Expansion unit
5ACCKPS1.215C-000

Data sheet

Version: **1.00 (October 2018)**

Model no.: **5ACCKPS1.215C-000**

Translation of the original documentation

1 Document history

Version	Date	Comment
1.00 (Rev. A0 and later)	2018-10-05	First edition

2 General information

Information:

This document is not intended for end customers! It is the responsibility of the machine manufacturer or system provider to provide the safety guidelines relevant to end customers in the operating instructions for the end customer in the respective local language.

2.1 Overview

Expansion unit 5ACCKPS1.215C-000 contains a SAFETY module and is designed for installation in Automation Panel 5AP5230.215C-000.

The front USB is wired directly to the Automation Panel in the interface area.

- Expansion unit for 5AP5230.215C-000
- Front USB interface
- Green and red pushbuttons, each with 1-color illumination (green, red) and evaluated via X2X
- 1-color illumination is controlled via X2X (pushbuttons, selector switch)
- Safe inputs and outputs evaluated via openSAFETY / X2X

  ° Selector switch, with 1-color illumination (white)
  ° Key switch
  ° Emergency stop

The emergency stop device can be used in safety-critical applications up to PL e or SIL 3. The B10d values are specified in the technical data for the safety-critical characteristics of the emergency stop device. These values apply up to the specified maximum contact service life.

2.2 Information regarding certified document and reference

Information:

Expansion unit 5ACCKPS1.215C-000 contains certified safety assembly B050006543xx-yy.

The associated documentation and certificate are available in the Downloads section for the expansion unit on the B&R website www.br-automation.com and must be taken into account accordingly.

2.3 Organization of safety notices

Safety notices in this manual are organized as follows:

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

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

2.4 Guidelines
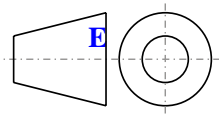
 European dimension standards apply to all dimension diagrams.

All dimensions are specified in mm.

Unless otherwise specified, the following general tolerances apply:

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

Table 2: Range of nominal sizes

3 Order data

Model number	Short description	Figure
	Expansion units	
5ACCKPS1.215C-000	AP5000 swing arm expansion option - X2X SAFETY expansion unit - 1x emergency stop (SAFETY) - 2x pushbutton (red and green) - 1x selector switch (SAFETY) - 1x key switch (SAFETY) - 1x front USB interface - For panel 5AP5230.215C-000	

Table 3: 5ACCKPS1.215C-000 - Order data

4 Technical data

4.1 Technical data

> ## Information:
>
> **The following specifications, properties and limit values apply only to this individual component and may deviate from those that apply to the complete system. For the complete system in which this individual component is used, for example, the data specified for that complete system applies.**

> ## Danger!
>
> **Operating outside of technical data specifications is not permitted and can result in dangerous situations.**

Product ID	5ACCKPS1.215C-000
General information	
B&R ID code	0xF243
Certifications	
CE	Yes
UL	In preparation
Functional safety	Yes (openSAFETY)
Safety characteristics [1]	
EN ISO 13849-1:2015	
Category	Cat. 4
PL	PL e
DC	>94%
MTTFD	2500 years
Mission time	Max. 20 years
IEC 61508:2010, IEC 61511:2004, EN 62061:2013	
SIL CL	SIL 3
SFF	>90%
PFH / PFH$_d$	
Module	$<1*10^{-10}$
openSAFETY wired	Negligible
openSAFETY wireless	$<1*10^{-14}$ * Number of openSAFETY packets per hour
PFD	$<2*10^{-5}$
Proof test interval (PT)	20 years
Emergency stop	
EN ISO 13849-1:2015	
B10d	Emergency stop switching element (1.20.126.414/0000): 130,000 Emergency stop button (1.30.273.512/0300): 130,000
Interfaces	
USB	
Quantity	1
Type	USB 1.1 / USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) [2]
Current-carrying capacity	Max. 500 mA [3]
X2X	
Type	X2X Link
Quantity	1
Variant	1x X2X IN and 1x X2X OUT
Features	
Pushbuttons	
Quantity	2 (green, red)
Type	Rafix 22 FS+ 1.30.270.021/2500 (green) Rafix 22 FS+ 1.30.270.021/2300 (red)
Selector switch	
Quantity	1
Type	Rafix 22 FS+ 1.30.272.102/2200
Key switch	
Quantity	1
Type	Rafix 22 FS+ 1.30.255.222/0000

