portrait/landscape)		
Installation elevation above sea level				
0 to 2000 m		No limitation		
>2000 m		Reduction of ambient temperature by 0.5°C per 100 m		
Degree of protection per EN 60529		Front: IP65, Back: IP20		
Ambient conditions				
Temperature				
Operation		0 to 50°C		
Storage		-20 to 70°C		
Transport		-20 to 70°C		
Relative humidity		See temperature/humidity diagram.		

Table 27: Power Panel C70 - 10.1" variants, 1x CAN bus and 1x RS485 - Technical data

Model number	4PPC70.101G-23W	4PPC70.101G-23B	4PPC70.101N-23W	4PPC70.101N-23B
Mechanical properties				
Note	Order terminal blocks 1x 0TB5104.2110-01, 1x 0TB5106.2110-01, 1x 0TB6102.2010-01 and 1x 0TB6102.2110-01 separately			
Front				
Design	Aluminum white pinstripe	Anthracite gray pinstripe	Aluminum white pinstripe	Anthracite gray pinstripe
Dimensions				
Width	276 mm		172 mm	
Height	172 mm		276 mm	
Depth	51 mm			
Weight	1.05 kg			

Table 27: Power Panel C70 - 10.1" variants, 1x CAN bus and 1x RS485 - Technical data

- 1) The real-time clock is buffered for approx. 1000 hours @ 25°C by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.
- 2) The size of the memory used for remanent variables is adjustable in Automation Studio.
- 3) Value applies at an ambient temperature of 25°C. Reducing the brightness by 50% can increase the half-brightness time up to 50%.
- 4) See section "Communication ⇒ POWERLINK ⇒ General information ⇒ Hardware - IF/LS" of Automation Help
- 5) The functionality for switching on the internal terminating resistor using software is available starting with Automation Studio 4.3.1 and Automation Runtime A4.31.
- 6) Measured while all communication interfaces in use.

3.5.5 Temperature/Humidity diagram

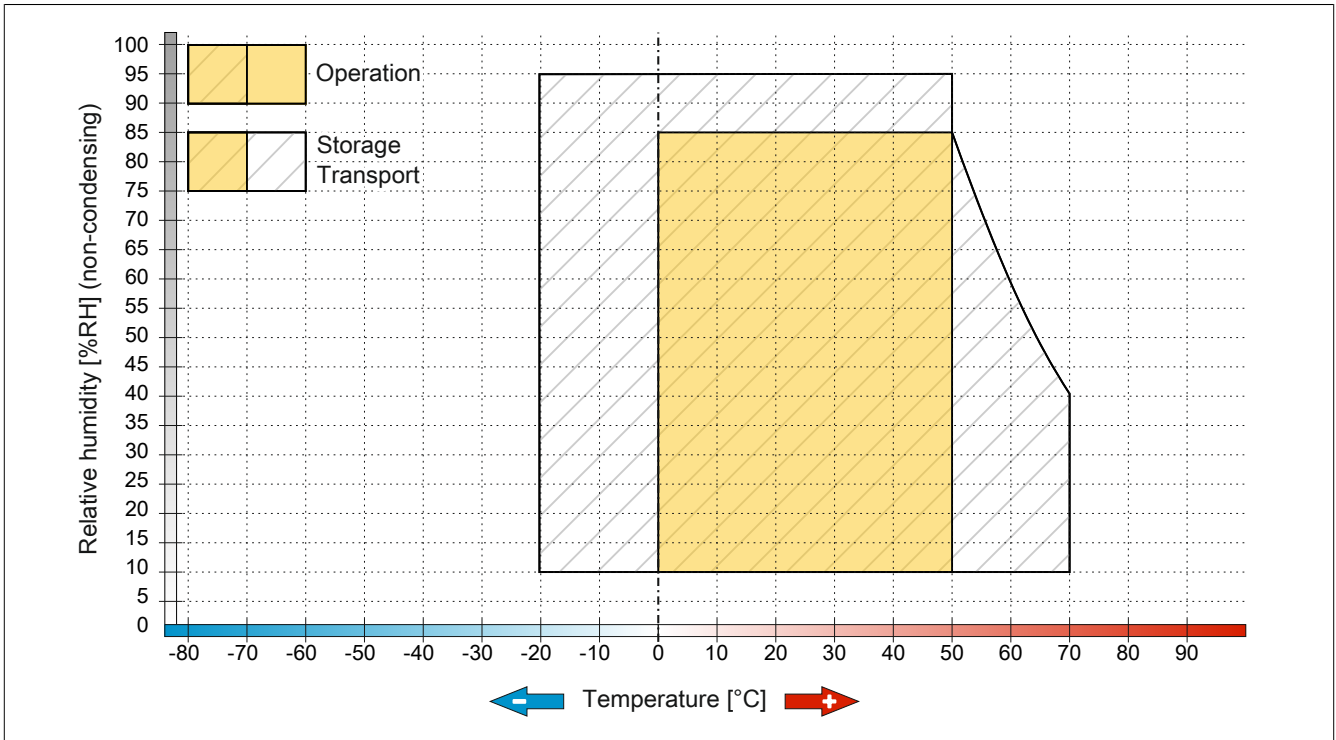
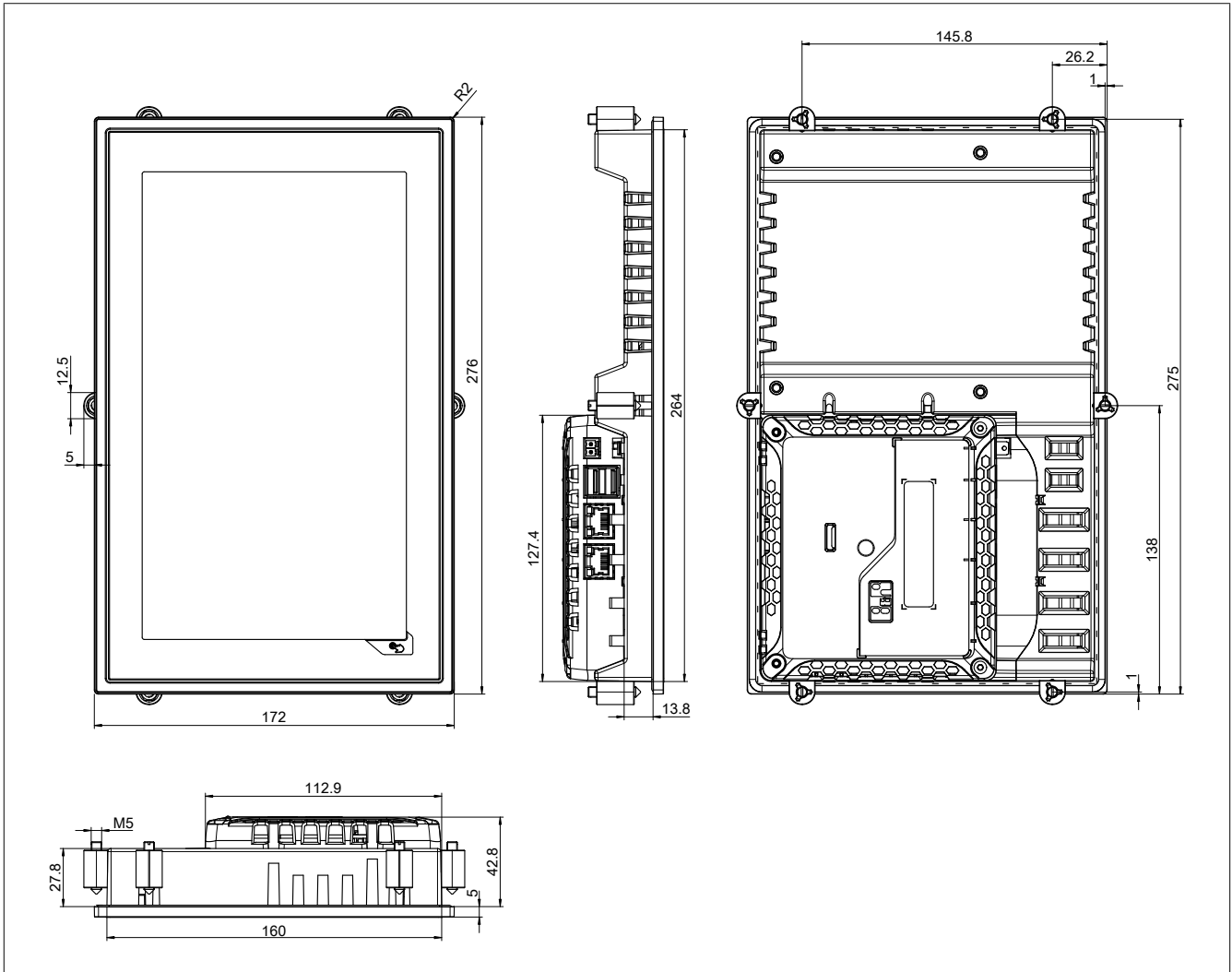


Figure: Power Panel C70 - 10.1" display - Temperature/Humidity diagram

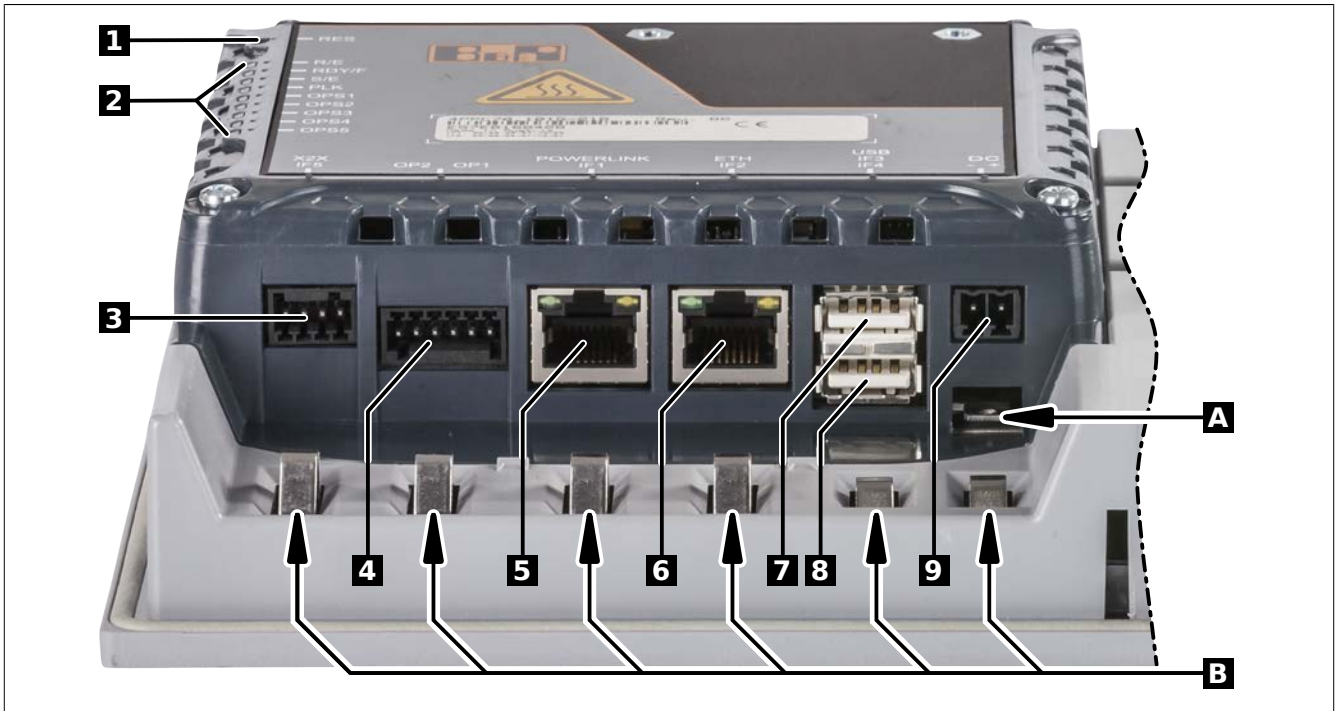
Portrait format for 10.1" variants



Dimensions of the installation cutout for this Power Panel variant: 161.9 ±1 mm x 265.9 ±1 mm

See also "[Installation cutout requirements](#)" on page 83.

3.6 Operating and connection elements



1	Reset button
2	Diagnostic LEDs
3	IF5: X2X Link interface
4	Fieldbus interface (depends on the Power Panel variant)
5	IF1: POWERLINK interface
6	IF2: Ethernet interface
7	IF3: USB interface
8	IF4: USB interface
9	Power supply
A	Grounding clip
B	Grounding plate (built into the device)

3.6.1 Diagnostic LEDs

Nine diagnostic LEDs are located on the back of the Power Panel C70:

Figure	LED	Color	Status	Description
	R/E	Green	On	Application running.
		Red	On	Mode SERVICE or BOOT.
		Double flash		Mode BOOT (during firmware update)
		Blinking		If LED "R/E" blinks red and LED "RDY/F" blinks yellow, a license violation has occurred.
	RDY/F	Yellow	On	Mode SERVICE or BOOT.
	Blinking			If LED "R/E" blinks red and LED "RDY/F" blinks yellow, a license violation has occurred.
	S/E	Green/ Red		LED "Status/Error" for the POWERLINK interface. For a description, see section "LED "S/E" (LED "Status/Error")" on page 72.
	PLK	Green	On	A connection to the remote station is established.
			Blinking	A connection to the remote station is established, and Ethernet activity is taking place on the bus.
	OPS1 OPS2 OPS3 OPS4 OPS5		These LEDs have a different meaning depending on the Power Panel variant. See the description in the following sections: <ul style="list-style-type: none"> "OPS" LEDs - Variant without fieldbus interfaces "OPS" LEDs - Variant with 2x CAN bus "OPS" LEDs - Variant with 1x CAN bus and 1x RS232 "OPS" LEDs - Variant with 1x CAN bus and 1x RS485 	

3.6.1.1 LED "S/E" (LED "Status/Error")

This LED is a green/red dual LED and indicates the state of the POWERLINK interface. The LED states have a different meaning depending on the operating mode of the POWERLINK interface.

3.6.1.1.1 Ethernet mode

In this mode, the interface is operated as an Ethernet interface.

LED "S/E"		Description
Green	Red	
On	Off	The interface is being operated as an Ethernet interface.

Table: LED "S/E": Interface in Ethernet mode

3.6.1.1.2 POWERLINK V2 mode

Error message

LED "S/E"		Description
Green	Red	
Off	On	The interface is in the error mode (failed Ethernet frames, increased number of collisions on the network, etc.). Note: Several red blinking signals are displayed immediately after the device is switched on. These are not errors, however.
Blinking	On	If an error occurs in the following modes, then the green LED blinks over the red LED: <ul style="list-style-type: none"> PRE_OPERATIONAL_1 PRE_OPERATIONAL_2 READY_TO_OPERATE

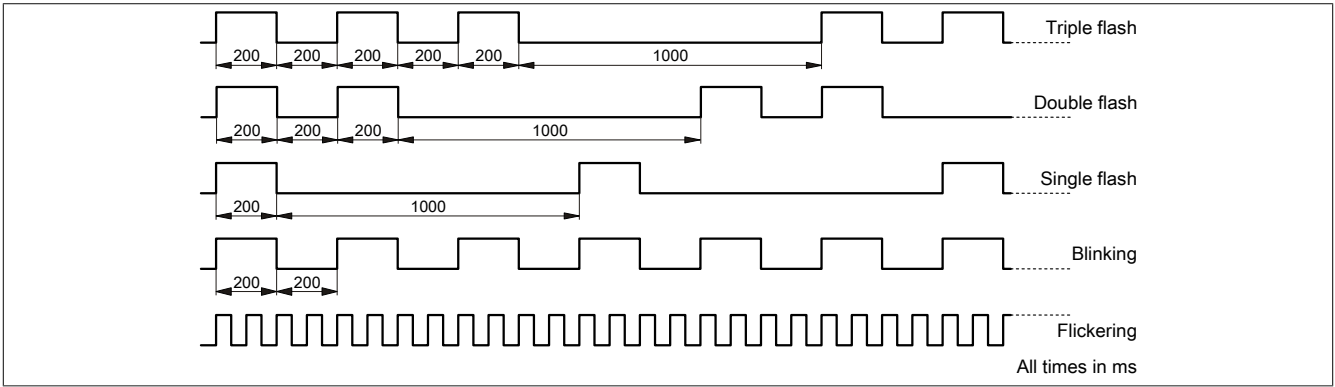
Table: LED "S/E" - Error message (interface in POWERLINK mode)

Interface status

LED "S/E"		Description
Green	Red	
Off	Off	<p>Mode: NOT_ACTIVE The interface is either in mode NOT_ACTIVE or one of the following modes or errors is present:</p> <ul style="list-style-type: none"> The device is switched off. The device is in the startup phase. The interface or device is not configured correctly in Automation Studio. The interface or device is defective. <p>Managing node (MN) The network is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface immediately enters mode PRE_OPERATIONAL_1. If POWERLINK communication is detected before the time has elapsed, however, the MN is not started.</p> <p>Controlled node (CN) The network is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface immediately enters mode BASIC_ETHERNET. If POWERLINK communication is detected before this time expires, however, the interface immediately enters mode PRE_OPERATIONAL_1.</p>
Flickering (approx. 10 Hz)	Off	<p>Mode: BASIC_ETHERNET The interface is in mode BASIC_ETHERNET. The interface is operated in Ethernet mode.</p> <p>Managing node (MN) This mode can only be exited by resetting the controller.</p> <p>Controlled node (CN) If POWERLINK communication is detected during this mode, the interface enters mode PRE_OPERATIONAL_1.</p>
Single flash (approx. 1 Hz)	Off	<p>Mode: PRE_OPERATIONAL_1 The interface is in mode PRE_OPERATIONAL_1.</p> <p>Managing node (MN) The MN is in "reduced cycle" operation. The CNs are configured in this mode. Cyclic communication is not yet taking place.</p> <p>Controlled node (CN) The CN can be configured by the MN in this mode. The CN waits until it receives an SoC frame and then switches to mode PRE_OPERATIONAL_2.</p>
	On	<p>Controlled node (CN) If the red LED lights up in this mode, this means that the MN has failed.</p>
Double flash (approx. 1 Hz)	Off	<p>Mode: PRE_OPERATIONAL_2 The interface is in mode PRE_OPERATIONAL_2.</p> <p>Managing node (MN) The MN starts cyclic communication (cyclic input data is not yet evaluated). The CNs are configured in this mode.</p> <p>Controlled node (CN) The CN can be configured by the MN in this mode. A command then switches the mode to READY_TO_OPERATE.</p>
	On	<p>Controlled node (CN) If the red LED lights up in this mode, this means that the MN has failed.</p>
Triple flash (approx. 1 Hz)	Off	<p>Mode: READY_TO_OPERATE The interface is in mode READY_TO_OPERATE.</p> <p>Managing node (MN) Cyclic and asynchronous communication. Received PDO data is ignored.</p> <p>Controlled node (CN) The configuration of the CN is completed. Normal cyclic and asynchronous communication. The transmitted PDO data corresponds to the PDO mapping. However, cyclic data is not yet evaluated.</p>
	On	<p>Controlled node (CN) If the red LED lights up in this mode, this means that the MN has failed.</p>
On	Off	<p>Mode: OPERATIONAL The interface is in mode OPERATIONAL. PDO mapping is active and cyclic data is evaluated.</p>
Blinking (approx. 2.5 Hz)	Off	<p>Mode: STOPPED The interface is in mode STOPPED.</p> <p>Managing node (MN) This mode does not occur for the MN.</p> <p>Controlled node (CN) Output data is not being output, and no input data is being provided. This mode can only be reached and exited by a corresponding command from the MN.</p>

Table: LED "S/E" - Interface state (interface in POWERLINK mode)

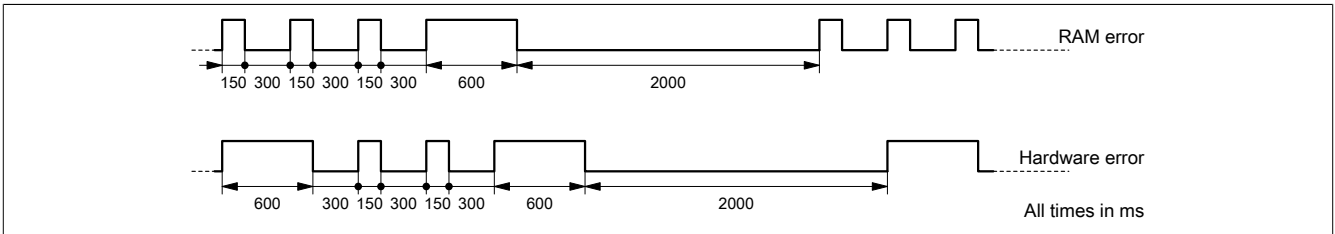
Blink times



3.6.1.1.3 System stop error codes

A system stop error can occur due to incorrect configuration or defective hardware.

The error code is indicated by LED "S/E" blinking red. The blinking signal of the error code consists of 4 switch-on phases with short (150 ms) or long (600 ms) duration. The error code is repeated every 2 seconds.



Error	Error description
RAM error	The device is defective and must be replaced.
Hardware error	The device or a system component is defective and must be replaced.

3.6.1.2 "OPS" LEDs - Variant without fieldbus interfaces

LEDs "OPS1" to "OPS5" do not have a function for Power Panel variants without fieldbus interfaces (4PPC70.xxxx-20x).

3.6.1.3 "OPS" LEDs - Variant with 2x CAN bus

Some Power Panel variants only have integrated terminating resistors starting with a certain hardware revision. See the technical data for information about the hardware revision and system requirements of Automation Studio and Automation Runtime for switching the terminating resistors.

Applies to hardware revisions with terminating resistors

LED	Color	Status	Description	Interface
OPS1	-	-	Reserved.	-
OPS2	Yellow	Off	Terminating resistor not switched on.	IF6: CAN bus
		On	Terminating resistor switched on.	
OPS3	Yellow	On	TxD/RxD: Data is being transmitted or received.	IF7: CAN bus
OPS4	Yellow	On	TxD/RxD: Data is being transmitted or received.	
OPS5	Yellow	Off	Terminating resistor not switched on.	IF7: CAN bus
		On	Terminating resistor switched on.	

Applies to hardware revisions without terminating resistors

LED	Color	Status	Description	Interface
OPS1	-	-	Reserved.	-
OPS2	Yellow	On	RxD: Data is being received.	IF6: CAN bus
OPS3	Yellow	On	TxD: Data is being transmitted.	
OPS4	Yellow	On	RxD: Data is being received.	IF7: CAN bus
OPS5	Yellow	On	TxD: Data is being transmitted.	

3.6.1.4 "OPS" LEDs - Variant with 1x CAN bus and 1x RS232

Some Power Panel variants only have integrated terminating resistors starting with a certain hardware revision. See the technical data for information about the hardware revision and system requirements of Automation Studio and Automation Runtime for switching the terminating resistors.

Applies to hardware revisions with terminating resistor

LED	Color	Status	Description	Interface
OPS1	-	-	Reserved.	-
OPS2	Yellow	Off	Terminating resistor not switched on.	IF6: CAN bus
		On	Terminating resistor switched on.	
OPS3	Yellow	On	TxD/RxD: Data is being transmitted or received.	IF8: RS232
OPS4	Yellow	On	TxD/RxD: Data is being transmitted or received.	
OPS5	-	-	Reserved	-

Applies to hardware revisions without terminating resistor

LED	Color	Status	Description	Interface
OPS1	-	-	Reserved.	-
OPS2	Yellow	On	RxD: Data is being received.	IF6: CAN bus
OPS3	Yellow	On	TxD: Data is being transmitted.	
OPS4	Yellow	On	RxD: Data is being received.	IF8: RS232
OPS5	Yellow	On	TxD: Data is being transmitted.	

3.6.1.5 "OPS" LEDs - Variant with 1x CAN bus and 1x RS485

Some Power Panel variants only have integrated terminating resistors starting with a certain hardware revision. See the technical data for information about the hardware revision and system requirements of Automation Studio and Automation Runtime for switching the terminating resistors.

Applies to hardware revisions with terminating resistors

LED	Color	Status	Description	Interface
OPS1	-	-	Reserved.	-
OPS2	Yellow	Off	Terminating resistor not switched on.	IF6: CAN bus
		On	Terminating resistor switched on.	
OPS3	Yellow	On	TxD/RxD: Data is being transmitted or received.	IF9: RS485
OPS4	Yellow	On	TxD/RxD: Data is being transmitted or received.	
OPS5	Yellow	Off	Terminating resistor not switched on.	
		On	Terminating resistor switched on.	

Applies to hardware revisions without terminating resistors

LED	Color	Status	Description	Interface
OPS1	-	-	Reserved.	-
OPS2	Yellow	On	RxD: Data is being received.	IF6: CAN bus
OPS3	Yellow	On	TxD: Data is being transmitted.	
OPS4	Yellow	On	RxD: Data is being received.	IF9: RS485
OPS5	Yellow	On	TxD: Data is being transmitted.	