Table 4: 5ACCKPS1.215C-000 - Technical data

Technical data

Product ID	5ACCKPS1.215C-000
Emergency stop	
Quantity	1
Type	RAFIX 22 FS+ Plus 1 1.30.273.512/0300
Standard switching element	
Quantity	4
Type	2x maintained / 2x momentary - RAFIX 22 FS universal, 1.20.126.005/0000
Emergency stop switching element	
Quantity	1
Type	Maintained - RAFIX 22 FS+ PCB gold, 1.20.126.414/0000
Electrical characteristics	
Nominal voltage	24 VDC -15% / +20% SELV [4]
Nominal current	Max. 150 mA
Power consumption	2.5 W
Overvoltage category per EN 61131-2	II
Electrical isolation	No
Operating conditions	
Degree of protection per EN 60529	IP65 with panel with mounting unit 5ACCMA00.0000-000, 5ACCMA00.0001-000 or 5ACCMA00.0002-000
Protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.0000-000, 5ACCMA00.0001-000 or 5ACCMA00.0002-000
Environmental conditions	
Temperature	
Operation	0 to 50°C [5]
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 90%, non-condensing
Transport	5 to 90%, non-condensing
Vibration [6]	
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude 9 to 200 Hz: 0.5 g peak
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude 9 to 200 Hz: 1 g peak
Storage	2 to 8 Hz: 7.5 mm amplitude 8 to 200 Hz: 2 g peak 200 to 500 Hz: 4 g peak
Transport	2 to 8 Hz: 7.5 mm amplitude 8 to 200 Hz: 2 g peak 200 to 500 Hz: 4 g peak
Shock [6]	
Operation	15 g, 11 ms
Storage	30 g, 6 ms
Transport	30 g, 6 ms
Elevation	
Operation	0 to 2000 m [5]
Mechanical properties	
Housing	
Material	Steel sheet
Front	
Keypad overlay	
Material	Polyester overlay
Dimensions	
Width	72.5 mm
Length	539 mm
Depth	33.6 mm [7]
Weight	Approx. 1000 g

Table 4: 5ACCKPS1.215C-000 - Technical data

1) Safety characteristics apply only to the emergency stop.
2) In SDL operation: Max. USB 1.1 without additional USB type A/B cable
   In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (30 Mbit/s).
   In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (150 Mbit/s).
3) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 500 mA).
4) IEC 60204 requirements must be observed; see section "+24 VDC power supply".
5) Maximum temperature specifications refer to operation at 500 meters. The maximum ambient temperature is typically derated by 1°C per 1000 meters starting at 500 meters above sea level.
6) Vibration testing is performed per EN 60068-2-6.
   Shock testing is performed per EN 60068-2-27.
7) See also section "Dimensions" (without key).

5 Mechanical properties

5.1 Mechanical properties

Products must be protected against impermissible dirt and contaminants. Products are protected from dirt and contaminants up to pollution degree II as specified in the IEC 60664 standard.
Pollution degree II can usually be achieved in an enclosure with IP54 protection, but uncoated modules are NOT permitted to be operated in condensing relative humidity.

> ## Danger!
>
> **Pollution levels higher than specified by pollution degree 2 in standard IEC 60664 can result in dangerous failures. A proper operating environment is absolutely essential.**

> ## Danger!
>
> **The keypads must be installed with at least IP65 protection. When connecting cables, the circuit board is not permitted to be touched except at the connector (see section "Safety guidelines" "Guidelines for proper ESD handling" on page 25). After connecting the cables, IP65 protection must be restored and the correct and complete function of the operating elements must be checked. For information about installing/removing the expansion unit rear cover, see the Automation Panel 5000 user's manual or B&R website www.br-automation.com. The rear cover of the expansion unit is only permitted to be removed for installation, commissioning or service purposes. Removal or any other manipulation of the expansion unit is prohibited.**

> ## Danger!
>
> **IP65 protection can only be achieved if the rear cover and USB protective cover are properly installed.**

> ## Danger!
>
> **Functional ground is a current path of low impedance between electrical circuits and ground. It is used to improve immunity to interference, for example, and not necessarily as a protective measure. It therefore serves only to conduct interference, not to provide any kind of protection against electric shock.**
> **This type of grounding is mandatory to ensure the system functions properly.**
>
> **The functional grounding of the device is carried out via the power supply connector of the expansion unit and additionally the ground connection of the complete system.**
>
> **To ensure the safe conductance of electrical interference, the following points must be observed:**
>
> - **The device must be connected to the central grounding point in the control cabinet or system using the shortest possible low impedance path.**
> - **Functional ground with min. 1.5 mm² wire diameter**

5.2 Protection

The Automation Panel 5000 offers IP65 protection per EN 60529 on all sides under the following conditions:

- Correct installation of the Automation Panel
- Correct installation of mounting unit 5ACCMA00.0000-000, 5ACCMA00.0001-000 or 5ACCMA00.0002-000
- All covers or components are installed on the interfaces and slots.
- All environmental conditions are observed.

5.3 Dimensions
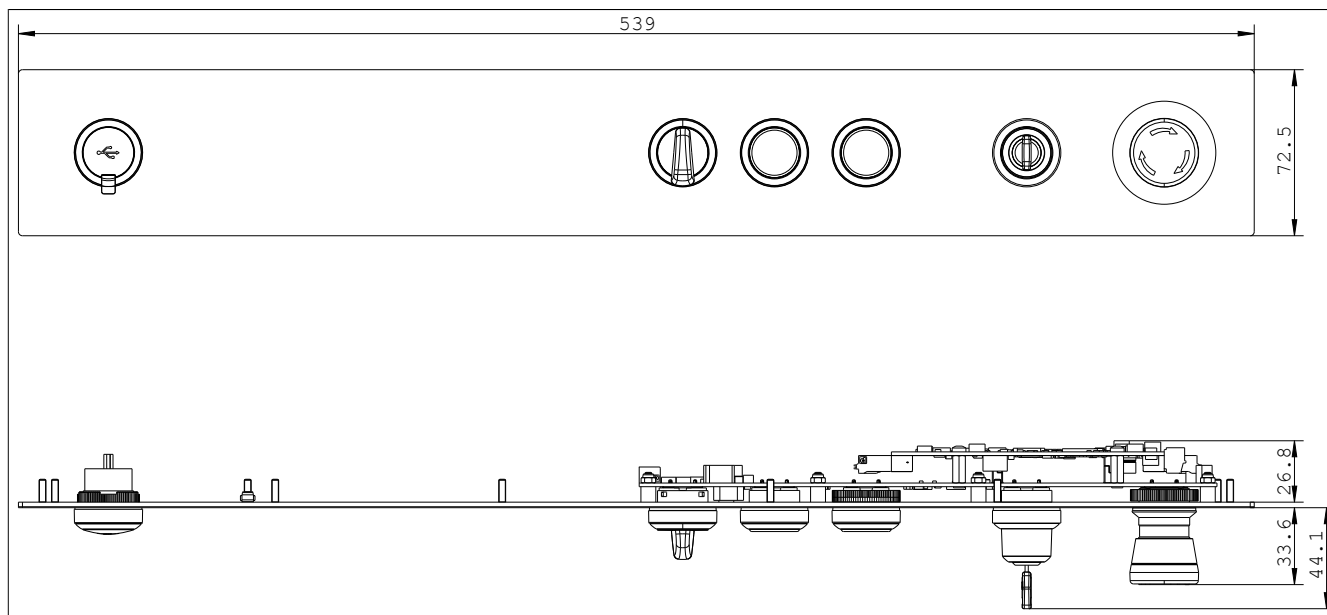
Figure 1: 5ACCKPS1.215C-000 - Dimensions

All dimensions are specified in mm.

5.4 Installation

Danger!