3.6.2 Reset button / Operating modes



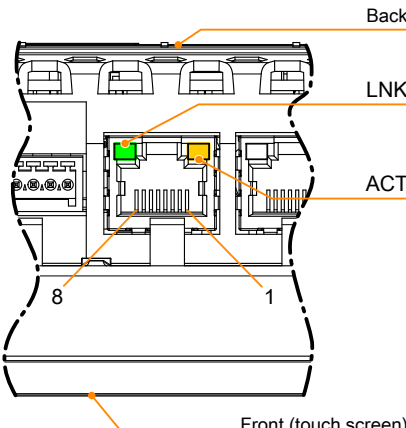
The reset button can be used to switch to one of 3 operating modes. The following key codes are used to select the desired operating mode:

Key code	Operating mode ¹⁾	Description
Press key briefly (<2 s).	RUN	<p>A hardware reset is triggered.</p> <ul style="list-style-type: none"> All application programs are stopped. The outputs of all connected modules are set to zero. <p>The device then starts up in mode RUN and an existing application is started. The device starts up in mode SERVICE by default. The startup mode that follows after pressing the reset button can be set in Automation Studio.</p> <ul style="list-style-type: none"> Mode SERVICE (default) Warm restart Cold restart Mode DIAGNOSIS
Press and hold key (>2 s).	DIAGNOSIS	The device is started in mode DIAGNOSIS . Program sections in User RAM and in the User FlashPROM are not initialized. A warm restart always take place after exiting mode DIAGNOSIS.
Press key briefly (<2 s). Pause (<2 s) Press and hold key (>2 s).	BOOT	The device changes to mode BOOT . Default Automation Runtime is started. In this mode, the runtime system can be installed with Automation Studio via the online interface. User flash memory is erased only when the download begins.

1) The operating mode can be seen in the display during the startup phase of the device.

Mode RUN is always enabled if a warm or cold restart of the device is triggered with Automation Studio.

3.6.3 POWERLINK interface (IF1)

Figure		Pinout		
	Terminal	Ethernet		
	1	RXD	Receive data	
	2	RXD\	Receive data\	
	3	TXD	Transmit data	
	4	Termination		
	5	Termination		
	6	TXD\	Transmit data\	
	7	Termination		
	8	Termination		
	Diagnostic LEDs			
LED	Color	Status	Description	
LNK	Link			
	Green	On	Link established to Ethernet network.	
ACT	Activity	Orange	On	No Ethernet activity taking place.
			Blinking	Ethernet activity taking place (data being transferred).

POWERLINK V2 mode

By default, the POWERLINK interface is operated as a managing node (MN). In the managing node, the node number is set to a fixed value of 240.

If the POWERLINK node is operated as a controlled node (CN), a node number from 1 to 239 can be set in the POWERLINK configuration in Automation Studio.

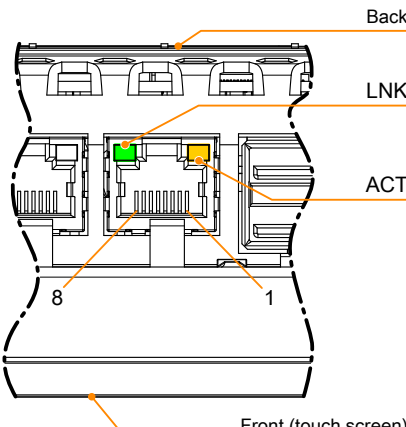
Ethernet mode

In this mode, the interface is operated as an Ethernet interface. The INA2000 node number is set using the B&R Automation Studio software.

Information:

If interface IF1 is operated in Ethernet mode, then this interface receives its own IP address and works independently of Ethernet interface IF2.

3.6.4 Ethernet interface (IF2)

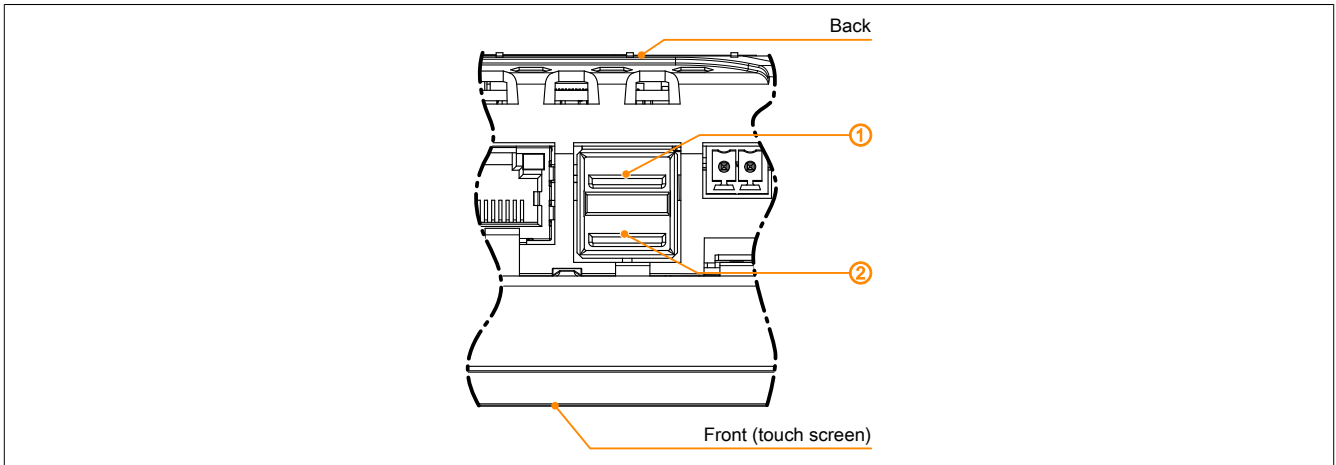
Figure		Pinout		
	Terminal	Ethernet		
	1	RXD	Receive signal	
	2	RXD\	Receive signal inverted	
	3	TXD	Transmit signal	
	4	Termination		
	5	Termination		
	6	TXD\	Transmit signal inverted	
	7	Termination		
	8	Termination		
	Diagnostic LEDs			
LED	Color	Status	Description	
LNK	Link			
	Green	On	Link established to Ethernet network.	
ACT	Activity	Orange	On	No Ethernet activity taking place.
			Blinking	Ethernet activity taking place (data being transferred).

The INA2000 node number is set with Automation Studio.

Information:

This Ethernet interface (IF2) is not suitable for POWERLINK.

3.6.5 USB interfaces



1	USB interface IF3
2	USB interface IF4

The Power Panel is equipped with a USB 2.0 host controller with 2 USB interfaces.

USB interfaces IF3 and IF4	
Transfer rate ¹	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Power supply	Max. 0.49 A (IF3) or 0.20 A (IF4) per interface ²

1 The actual value depends on the operating system or driver used.

2 Each USB interface is protected by a maintenance-free USB current-limiting switch.

On some Power Panel variants up to a certain hardware revision, the current-carrying capacity of IF4 is max. 0.10 A (see the technical data for the Power Panel being used).

Important!

Possible damage to USB interfaces or USB devices!

- **Peripheral USB devices can be connected to the USB interfaces. Due to the large number of USB devices available on the market, B&R cannot guarantee their functionality. Functionality is ensured when using the USB devices available from B&R.**
- **Because of general PC specifications these USB interfaces should be handled with extreme care with regard to EMC, location of cables, etc.**

Important!

Possible malfunction of interfaces and touch screen!

If functional ground is not present, faults in interface communication and touch screen functionality can occur.

The device is only permitted to be operated if properly grounded.

3.6.6 X2X Link interface

Figure	Pinout		
	Terminal	X2X Link	
	1	X2X	X2X data
	2	X2X _⊥	X2X ground
	3	X2X _∖	X2X data inverted
	4	SHLD	Shield
Required accessories			
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp terminal block 0.5 mm ²		

3.6.7 Fieldbus interfaces

3.6.7.1 Variant with 2x CAN bus

Figure	Terminal	Pinout	
	IF7: CAN bus		
	1	CAN_H	CAN high
	2	GND	Ground
	3	CAN_L	CAN low
	IF6: CAN bus		
	4	CAN_H	CAN high
	5	GND	Ground
	6	CAN_L	CAN low
	Required accessories		
	0TB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²	

A terminating resistor can be switched on individually and independently for each interface via software (configuration in Automation Studio).¹⁾

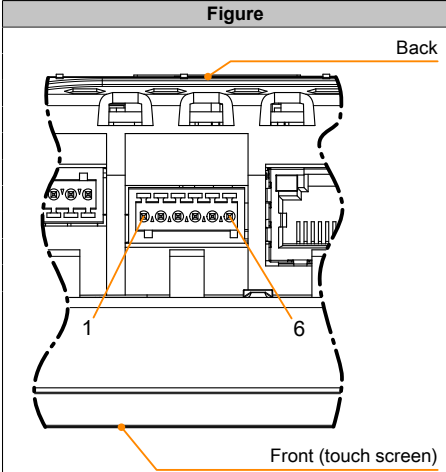
3.6.7.2 Variant with 1x CAN bus and 1x RS232

Figure	Terminal	Pinout	
	IF8: RS232		
	1	TxD	Transmit signal
	2	GND	Ground
	3	RxD	Receive signal
	IF6: CAN bus		
	4	CAN_H	CAN high
	5	GND	Ground
	6	CAN_L	CAN low
	Required accessories		
	0TB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²	

A terminating resistor can be switched on individually and independently for each interface via software (configuration in Automation Studio).²⁾

¹⁾ The functionality for switching on the terminating resistor using software is available with Automation Studio 4.3.1 and later as well as Automation Runtime 4.31 and later.
²⁾ The functionality for switching on the terminating resistor using software is available with Automation Studio 4.3.1 and later as well as Automation Runtime 4.31 and later.

3.6.7.3 Variant with 1x CAN bus and 1x RS485

Figure	Terminal	Pinout	
	IF9: RS485		
	1	DATA	Data
	2	GND	Ground
	3	DATA	Data inverted
	IF6: CAN bus		
	4	CAN_H	CAN high
	5	GND	Ground
	6	CAN_L	CAN low
	Required accessories		
	0TB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²	

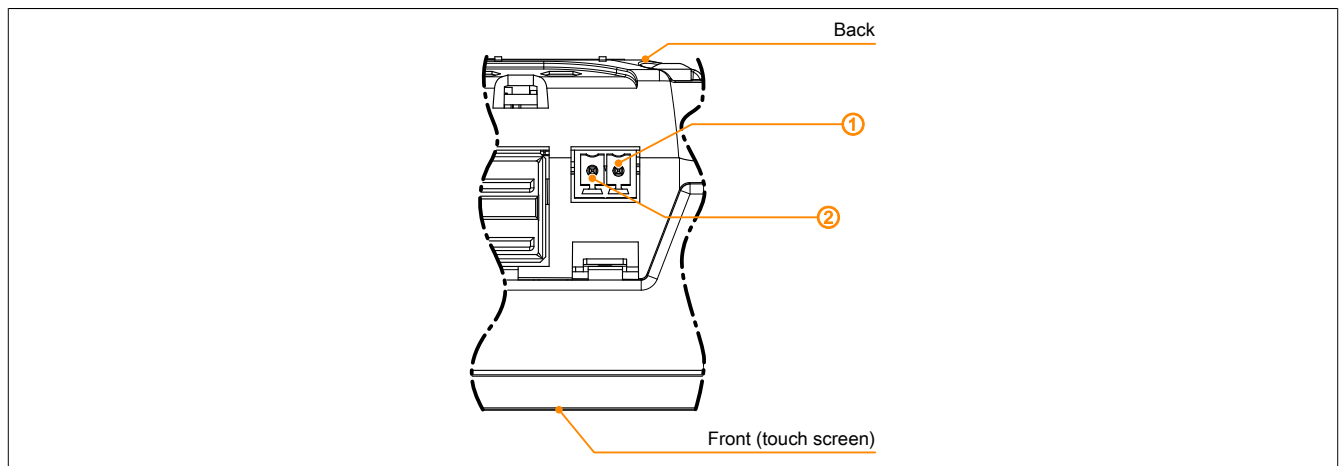
A terminating resistor can be switched on individually and independently for each interface via software (configuration in Automation Studio).³⁾

3.6.8 Power supply

Danger!

This device is only permitted to be supplied with protective extra-low voltage (PELV).

Protective earth (grounding clip on the device) and the GND connection of the power supply are connected internally in the Power Panel.



The pinout for the power supply is listed in the following table and printed on the back of the Power Panel. The Power Panel has reverse polarity protection that prevents the supply voltage from being connected incorrectly and damaging the device.

Terminal	Assignment	Explanation
1	+	24 VDC
2	-	GND

Required accessories	
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²

Overload protection must be provided by an external fuse (5 A, fast-acting).

³⁾ The functionality for switching on the terminating resistor using software is available with Automation Studio 4.3.1 and later as well as Automation Runtime 4.31 and later.