- **All power supplies must be disconnected before removing device covers or components and installing/removing accessories, hardware or cables.**
- **The power cable must be disconnected from the device and from the power supply.**
- **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.**

5.4.1 Installation and removal

For information about installing/removing, see the Automation Panel 5000 user's manual, which is available for download in PDF format on the B&R website www.br-automation.com.
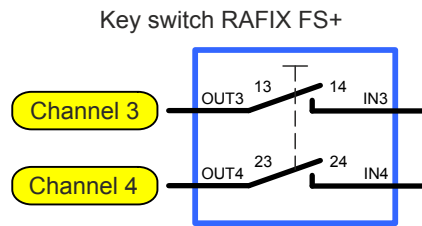
6 Safe inputs and outputs via openSAFETY

6.1 Wiring diagram

Information:

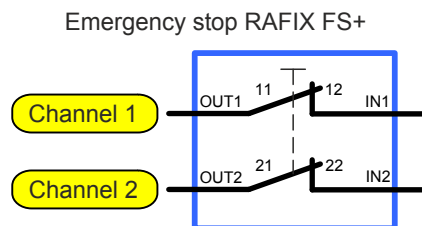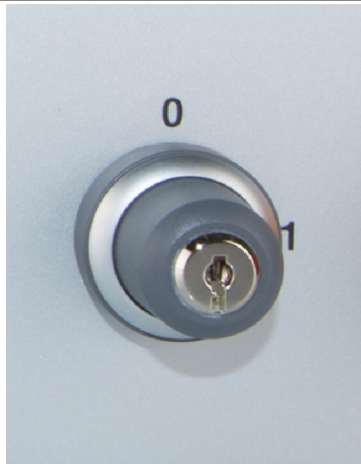**There are 8 safe channels; each channel has a pulse output (OUTx) and an input (INx). With the 5ACCKPS1.215C-000, 6 of the 8 safe channels are used internally as shown below. No further wiring can be carried out.**

Emergency stops RAFIX 22FS+ 1.30.273.512/0300 and 1.20.126.414/0000 - SAFETY wiring diagram		
	Normally closed contact 11/12	Emergency stop RAFIX FS+ Channel 1 — OUT1 — 11 — 12 — IN1 Channel 2 — OUT2 — 21 — 22 — IN2
	Normally closed contact 21/22	

Key switches RAFIX 22FS+ 1.30.255.222/0000 and 1.20.126.005/0000 - SAFETY wiring diagram		
	Normally open contact 13/14	Key switch RAFIX FS+ Channel 3 — OUT3 — 13 — 14 — IN3 Channel 4 — OUT4 — 23 — 24 — IN4
	Normally open contact 23/24	

Selector switches RAFIX 22FS+ 1.30.272.102/2200 and 1.20.126.005/0000 - SAFETY wiring diagram		
	Normally open contact 13/14	Selector switch RAFIX FS+ Channel 5 — OUT5 — 13 — 14 — IN5 Channel 6 — OUT6 — 23 — 24 — IN6
	Normally open contact 23/24	