4 Commissioning

4.1 Installation

Important!

Possible damage to device!

- Commissioning and maintenance work is only permitted to be performed when the power is switched off. The power cable must also be disconnected from the power supply and device.
- Do not use force! Handle all the modules and components carefully.
- All covers, components, accessories, hardware and cables must be installed or connected before the device can be connected to the power supply and switched on.
- Observe the ESD notes (see ["Protection against electrostatic discharge" on page 6](#)).

Important installation information

- The environmental conditions must be observed.
- When installed in a closed housing, enough space must be available for air to circulate sufficiently.
- The device must be installed on a flat, clean and burr-free surface.
- Ventilation holes are not permitted to be covered.
- You must observe the permissible mounting orientations when installing the device.
- When connecting cables, the bend radius must be taken into account.
- The device must be installed such that viewing is optimized for the user.

Only 2 screws are needed in order to adhere to the mechanical properties. For this reason, the cover of the Power Panel is installed using 2 screws when delivered.

Some devices have unused drill holes that can be used for additional installation purposes (e.g. top-hat rail installation).



4.1.1 Installation cutout requirements

When installing the Power Panel, it is important to ensure that the surface and wall thickness of the installation cutout meet the following conditions:

Properties of the installation cutout	Value
Permissible deviation from the evenness Note: This condition must also be met with a built-in device.	≤0.5 mm
Permitted surface roughness in the area of the seal	≤120 μm (R z 120)
Min. wall thickness	2 mm
Max. wall thickness	6 mm

Important!

The degree of protection of the device (see technical data) can only be maintained if the device is installed in an appropriate housing with at least the same degree of protection per the above requirements.

Important!

The device must ultimately be installed in a protective housing with sufficient rigidity (per UL61010-1 and UL61010-2-201).

4.1.2 Mounting with retaining clips

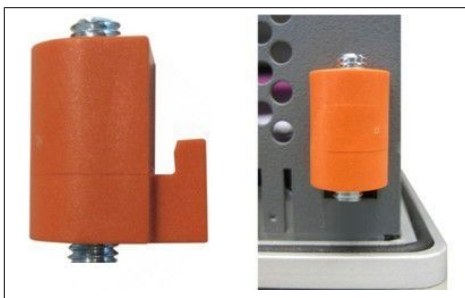


Figure: Retaining clip

The retaining clips are designed for a certain thickness of the material to be clamped (max. 6 mm, min. 2 mm).

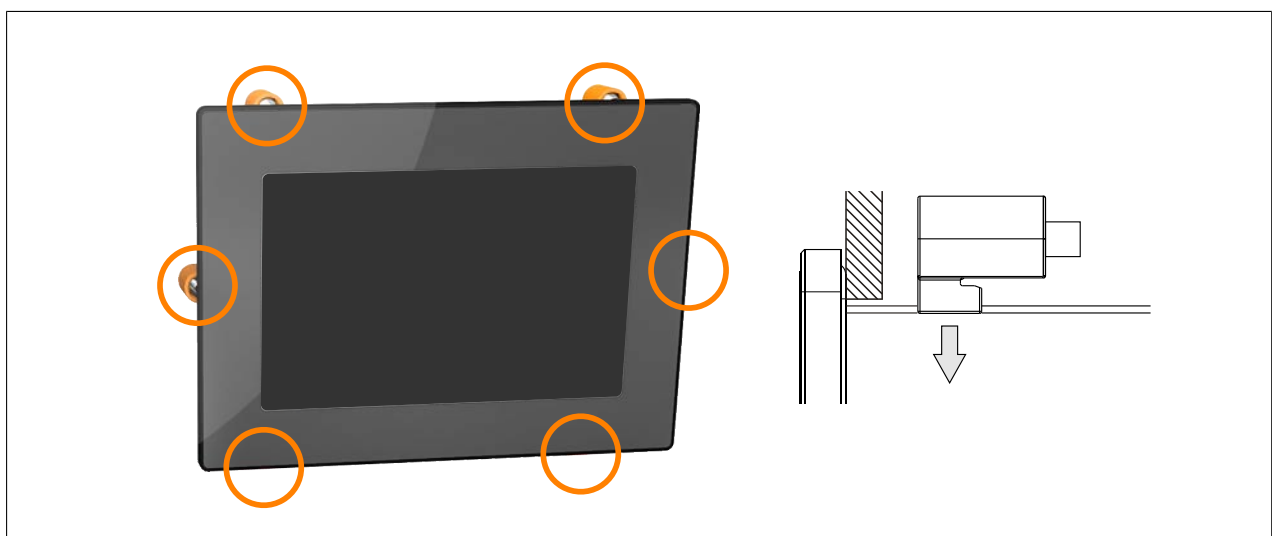
A large flat-blade screwdriver is needed to tighten and remove the screws.

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

See also "Installation cutout requirements" on page 83.

Procedure

1. Insert the device into the front of the prepared, burr-free and flat installation cutout. For the dimensions of the installation cutout, see section "Dimensions" for the individual devices.
2. Install the retaining clips on the device. To do this, insert the clips into the openings on the sides of the device (indicated by the orange circles). The number of openings may vary depending on the size of the device.



- Slide the retaining clips all the way to the back of the openings.

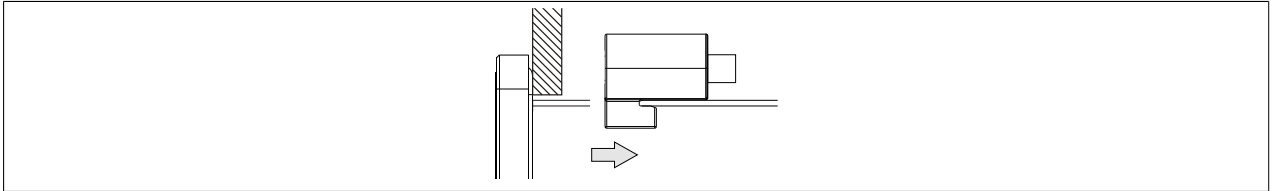


Figure: Sliding the retaining clips back

- Now secure the retaining clips to the wall or control cabinet by tightening the screws with a flat-blade screwdriver.
Tightening torque: 0.4 Nm

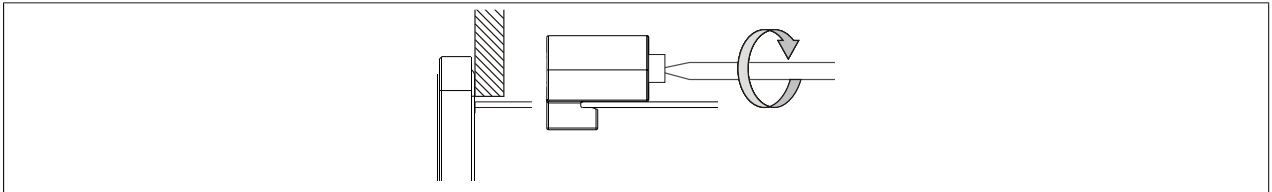


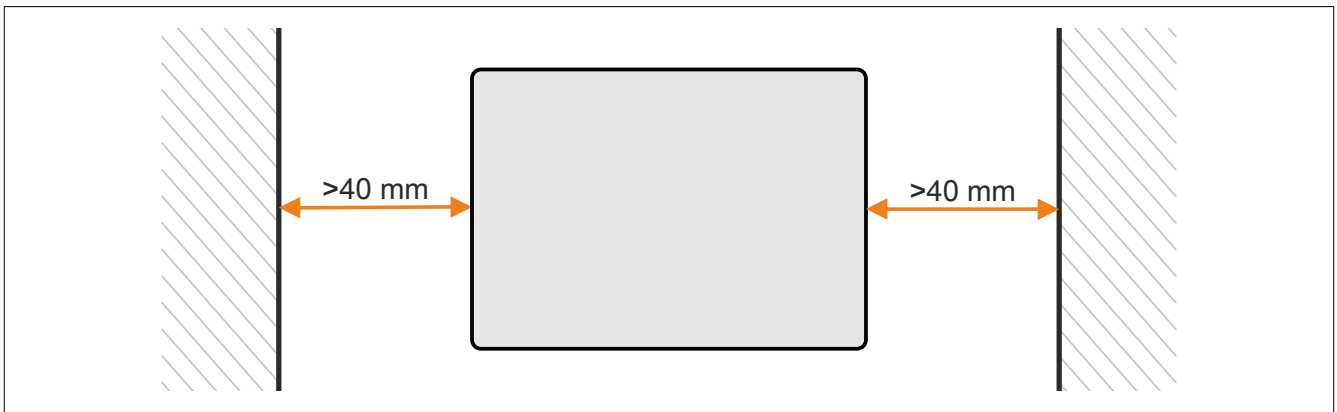
Figure: Securing the retaining clips

4.1.3 Installation instructions

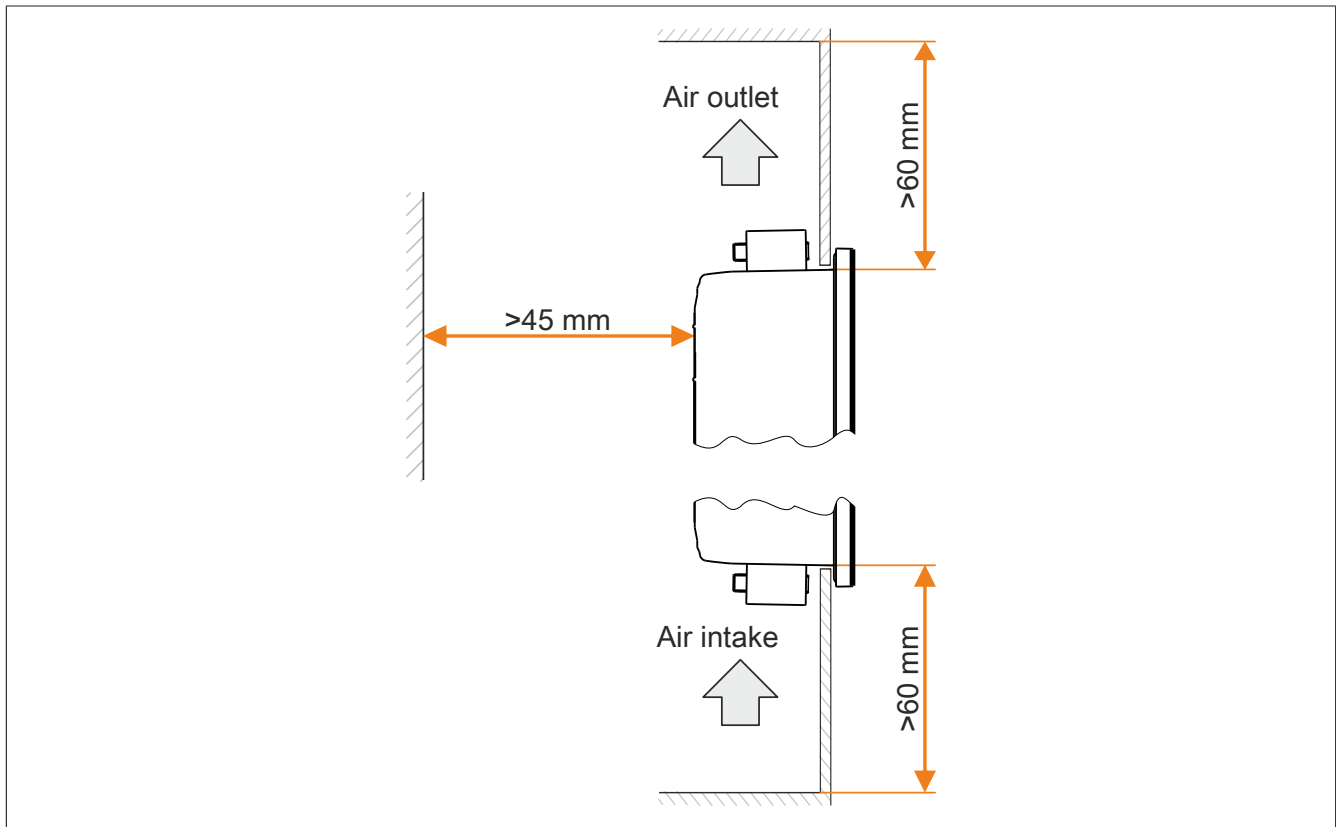
The Power Panel must be mounted using the retaining clips included in delivery (tightening torque: 0.4 Nm).

In order to ensure sufficient air circulation, the specified clearance values must be observed above, below, to the side and behind the Power Panel. The minimum specified spacing is indicated in the following schematic diagrams. This applies to all Power Panel variants.

Air circulation - Rear view



Air circulation - Side view

**Information:**

The specified air circulation clearance values are based on worst-case operation at the maximum specified ambient temperature (see "Temperature values" in chapter "Technical data").

If the specified air circulation clearance values cannot be observed, then the internal housing temperature must be monitored by the user and appropriate measures taken if they are exceeded (see "Temperature monitoring" on page 15).

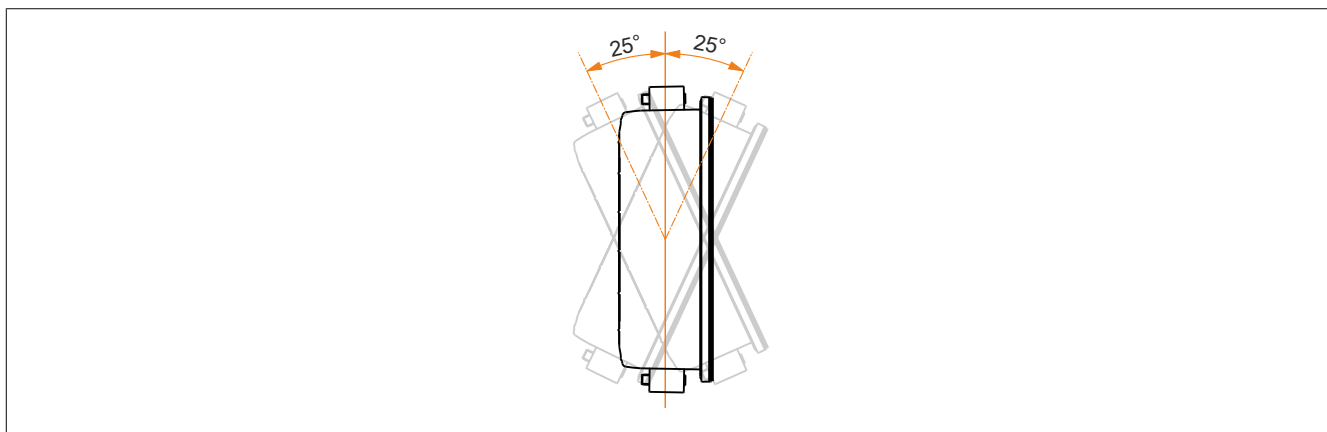
4.1.4 Mounting orientations

Important!**Possible damage to device!**

- An ambient temperature that is too high can cause damage to the device or faulty behavior.
- For the maximum permissible ambient temperature, see the technical data for the respective device.

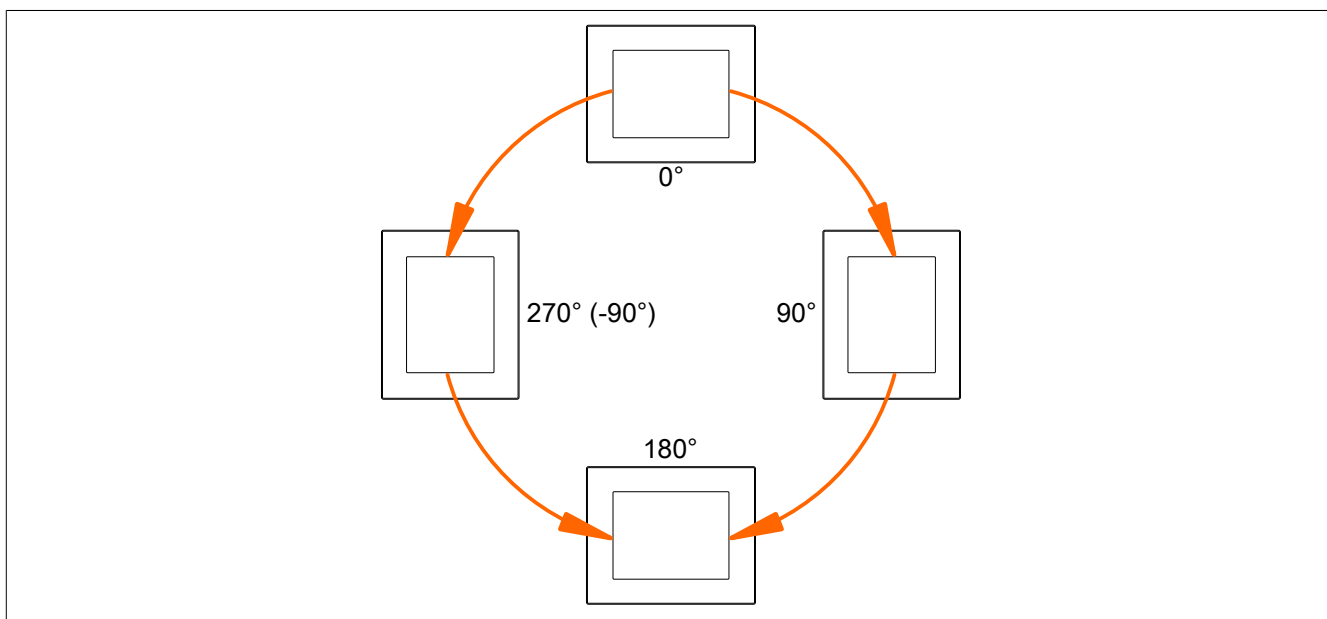
The following diagrams show the permissible mounting orientations of Power Panels. The operating temperature limit values specified in the technical data apply taking into account the permissible mounting orientations.

Tilted mounting orientation



Rotated mounting orientation

The Power Panel is permitted to be rotated in 90° increments and installed.



4.1.5 Grounding

Disturbances are discharged effectively via a grounding clip. The cable shields (e.g. Ethernet) are discharged via the grounding plate. For additional information about electromagnetic compatibility, see the **INSTALLATIONS / EMC GUIDE** user's manual (MAEMV-ENG on the B&R website www.br-automation.com).

Information:

In the Power Panels, ground and GND potential are connected together internally in the device.

Important!

Possible malfunction of interfaces and touch screen!

If functional ground is not present, faults in interface communication and touch screen functionality can occur.

The device is only permitted to be operated if properly grounded.

Built-in grounding plate



- | | |
|---|--|
| 1 | Grounding plate with clips serves to establish a conductive connection to the cable shield and to secure the connected cables. |
| 2 | Blade terminal for ground conductor to the control cabinet. |

Securing the conductor lines to the grounding plate

1 Ground conductor

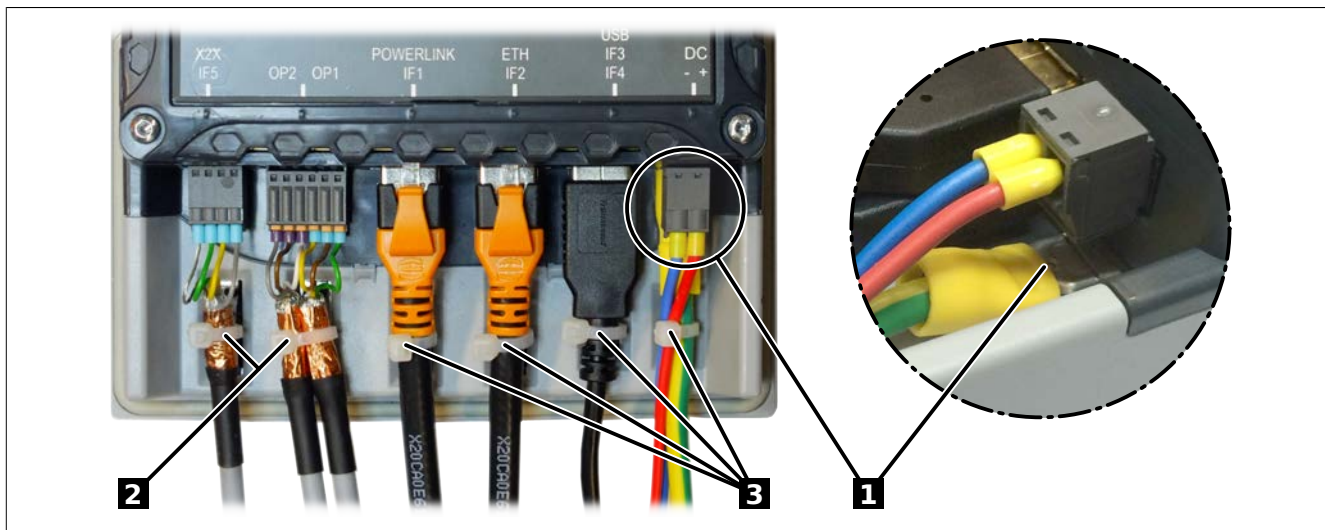
The connection to ground potential must be as short as possible and sufficiently strong ($\geq 4 \text{ mm}^2$) over the intended spade terminal (Faston 6.3 mm).

2 Shielded lines

A central ground connection is available to effectively deflect interference. All cable shields must be connected to ground with good conductivity using a cable tie on the grounding plate or some other method.

3 Unshielded lines

All unshielded lines must be relieved of tension by using a cable tie to tie them to the grounding plate.



Grounding in the control cabinet

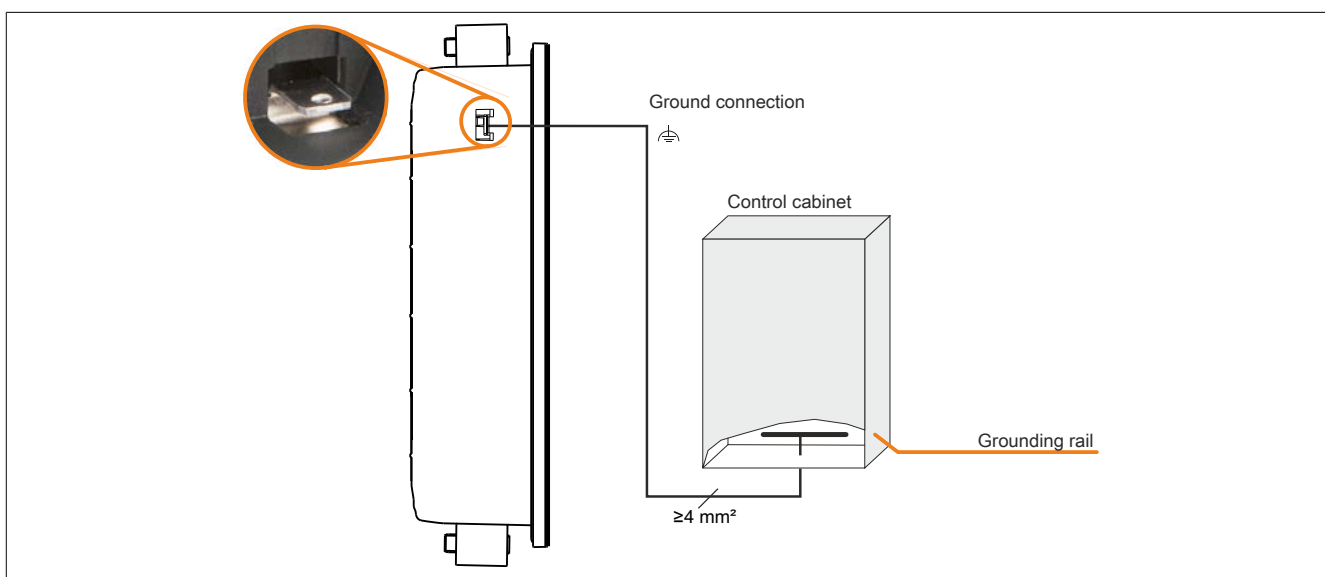


Figure: Grounding in the control cabinet

Important!

The ground connection of the device must be low impedance and connected to ground (e.g. grounding rail in the control cabinet) using a short path.

4.2 Commissioning

The Power Panel is delivered with Boot AR. This is an operating system with a limited range of functions but that provides all functions necessary for an online connection between Automation Studio and the Power Panel.

In order to put the Power Panel into service, a full version of Automation Runtime must be transferred to the Power Panel. The following options are available for this:

- [Transferring Automation Runtime over a network with a DHCP server](#)
- [Transferring Automation Runtime over a network without a DHCP server](#)
- [USB flash drive - remote install structure](#)

Transferring Automation Runtime over a network with a DHCP server

See Automation Help:

⇒ Real-time operating system ▶ Target systems ▶ Target systems - SG4 ▶ Automation Runtime remote install

Transferring Automation Runtime over a network without a DHCP server

- ▶ Connect the Power Panel to the Ethernet network.
- ▶ Switch on the Power Panel.
- ▶ Create a new project with the Power Panel in Automation Studio.
- ▶ In a network without a DHCP server, an IP address must be assigned to the Power Panel in order for an online connection between Automation Studio and the Power Panel to be established:
 - Menu option **Online / Settings** opens connection window "Online settings".
 - The target system search is started in this window with menu option **View / Online settings / Browse**.
 - The list of target systems found also includes the Power Panel. Since an IP address has not yet been assigned to the Power Panel, address 0.0.0.0 is displayed.
 - Command **Set IP parameters** (Power Panel shortcut menu) opens the dialog box where all required network configurations can be made temporarily (they should be identical to the settings defined in the project).