Table 5: 5ACCKPS1.215C-000 - Wiring diagram

6.2 LED status indicators
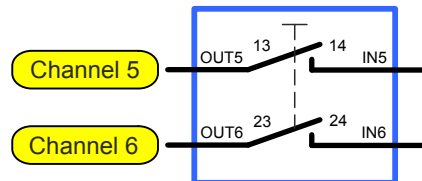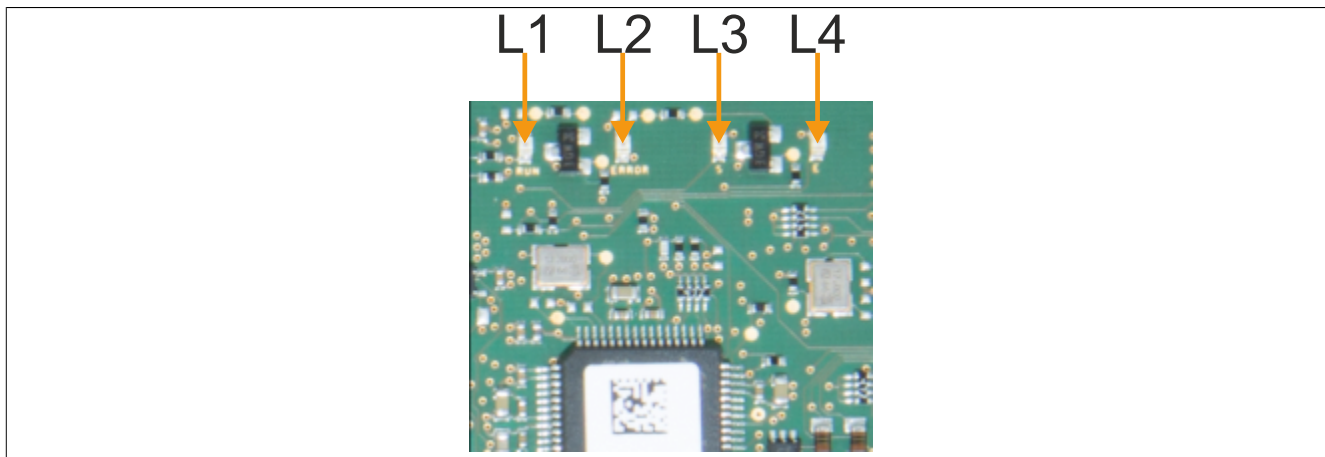

Figure 2: 5ACCKPS1.215C-000 - LED status indicators
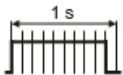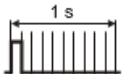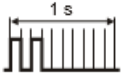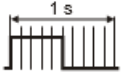
LED	Name	Color
Run (**L1**)	LED "Run"	Green
Error (**L2**)	LED "Error"	Red
S-LED (**L3**)	Safety: S...Status of safety processor 1	Red
E-LED (**L4**)	Safety: E...Status of safety processor 2	Red

Table 6: 5ACCKPS1.215C-000 - LED status indicators

6.2.1 LED status indicators - Run/Error

LED	Color	Status	Description
Run (**L1**)	Green	Off	No power to module
		Single flash	Mode "Reset"
		Double flash	Updating firmware
		Blinking	Mode PREOPERATIONAL
		On	Mode RUN
Error (**L2**)	Red	Off	Module not supplied with power or everything OK
		Pulsating	Bootloader mode
		Triple flash	Updating safety-related firmware
		On	Error or I/O component not supplied with power
Run (**L1**) + Error (**L2**)	Solid red + single green flash		Invalid firmware

6.2.2 LED status indicators of the safety processor

LED	Color	Status	Description
S-LED (**L3**) E-LED (**L4**)	Red	Off	Mode RUN or I/O component not provided with voltage
		(1 s flashing pattern)	Boot phase, missing X2X Link or defective processor
		(1 s flashing pattern)	Safety PREOPERATIONAL state Modules that are not used in the SafeDESIGNER application remain in state PREOPERATIONAL.
		(1 s flashing pattern)	Safe communication channel not OK
		(1 s flashing pattern)	The firmware for this module is a non-certified pilot customer version.
		(1 s flashing pattern)	Boot phase, faulty firmware
		On	Safety state active for the entire module (state "FailSafe")
LED "S" and LED "E" separately indicate the status of safety processor 1 (LED "S") and safety processor 2 (LED "E").			

Table 7: LED status indicators of the safety processor

Danger!

Constantly lit "S" and "E" LEDs indicate a defective module that must be replaced immediately. It is your responsibility to ensure that all necessary corrective measures are initiated after an error occurs since subsequent errors can result in a hazard!

7 Key and LED configurations

Figure 3: 5ACCKPS1.215C-000 - Key and LED matrix

Information:

Keys and LEDs are evaluated internally and transferred via X2X. Separate hardware upgrade 5ACCK-PS1.215C-000 must be installed and configured in Automation Studio for this.

8 Device interfaces

8.1 Overview

The interfaces of SAFETY X2X expansion unit 5ACCKPS1.215C-000 are located on the front and rear of the Automation Panel 5000. To access the rear interfaces, the cover plate must be removed (see section "Installation" on page 12).

Figure 4: 5ACCKPS1.215C-000 - Interface description (front)
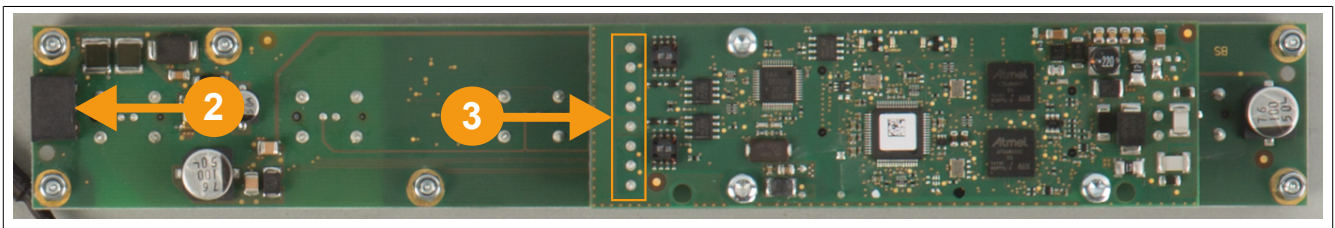
Figure 5: 5ACCKPS1.215C-000 - Interface description (rear)