Information:

The data required for manual network configuration can be obtained from the network or system administrator.

- ▶ Rebuild the project in Automation Studio with menu option **Project / Rebuild configuration**.
- ▶ The connection must first be enabled in order to transfer Automation Runtime to the Power Panel. This is done using option **Connect** from the Power Panel's shortcut menu.
- ▶ Automation Runtime can then be transferred to the Power Panel with the following menu option:

AS version <4.3.3	Online / Services / Transfer Automation Runtime
AS V4.3.3 or later	Project / Project installation / Transfer Automation Runtime

- ✓ Then follow the instructions provided by Automation Studio.

Information:

Memory is erased first during this procedure; Automation Runtime is then transferred and after 3 automatic restarts the Power Panel is in mode RUN.

USB flash drive - remote install structure

See details in the Runtime Utility Center (RUC) documentation in Automation Help.

Information:

To ensure error-free functionality of the USB flash drive, the current consumption of the USB flash drive must be less than the current-carrying capacity of the USB interface.

Observe the technical data for the Power Panel and USB flash drive being used.

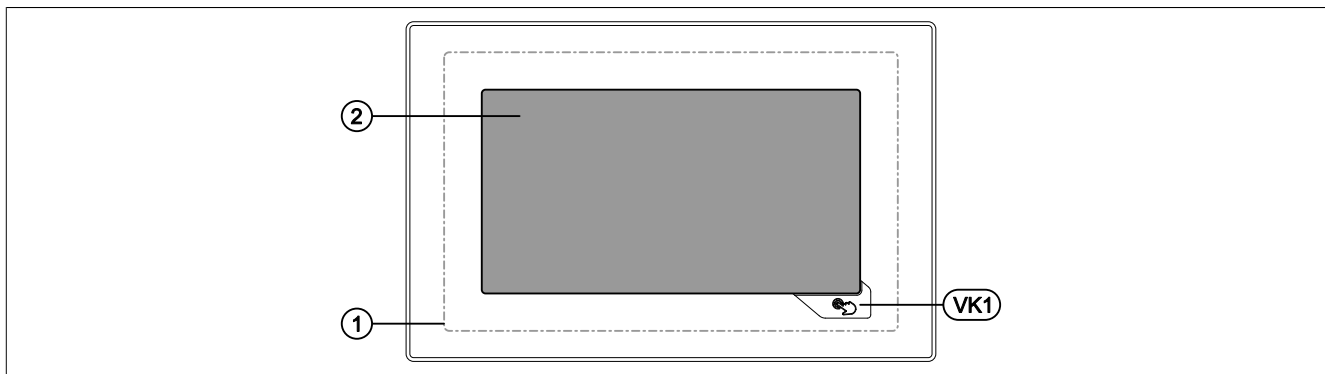
4.3 Operating the Power Panel

The following input methods can be used individually or together to operate the Power Panel:

- Touch screen
- USB keyboard^{*)}

4.3.1 Touch screen

The touch screen ① of the Power Panel juts out over the display on all four sides by about 1 cm:

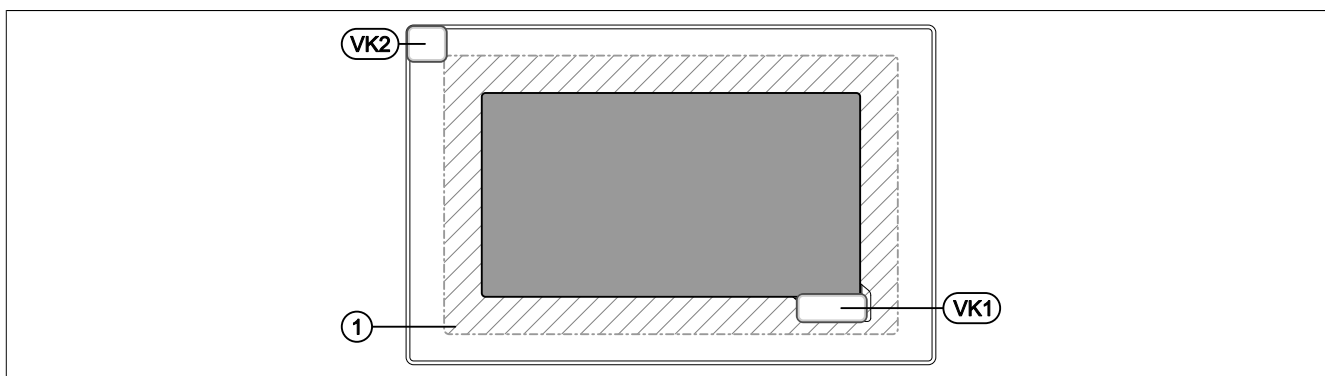


Touching the touch screen ② (corresponds to the display) and the Hand button (VK1) triggers commands in the application.

Because the analog resistive touch screen is not capable of multi-touch, touching multiple positions simultaneously generates an average value. This averaged position value is evaluated by the application. Because the entire touch screen ① is bigger than the display itself, it may occur that multiple touches (also outside of the display area) can lead to a command being triggered unintentionally. This can happen when the Power Panel is held in your hands.

Defined touch keys

The following touch keys (virtual keys) are predefined if the Visual Components object is used for designing the HMI application in Automation Studio:



In addition to the Hand button (VK1 virtual key), a further VK2 virtual key is available, which represents the touch-screen ① outside of the display area (hatched area). With this key, a touch outside of the display area can be recognized by the application. The application can warn the user of faulty operation with a corresponding message.

Version dependencies

Virtual key VK2 is available **starting with** Automation Runtime A4.41 and **starting with** version 1.5.0.0 of the hardware upgrade:

^{*)} A USB keyboard is configurable in Automation Studio.

4.3.1.1 Touch screen calibration

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

During the calibration process, the specified point must be pressed four times in row within a certain time frame.

An error message is displayed if calibration is not performed properly.

Information:

A stylus pen (e.g. 9A0013.01) is recommended for touch screen calibration.

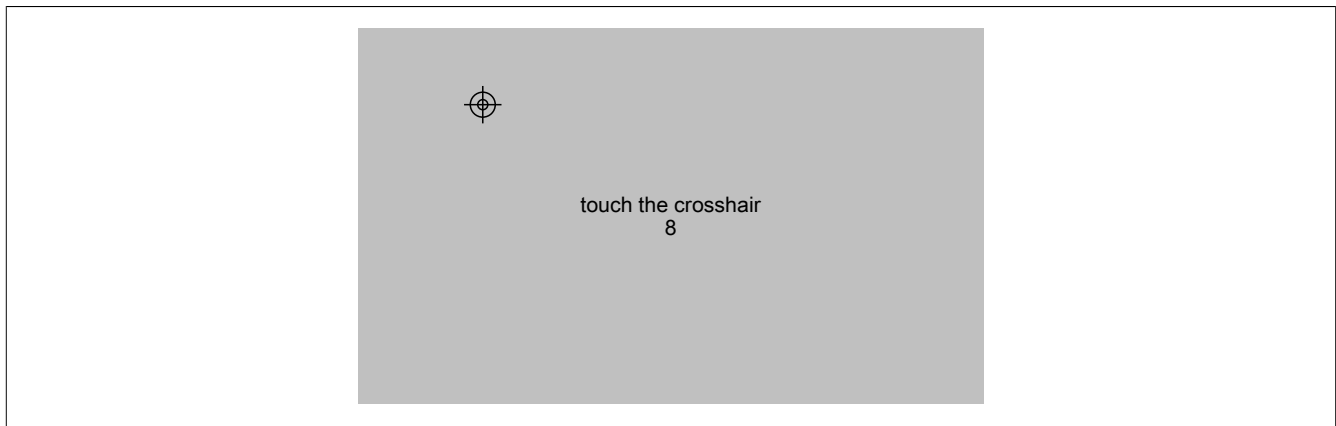


Figure: Touch screen calibration

Touch screen calibration from the application using Visual Components.

Touch screen calibration is started in the application. The several options available to the user are described in Automation Help in section "Visual Components". See the following keywords:

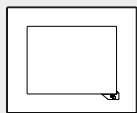
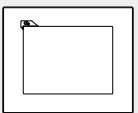
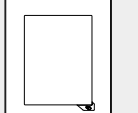
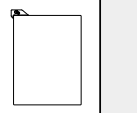
- Data points *CalibrationDatapoint* and *CalibrationStateDatapoint*
- Key action *CalibrateTouch*

4.3.1.2 Set brightness with the application

Function *VA_SetBrightness* from library *VISAPI* sets the brightness of the display (see library description in Automation Help).

4.3.1.3 Screen rotation

It is possible to rotate the contents of the screen by 180° using the graphic driver's screen rotation function. This function is supported by Automation Runtime. The following settings are possible in the configuration in Automation Studio depending on the Power Panel variant:

Power Panel variant	Landscape		Portrait	
				
Screen rotation Configuration in Automation Studio	0°	180°	90 °	270°

In addition to this configuration setting in Automation Studio, the orientation of the HMI application can be defined in the visualization object.

5 Maintenance

5.1 Cleaning

Danger!

Power Panel devices are only permitted to be cleaned while switched off in order to prevent unintended functions from being triggered when handling the touch screen or pressing keys.

Power Panel devices should be cleaned with a moist cloth. The cloth should be moistened with water and detergent, a screen cleaning agent or alcohol (ethanol). The cleaning agent should be applied to the cloth beforehand, not sprayed directly on the Power Panel! Never use aggressive solvents, chemicals, scouring agents, pressurized air or steam-jet air ejectors.

Important!

Cleaning the label on the back of the unit is only permitted with a dry cloth. This ensures readability of the thermal print during the service life of the device.

Information:

The display with the touch screen should be cleaned at regular intervals.

5.2 User tips for increasing the service life of the display or touch screen

Pixel errors

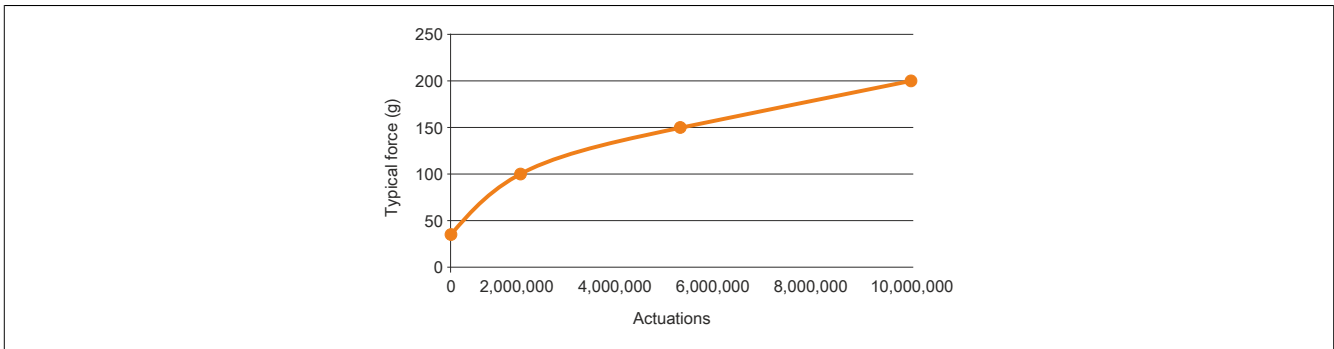
Information:

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

5.2.1 Service life

The maximum service life of the analog resistive touch screen is 10 million actuations.

The following diagram describes the force required to activate the touch screen over the course of its service life. The requirements are the same as those for specifying a maximum of 10 million operations.



5.2.2 Backlight

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

How can the service life of backlights be extended?

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

5.2.3 Image persistence

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

There are 2 different types:

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

What causes image persistence?

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

How can image persistence be reduced?