No.	Type of interface	Link
1	Front USB interface	See "Front USB interface" on page 17.
2	+24 VDC power supply	See "+24 VDC power supply" on page 18.
3	X2X interface	See "X2X interface" on page 18.

Table 8: 5ACCKPS1.215C-000 - Interface description

8.2 Front USB interface

The expansion units (expansion options) are equipped with a USB 1.1 or USB 2.0 interface on the front depending on the type of transfer or control. This is equipped with a protective cover.

> **Danger!**
>
> **IP65 protection can only be achieved if the USB protective cover is properly installed.**

> **Warning!**
>
> **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. USB devices from B&R are guaranteed to function properly, however.**

> **Danger!**
>
> **Because this interface is designed according to general PC specifications, extreme care should be taken with regard to EMC, wiring, etc.**

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

Depending on the transfer method (SDL4/SDL3/SDL/DVI operation), the transfer rate of the front USB interface may be limited.

Universal Serial Bus (front USB)		
Type	USB 1.1 / USB 2.0	
Variant	Type A	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) [1]	
Front USB - Current-carrying capacity [2]	Max. 500 mA	
USB 2.0 - Cable length	<3 m	

Table 9: Front USB

[1]   In SDL operation: Max. USB 1.1 without additional USB type A/B cable
       In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (30 Mbit/s).
       In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (150 Mbit/s).
[2]   The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 500 mA).

8.3 X2X interface

> **Information:**
>
> **Notes about wiring modules with an X2X connector are available for download from the B&R website www.br-automation.com.**

The 8-pin connector required to connect the X2X interface is included in delivery but can also be ordered separately under 0TB6108.2010-01 (screw clamp terminal block) or 0TB6108.2110-01 (cage clamp terminal block).

Ferrite bead 7427153 from Würth Elektronik must be installed on the X2X cable in the connection area.

Pin	Assignment	
X2X IN		
1	X2X	
2	X2X GND	
3	X2X\	
4	Shield	
X2X OUT		
5	X2X	
6	X2X GND	
7	X2X\	
8	Shield	
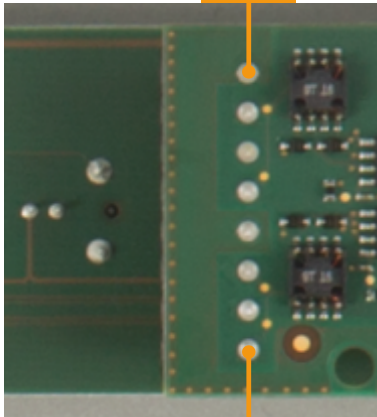
Table 10: 5ACCKPS1.215C-000 - X2X interface

8.4 +24 VDC power supply

> **Danger!**
>
> **The expansion unit requires its own power supply. This device is only permitted to by supplied by a SELV/PELV power supply or with safety extra-low voltage (SELV) per IEC 60204. This also applies to all digital signal sources that are connected to the modules.**
>
> **If the power supply is grounded (PELV system), then only a GND connection is permitted for grounding. Grounding types that have ground connected to +24 VDC are not permitted.**

The 3-pin connector required to connect the power supply is included in delivery but can also be ordered separately under 0TB6103.2010-01 (screw clamp terminal block) or 0TB6103.2110-01 (cage clamp terminal block).

For the pinout, see the following table.
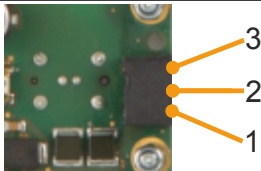
+24 VDC power supply		
Pin	**Assignment**	
1	+24 VDC	
2	Functional ground	
3	GND	

Table 11: Power supply connection

Power supply connectors		
Pin	**Assignment**	
1	+24 VDC	
2	Functional ground	
3	GND	

Table 12: Power supply connectors

9 Features

9.1 Arrangement of operating elements

The following overview defines the arrangement of operating elements in detail.

Figure 6: Front view of panel with expansion unit
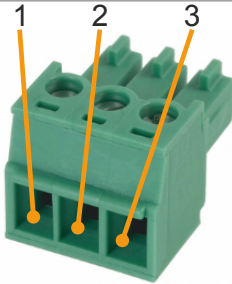
9.2 Emergency stop RAFIX 22 FS+ "Plus 1", 1.30.273.512/0300

Emergency stop 1.30.273.512/0300		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+ emergency stop button "Plus 1"	
Manufacturer number	1.30.273.512/0300	
Contact function	Maintained	
Resetting	By rotating to the right	
Service life	50,000	
B10 value	65,000	

Table 13: Emergency stop 1.30.273.512/0300

9.3 Switching element RAFIX 22 FS+ PCB gold, 1.20.126.414/0000

The switching element is used for the emergency stop.

Switching element 1.20.126.414/0000		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+ - PCB gold, emergency stop "Plus 1"	
Manufacturer number	1.20.126.414/0000	
Contact system	Self-cleaning bridge contact	
Contact material	Au	
Contacts	2 normally closed contacts + 1 alarm contact [1]	
Normally closed contact with positive separation per IEC 60947-5-1	Yes	
Connection	THT soldered connection with anti-rotation element	
Service life	50,000 at 10 mA / 24 VDC	
B10 value	65,000	
AC/DC operating voltage	Min. 1 V	

Table 14: Switching element 1.20.126.414/0000

Switching element 1.20.126.414/0000	
AC/DC operating voltage	Max. 35 V
AC/DC operating current	Min. 1 mA
AC/DC operating current	Max. 100 mA
Switching capacity	Max. 250 mW

Table 14: Switching element 1.20.126.414/0000

1) The alarm contact is only momentary and not designed as a maintained contact.

9.4 Key switch RAFIX 22 FS+, 1.30.255.222/0000

Key switch 1.30.255.222/0000		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	1.30.255.222/0000	
Contact function	Maintained	
Number of possible closings	500	
Angle of rotation	1 x 90°, L form	
Key removal position	0+1	
Service life	50,000 maintained / 30,000 key removal switching cycles	
B10 value	65,000 maintained / 40,000 key removal switching cycles	
Actuation torque	Max. 1.3 Nm	

Table 15: Key switch 1.30.255.222/0000

9.5 Selector switch RAFIX 22 FS+, 1.30.272.102/2200

Selector switch 1.30.272.102/2200		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	1.30.272.102/2200	
Illumination	White	
Contact function	Maintained	
Angle of rotation	1 x 90°, L form	
Service life	300,000	
B10 value	400,000	
Actuation torque	Max. 1.5 Nm	

Table 16: Selector switch 1.30.272.102/2200

9.6 Pushbutton RAFIX 22 FS+, 1.30.270.021/2300

Pushbutton 1.30.270.021/2300		
Manufacturer	RAFI	
Type	RAFIX 22 FS+	Example image
Manufacturer number	1.30.270.021/2300	
Quantity	1	
Illumination	Red	
Contact function	Momentary	
Service life	1,000,000	
B10 value	1,300,000	
Actuation travel	4 mm	
Stop strength	Max. 100 N	

Table 17: Pushbutton 1.30.270.021/2300

9.7 Pushbutton RAFIX 22 FS+, 1.30.270.021/2500

Pushbutton 1.30.270.021/2500		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	1.30.270.021/2500	
Illumination	Green	
Contact function	Momentary	
Service life	1,000,000	
B10 value	1,300,000	
Actuation travel	4 mm	
Stop strength	Max. 100 N	

Table 18: Pushbutton 1.30.270.021/2500

9.8 Switching element RAFIX 22 FS universal, 1.20.126.005/0000

The switching element is used for the pushbuttons, the selector switch and the key switch.