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

6 Accessories

6.1 Overview

Model number	Product ID	Page
Cage clamp terminal blocks for all Power Panel variants		
0TB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²	97
0TB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp terminal block 0.5 mm ²	98
Cage clamp terminal blocks for Power Panel variants with fieldbus interfaces		
0TB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²	98
Screw clamp terminals		
0TB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²	97
USB accessories		
5MMUSB.2048-01	USB 2.0 flash drive, 2048 MB, B&R	99
5MMUSB.4096-01	USB 2.0 flash drive, 4096 MB, B&R	
Other accessories		
9A0013.01	Stylus pen for resistive touch screen	

POWERLINK/Ethernet cables

Model number	Product ID	Page
POWERLINK/Ethernet cables, RJ45 to RJ45		
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.20 m	99
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.30 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00040	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.40 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.50 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
X20CA0E61.00150	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1.50 m	
X20CA0E61.00200	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 2 m	
X20CA0E61.00300	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 3 m	
X20CA0E61.00500	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 5 m	
X20CA0E61.00800	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 8 m	
X20CA0E61.01000	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 10 m	
X20CA0E61.01200	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 12 m	
X20CA0E61.01500	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 15 m	
X20CA0E61.02000	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 20 m	
X20CA0E61.03000	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 30 m	
X20CA0E61.05000	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 50 m	
X20CA0E61.06000	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 60 m	
POWERLINK/Ethernet cables, RJ45 to RJ45, can be used in cable drag chains		
X20CA3E61.0100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, can be used in cable drag chains, 10 m	99
X20CA3E61.0150	POWERLINK/Ethernet connection cable, RJ45 to RJ45, can be used in cable drag chains, 15 m	
X20CA3E61.0200	POWERLINK/Ethernet connection cable, RJ45 to RJ45, can be used in cable drag chains, 20 m	
POWERLINK/Ethernet cables, RJ45 to M12		
X67CA0E41.0010	POWERLINK/Ethernet attachment cable, RJ45 to M12, 1 m	99
X67CA0E41.0050	POWERLINK/Ethernet attachment cable, RJ45 to M12, 5 m	
X67CA0E41.0150	POWERLINK/Ethernet attachment cable, RJ45 to M12, 15 m	
X67CA0E41.0500	POWERLINK/Ethernet attachment cable, RJ45 to M12, 50 m	
POWERLINK/Ethernet cables, RJ45 to M12, can be used in cable drag chains		
X67CA3E41.0150	POWERLINK/Ethernet attachment cable, RJ45 to M12, can be used in cable drag chains, 15 m	99

X2X Link cables

Model number	Product ID	Page
X2X Link cables, straight		
X67CA0X21.0005	X2X Link attachment cable, 0.50 m	99
X67CA0X21.0020	X2X Link attachment cable, 2 m	
X67CA0X21.0030	X2X Link attachment cable, 3 m	
X67CA0X21.0050	X2X Link attachment cable, 5 m	
X67CA0X21.0100	X2X Link attachment cable, 10 m	
X67CA0X21.0150	X2X Link attachment cable, 15 m	
X67CA0X21.0200	X2X Link attachment cable, 20 m	
X67CA0X21.0500	X2X Link attachment cable, 50 m	

Accessories

Model number	Product ID	Page
X2X Link cables, angled		
X67CA0X31.0020	X2X Link attachment cable, angled, 2 m	99
X67CA0X31.0040	X2X Link attachment cable, angled, 4 m	
X67CA0X31.0050	X2X Link attachment cable, angled, 5 m	
X67CA0X31.0100	X2X Link attachment cable, angled, 10 m	
X67CA0X31.0150	X2X Link attachment cable, angled, 15 m	
X67CA0X31.0500	X2X Link attachment cable, angled, 50 m	
X2X Link cables		
X67CA0X99.1000	Cable for custom assembly, 100 m	99
X67CA0X99.5000	Cable for custom assembly, 500 m	

6.2 TB6102 2-pin power supply connector

This 1-row 2-pin terminal block is used to connect the power supply.

6.2.1 Order data

Model number	Short description
	Terminal blocks
OTB6102.2010-01	Accessory terminal block, 2-pin (3.81), screw clamp terminal block 1.5 mm ²
OTB6102.2110-01	Accessory terminal block, 2-pin (3.81), cage clamp terminal block 1.5 mm ²

Table 28: OTB6102.2010-01, OTB6102.2110-01 - Order data

6.2.2 Technical data

Information:

The following specifications, properties and limit values apply only to this accessory and may deviate from those that apply to the complete system. The data specifications for the complete system take precedence over those of individual components.

The technical data in this manual is current as of its creation/publication. We reserve the right to make changes.

Model number	OTB6102.2010-01	OTB6102.2110-01
Terminal block		
Number of pins	2 (female)	
Type of terminal block	Screw clamp terminal block	Cage clamp terminal block
Cable type	Only copper wires (no aluminum wires!)	
Spacing	3.81 mm	
Connection cross section		
AWG wire	28 to 16	
Wire end sleeves with plastic covering	0.25 to 0.5 mm ²	
With wire end sleeves	0.25 to 1.5 mm ²	
Flexible	0.14 to 1.5 mm ²	
Inflexible	0.14 to 1.5 mm ²	
Tightening torque	0.22 to 0.25 Nm	-
Electrical properties		
Nominal voltage	300 V	
Nominal current ¹⁾	8 A	

Table 29: OTB6102.2010-01, OTB6102.2110-01 - Technical data

1) The limit data for each Power Panel must be taken into consideration.

6.3 TB510x 4/6-pin terminal block

The single-row 4-pin terminal block is needed for the X2X Link interface.

The single-row 6-pin terminal block is needed for the fieldbus interfaces.

6.3.1 Order data



 <p>OTB5104.2110-01</p>	 <p>OTB5106.2110-01</p>
Model number	Short description
Terminal blocks	
OTB5104.2110-01	Accessory terminal block, 4-pin (2.5), cage clamp, 0.5 mm ²
OTB5106.2110-01	Accessory terminal block, 6-pin (2.5), cage clamp terminal block 0.5 mm ²

Table 30: OTB5104.2110-01, OTB5106.2110-01 - Order data

6.3.2 Technical data

Information:

The following specifications, properties and limit values apply only to this accessory and may deviate from those that apply to the complete system. The data specifications for the complete system take precedence over those of individual components.

The technical data in this manual is current as of its creation/publication. We reserve the right to make changes.

Model number	OTB5104.2110-01	OTB5106.2110-01
Terminal block		
Number of pins	4	6
Type of terminal block	Cage clamp terminal block ¹⁾	Cage clamp terminal block
Cable type	Only copper wires (no aluminum wires!)	
Spacing	2.5 mm	
Connection cross section		
AWG wire	26 to 20	
With wire end sleeves	0.25 to 0.5 mm ²	
Flexible	0.14 to 0.5 mm ²	
Inflexible	0.14 to 0.5 mm ²	
Electrical properties		
Nominal voltage	125 V	
Nominal current ²⁾	4 A	

Table 31: OTB5104.2110-01, OTB5106.2110-01 - Technical data

- 1) Cage clamp terminal blocks cannot be used side-by-side.
- 2) Take the respective limit data for the I/O modules into consideration!

6.4 Data storage devices

For technical data and additional information about data storage devices, see the corresponding documentation. This can be located and downloaded by searching for the data storage device's model number at www.br-automation.com.

6.5 Cable accessories

For technical data and additional information about cables, see the corresponding documentation. This can be located and downloaded by searching for the cable's model number on the B&R website at www.br-automation.com.

7 International and national certifications

Power Panel devices meet the requirements of the listed certifications and their relevant standards. We are committed to ensuring the reliability of our products in industrial environments.

Information:

Certifications applicable to the respective Power Panel are available at the following locations:

- Chapter "Device description" in section "Technical data" for the individual products.
- On the website www.br-automation.com in section "Technical data" for the individual products (possible to search using model number).
- On the product label (see Power Panel housing).

Changes and new certifications are promptly made available in electronic form on the B&R website at www.br-automation.com.

7.1 Overview of certifications

Mark	Explanation	Certificate authority	Region
	CE marking	Notified bodies	Europe (EU)
	Underwriters Laboratories Inc. (UL) (certification for Canada and USA)	UL	Canada USA

7.2 EU directives and standards (CE)

CE markings



The respective product complies with all applicable EU directives and relevant harmonized standards.

Certification of these products is performed in cooperation with accredited testing laboratories.

Europe (EU)

EMC Directive 2014/30/EU

All devices satisfy the protection requirements of the "EMC directive" and are designed for industrial use:

Applicable standards from this directive:

EN 61131-2	Programmable logic controllers - Part 2: Guidance for inspection and routine testing
EN 61000-6-2	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments
EN 61000-6-4	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emissions standard for industrial environments

The corresponding declaration of conformity is available for download from the B&R website. For information about the versions of applicable standards, see the declaration of conformity.



Declaration of conformity

[Website > Downloads > Certificates > Declarations of conformity > Declaration of conformity HMI IPC](#)

7.2.1 Overview of standards

Standard	Description
EN 55011 (CISPR 11)	Industrial, scientific and medical equipment - Radio frequency disturbance characteristics - Limits and methods of measurement
EN 55016-2-1 (CISPR 16-2-1)	Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements
EN 55016-2-3 (CISPR 16-2-3)	Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurement of disturbances and immunity - Radiated disturbance measurements
EN 55022 (CISPR 22)	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
EN 60068-2-6	Environmental testing - Part 2-6: Procedures - Test Fc: Vibration (sinusoidal)
EN 60068-2-27	Environmental testing - Part 2-27: Test procedure - Test Ea and guidance: Shock
EN 60068-2-31 ¹⁾	Environmental testing - Part 2-31: Test procedure - Test Ec: Rough handling shocks, mainly for devices
EN 60529	Degrees of protection provided by enclosures (IP code)
EN 60664-1	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests
EN 60721-3-2	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 2: Transport
EN 60721-3-3	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 3: Stationary use at weather-protected locations
EN 61000-4-2	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
EN 61000-4-3	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
EN 61000-4-5	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measuring techniques - Surge immunity test
EN 61000-4-6	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measuring techniques - Power frequency magnetic field immunity test
EN 61000-4-11	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Immunity tests for voltage dips, short interruptions and voltage variations
EN 61000-4-29	Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on DC input power port immunity tests
EN 61000-6-2	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments
EN 61000-6-4	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
EN 61131-2	Programmable logic controllers - Part 2: Guidance for inspection and routine testing

1) Replacement for EN 60068-2-32

7.2.2 Requirements for immunity to disturbances

Immunity	Testing performed per standard:	Requirements per standard:	
		EN 61131-2 ¹⁾	EN 61000-6-2 ²⁾
Electrostatic discharge (ESD)	EN 61000-4-2	✓	✓
High-frequency electromagnetic fields (HF field)	EN 61000-4-3	✓	✓
High-speed transient electrical disturbances (Burst)	EN 61000-4-4	✓	✓
Surge voltages (Surge)	EN 61000-4-5	✓	✓
Conducted disturbances	EN 61000-4-6	✓	✓
Magnetic fields with electrical frequencies	EN 61000-4-8	✓	✓
Voltage dips (AC) Short-term interruptions (AC) Voltage fluctuations (AC)	EN 61000-4-11	✓	✓
Short-term interruptions (DC) Voltage fluctuations (DC)	EN 61000-4-29	✓	-

1) EN 61131-2: Product standard - Programmable logic controllers

2) EN 61000-6-2: Generic standard - Immunity for industrial environments

Criteria to prove the performance of a PLC system against EMC disturbances

Criteria	During test	After test
A	The PLC system shall continue to operate as intended. No loss of function or performance.	The PLC system shall continue to operate as intended.
B	Degradation of performance accepted. The operating mode is not permitted to change. Irreversible loss of stored data is not permitted.	The PLC system shall continue to operate as intended. Temporary degradation of performance must be self-recoverable.
C	Loss of functions accepted, but no destruction of hardware or software (program or data).	The PLC system shall continue to operate as intended automatically, after manual restart or power off / power on.
D	Degradation or failure of functionality that can no longer be restored.	PLC system permanently damaged or destroyed.

Electrostatic discharge (ESD)

Testing performed per standard: EN 61000-4-2	Requirements per standard: EN 61131-2 / Zone B	Requirements per standard: EN 61000-6-2
Contact discharge (CD) to conductive accessible parts		±4 kV Criteria B
Air discharge (AD) to insulating external parts		±8 kV Criteria B

High-frequency electromagnetic fields (HF field)

Testing performed per standard: EN 61000-4-3	Requirements per standard: EN 61131-2 / Zone B	Requirements per standard: EN 61000-6-2
Housing, completely wired		80 MHz to 1 GHz, 10 V/m 1.4 to 2 GHz, 3 V/m 2 to 2.7 GHz, 1 V/m Criteria A

High-speed transient electrical disturbances (Burst)

Testing performed per standard: EN 61000-4-4	Requirements per standard: EN 61131-2 / Zone B	Requirements per standard: EN 61000-6-2
AC power inputs		±2 kV / 5 kHz Criteria B
AC power outputs	±2 kV / 5 kHz ¹⁾ Criteria B	±2 kV / 5 kHz Criteria B
Other AC I/O	±2 kV / 5 kHz ¹⁾ Criteria B	-
DC mains inputs/outputs		±2 kV / 5 kHz ¹⁾ Criteria B
Other I/Os and interfaces		±1 kV / 5 kHz ¹⁾ Criteria B

1) Only for connections with a permitted line length greater than 3 m.

Surge voltages (Surge)

Testing performed per standard: EN 61000-4-5	Requirements per standard: EN 61131-2 / Zone B	Requirements per standard: EN 61000-6-2
AC mains inputs/outputs Line / line		±1 kV Criteria B
AC mains inputs/outputs Line / ground		±2 kV Criteria B
DC mains inputs/outputs Line / line	±0.5 kV ¹⁾ Criteria B	±0.5 kV Criteria B
DC power inputs Line / ground	±0.5 kV ¹⁾ Criteria B	±0.5 kV Criteria B
DC power outputs Line / ground	±0.5 kV ¹⁾ Criteria B	±0.5 kV Criteria B
Signal connections, unshielded Line / ground		±1 kV ¹⁾ Criteria B
All shielded lines Line / ground	±1 kV ¹⁾ Criteria B	-

1) Only for connections with a permitted line length greater than 30 m.

Conducted disturbances

Testing performed per standard: EN 61000-4-6	Requirements per standard: EN 61131-2 / Zone B	Requirements per standard: EN 61000-6-2
AC mains inputs/outputs		10 V 150 kHz to 80 MHz 80% AM (1 kHz) Criteria A
DC mains inputs/outputs		10 V 150 kHz to 80 MHz 80% AM (1 kHz) Criteria A
Other I/Os and interfaces		10 V ¹⁾ 150 kHz to 80 MHz 80% AM (1 kHz) Criteria A

1) Only for connections with a permitted line length greater than 3 m.

Magnetic fields with electrical frequencies

Testing performed per standard: EN 61000-4-8	Requirements per standard: EN 61131-2 / Zone B	Requirements per standard: EN 61000-6-2
Housing, completely wired		30 A/m 3 axes (x, y, z) 50/60 Hz ¹⁾ Criteria A

1) Mains frequency per manufacturer data

Voltage dips

Testing performed per standard: EN 61000-4-11	Requirements per standard: EN 61131-2 / Zone B	Requirements per standard: EN 61000-6-2
AC power inputs		0% residual voltage 250/300 periods (50/60 Hz) ¹⁾ 20 attempts Criteria C
		40% residual voltage 10/12 periods (50/60 Hz) ¹⁾ 20 attempts Criteria C
		70% residual voltage 25/30 periods (50/60 Hz) ¹⁾ 20 attempts Criteria C

1) Mains frequency per manufacturer data

Short-term interruptions

Testing performed per standard: EN 61000-4-11 / EN 61000-4-29	Requirements per standard: EN 61131-2 / Zone B	Requirements per standard: EN 61000-6-2
AC power inputs	0% residual voltage 0.5 periods (50/60 Hz) ¹⁾ 20 attempts Criteria A	0% residual voltage 1 period (50/60 Hz) ¹⁾ 3 attempts Criteria B
DC power inputs	0% residual voltage ≥10 ms (PS2) ²⁾ 20 attempts Criteria A	-

1) Mains frequency per manufacturer data
2) Use of a B&R power supply guarantees that these requirements are met.

Voltage fluctuations

Testing performed per standard: EN 61000-4-11 / EN 61000-4-29	Requirements per standard: EN 61131-2 / Zone B	Requirements per standard: EN 61000-6-2
AC power inputs	-15% / +10% Test duration per 30 minutes Criteria A	-
DC power inputs	-15% / +20% Test duration per 30 minutes Criteria A	-

7.2.3 Emission requirements

Phenomenon	Testing performed per standard:	Limit values per standard:	
		EN 61131-2 ¹⁾	EN 61000-6-4 ²⁾
Emissions related to lines	EN 55011 / EN 55022 EN 55016-2-1	✓	✓
Radiated emissions	EN 55011 / EN 55022 EN 55016-2-3	✓	✓

1) EN 61131-2: Product standard - Programmable logic controllers

2) EN 61000-6-4: Generic standards - Emission standard for industrial environments

Emissions related to lines

Testing performed per standard: EN 55011 / EN 55022 / EN 55016-2-1	Limit values per standard: EN 61131-2 / Zone B	Limit values per standard: EN 61000-6-4
AC mains connection 150 kHz to 30 MHz	150 to 500 kHz 79 dB (µV) quasi-peak value 66 dB (µV) average value	
	500 kHz to 30 MHz 73 dB (µV) quasi-peak value 60 dB (µV) average value	
Telecommunications / network connection 150 kHz to 30 MHz	-	150 to 500 kHz 97 to 87 dB (µV) quasi-peak value 53 to 40 dB (µA) quasi-peak value 84 to 74 dB (µV) average value 40 to 30 dB (µA) average value
	-	500 kHz to 30 MHz 87 dB (µV) quasi-peak value 43 dB (µA) quasi-peak value 74 dB (µV) average value 30 dB (µA) average value

Radiated emissions

Testing performed per standard: EN 55011 / EN 55022 / EN 55016-2-3	Limit values per standard: EN 61131-2 / Zone B	Limit values per standard: EN 61000-6-4
Electric field / Measured from 10 m 30 MHz to 1 GHz	30 to 230 MHz 40 dB (µV/m) quasi-peak value	
	230 MHz to 1 GHz 47 dB (µV/m) quasi-peak value	
Electric field / Measured from 3 m 1 to 6 GHz ¹⁾	-	1 to 3 GHz 76 dB (µV/m) peak value 56 dB (µV/m) average value
	-	3 to 6 GHz 80 dB (µV/m) peak value 60 dB (µV/m) average value

1) Depending on highest internal frequency

7.2.4 Mechanical conditions

Testing	Testing performed per standard:	Requirements per standard:				
		EN 61131-2 ¹⁾	EN 60721-3-2 Class 2M1	EN 60721-3-2 Class 2M2	EN 60721-3-2 Class 2M3	EN 60721-3-3 Class 3M4
Vibration (sinusoidal) / Operation	EN 60068-2-6	✓	-	-	-	✓
Shock / Operation	EN 60068-2-27	✓	-	-	-	✓
Vibration (sinusoidal) / Transport (packaged)	EN 60068-2-6	-	✓	✓	✓	-
Shock / Transport (packaged)	EN 60068-2-27	-	✓	✓	-	-
Free fall / Transport (packaged)	EN 60068-2-31 ²⁾	✓	✓	-	-	-
Toppling / Transport (packaged)	EN 60068-2-31	-	✓	✓	✓	-

- 1) EN 61131-2: Product standard - Programmable logic controllers
 2) Replacement for EN 60068-2-32

Vibration (sinusoidal) / Operation

Testing performed per standard: EN 60068-2-6	Requirements per standard: EN 61131-2		Requirements per standard: EN 60721-3-3 / Class 3M4	
Vibration (sinusoidal) ¹⁾ Operation	Frequency	Amplitude	Frequency	Amplitude
	5 to 8.4 Hz	Deflection 3.5 mm	2 to 9 Hz	Deflection 3 mm
	8.4 to 150 Hz	Acceleration 1 g ²⁾	9 to 200 Hz	Acceleration 1 g ²⁾
20 sweeps for each axis ³⁾				

- 1) Uninterrupted duty with movable frequency in all 3 axes (x, y, z); 1 octave per minute
 2) 1 g = 10 m/s²
 3) 2 sweeps = 1 frequency cycle ($f_{min} \rightarrow f_{max} \rightarrow f_{min}$)

Shock / Operation

Testing performed per standard: EN 60068-2-27	Requirements per standard: EN 61131-2	Requirements per standard: EN 60721-3-3 / Class 3M4
Shock ¹⁾ Operation	Acceleration 15 g Duration 11 ms 18 shocks	Acceleration 10 g Duration 11 ms 18 shocks

- 1) Pulse (half-sine) stress in all 3 axes (x, y, z), 1 octave per minute

Vibration (sinusoidal) / Transport (packaged)

Testing performed per standard: EN 60068-2-6	Requirements per standard: EN 60721-3-2 / Class 2M1		Requirements per standard: EN 60721-3-2 / Class 2M2		Requirements per standard: EN 60721-3-2 / Class 2M3	
Vibration (sinusoidal) ¹⁾ Transport (packaged)	Frequency	Amplitude	Frequency	Amplitude	Frequency	Amplitude
	2 to 9 Hz	Deflection 3.5 mm	2 to 9 Hz	Deflection 3.5 mm	2 to 8 Hz	Deflection 7.5 mm
	9 to 200 Hz	Acceleration 1 g ²⁾	9 to 200 Hz	Acceleration 1 g ²⁾	8 to 200 Hz	Acceleration 2 g ²⁾
200 to 500 Hz	Acceleration 1.5 g ²⁾	200 to 500 Hz	Acceleration 1.5 g ²⁾	200 to 500 Hz	Acceleration 4 g ²⁾	
20 sweeps for each axis ³⁾						

- 1) Uninterrupted duty with movable frequency in all 3 axes (x, y, z); 1 octave per minute
 2) 1 g = 10 m/s²
 3) 2 sweeps = 1 frequency cycle ($f_{min} \rightarrow f_{max} \rightarrow f_{min}$)

Shock / Transport (packaged)

Testing performed per standard: EN 60068-2-27	Requirements per standard: EN 60721-3-2 / Class 2M1	Requirements per standard: EN 60721-3-2 / Class 2M2
Shock ¹⁾ Transport (packaged)	Type I Acceleration 10 g Duration 11 ms 18 shocks	
	Type II -	Type II Acceleration 30 g Duration 6 ms 18 shocks

- 1) Pulse (half-sine) stress in all 3 axes (x, y, z)

Free fall / Transport (packaged)

Testing performed per standard: EN 60068-2-31 ¹⁾	Requirements per standard: EN 61131-2 with shipping packaging		Requirements per standard: EN 61131-2 with product packaging		Requirements per standard: EN 60721-3-2 / Class 2M1	
Free fall Transport (packaged)	Weight	Height	Weight	Height	Weight	Height
	<10 kg	1.0 m	<10 kg	0.3 m	<20 kg	0.25 m
	10 to 40 kg	0.5 m	10 to 40 kg	0.3 m	20 to 100 kg	0.25 m
	>40 kg	0.25 m	>40 kg	0.25 m	>100 kg	0.1 m
5 attempts						

- 1) Replacement for EN 60068-2-32

Toppling / Transport (packaged)

Testing performed per standard: EN 60068-2-31	Requirements per standard: EN 60721-3-2 / Class 2M1		Requirements per standard: EN 60721-3-2 / Class 2M2		Requirements per standard: EN 60721-3-2 / Class 2M3	
Toppling Transport (packaged)	Weight	Required	Weight	Required	Weight	Required
	<20 kg	Yes	<20 kg	Yes	<20 kg	Yes
	20 to 100 kg	-	20 to 100 kg	Yes	20 to 100 kg	Yes
	>100 kg	-	>100 kg	-	>100 kg	Yes
Topple on all edges		Topple on all edges		Topple on all edges		

7.2.5 Electrical safety

Overvoltage category

Requirement per standard: EN 61131-2	Explanation per standard: EN 60664-1
Overvoltage category II	Equipment of "Overvoltage category II" is energy-consuming equipment to be supplied by the fixed installation.

Pollution degree

Requirement per standard: EN 61131-2	Explanation per standard: EN 60664-1
Pollution degree 2	Only non-conductive pollution occurs. Occasionally, however, temporary conductivity caused by condensation is to be expected.

Protection rating provided by enclosure (IP code)

Requirement per standard: EN 61131-2	Explanation of code numbers per standard: EN 60529	Meaning for the protection of equipment	Meaning for the protection of personnel
Back: ≥IP20	First number IP2x	Protected against solid foreign bodies with a diameter ≥12.5 mm	Protected against touching dangerous parts with fingers
	Second number IPx0	Not protected.	-

Requirement per manufacturer	Explanation of code numbers per standard: EN 60529	Meaning for the protection of equipment	Meaning for the protection of personnel
Front: IP65	First number IP6x	Dust-proof.	Protected against touching dangerous parts with conductor.
	Second number IP x5	Protection against water jets.	-

7.3 Underwriters Laboratories (UL)

UL markings



Ind. Cont. Eq.
E115267

Underwriters Laboratories (UL)

Products with this mark are tested by Underwriters Laboratories and listed as "industrial control equipment" in category NRAQ (programmable controllers) with file number E115267.

This mark is valid for the USA and Canada and simplifies the certification of your machines and manufacturing systems in this economic region.

Canada / USA

Standards applied:

UL 508	Standard for industrial control equipment
UL 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements
UL 61010-2-201	Standard for safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-201: Particular requirements for control equipment
CSA C22.2 No. 142-M1987	Process control equipment
CSA C22.2 No. 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements
CSA C22.2 No. 61010-2-201	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-201: Particular requirements for control equipment



Certificate

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