Switching element 1.20.126.005/0000		
Manufacturer	RAFI	
Type	RAFIX 22 FS+ - universal, 2 S	
Manufacturer number	1.20.126.005/0000	Example image
Contact system	Self-cleaning bridge contact	
Contact material	Au	
Contacts	2 normally open contacts	
Connection	THT soldered connection with anti-rotation element	
Service life	1,000,000 at 10 mA / 24 VDC	
B10 value	1,300,000	
AC/DC operating voltage	Min. 1 V	
AC/DC operating voltage	Max. 35 V	
AC/DC operating current	Min. 1 mA	
AC/DC operating current	Max. 100 mA	
Switching capacity	Max. 250 mW	

Table 19: Switching element 1.20.126.005/0000

9.9 USB RAFIX 22 FS+ 9.30.279.005/0700

Universal serial bus		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	9.30.279.005/0700	
Quantity	1	
Type	USB 2.0	
Variant	Type A	

Table 20: USB interface 9.30.279.005/0700

Information:

For additional technical data, see the manufacturer's website: www.rafi.de.

10 Safety guidelines

10.1 Intended use

10.1.1 Qualified personnel

Use of safety-related products is restricted to the following persons:

- Qualified personnel who are familiar with relevant safety concepts for automation technology as well as applicable standards and regulations
- Qualified personnel who plan, develop, install and commission safety equipment in machines and systems

Qualified personnel in the context of this manual's safety guidelines are those who, because of their training, experience and instruction combined with their knowledge of relevant standards, regulations, accident prevention guidelines and operating conditions, are qualified to carry out essential tasks and recognize and avoid potentially dangerous situations.
In this regard, sufficient language skills are also required in order to be able to properly understand this manual.

10.1.2 Application range

The safety-related B&R control components described in this manual were designed, developed and manufactured for special applications for machine and personnel protection. They are not suitable for any use involving serious risks or hazards that could lead to the injury or death of several people or serious environmental impact without the implementation of exceptionally stringent safety precautions. In particular, this includes the use of these devices to monitor nuclear reactions in nuclear power plants, in flight control or flight safety systems as well as in the control of mass transportation systems, medical life support systems or weapons systems.

When using safety-oriented control components, the safety precautions applying to industrial control systems (e.g. the provision of safety devices such as emergency stop circuits, etc.) must be observed in accordance with applicable national and international regulations. The same applies for all other devices connected to the system, e.g. drives or light curtains.

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

10.1.3 Safety technology disclaimer

The proper use of all B&R products must be guaranteed by the customer through the implementation of suitable training, instruction and documentation measures. The guidelines set forth in system user's manuals must be taken into consideration here as well. B&R has no obligation to provide verification or warnings with regard to the customer's purpose of using the delivered product.

Changes to the devices are not permitted when using safety-related components. Only certified products are permitted to be used. Currently valid product versions in each case are listed in the corresponding certificates. Current certificates are available on the B&R website (www.br-automation.com) in the Downloads section for the respective product. The use of non-certified products or product versions is not permitted.

All relevant information regarding these safety products must be read in the latest version of the related data sheet and the corresponding safety notices observed before the safety products are permitted to be operated. Certified data sheets are available on the B&R website (www.br-automation.com) in the Downloads section for the respective product.

Safety-related products are only permitted to be operated by qualified personnel who, because of their training, experience and instruction combined with their knowledge of relevant standards, regulations, accident prevention guidelines and operating conditions, are qualified to carry out essential tasks and recognize and avoid potentially dangerous situations. Consideration of and adherence to industry standards, safety regulations, operating conditions, etc. that apply to the end product are the sole responsibility of the customer, as is the functionality of the supplied contractual product as part of the end product.

B&R and its employees are not liable for any damages or loss resulting from the incorrect use of these products. The same applies to misuse that may result from specifications or statements made by B&R in connection with sales, support or application activities. It is the sole responsibility of the user to check all specifications and statements made by B&R for proper application as it pertains to safety-related applications. In addition, the user assumes sole responsibility for the proper design of the safety function as it pertains to safety-related applications.

10.1.4 Installation notes for SAFETY modules

Products must be protected against impermissible dirt and contaminants. Products are protected from dirt and contaminants up to pollution degree II as specified in the IEC 60664 standard.

Pollution degree II can usually be achieved in an enclosure with IP54 protection, but uncoated modules are NOT permitted to be operated in condensing relative humidity.

Danger!

Pollution levels higher than specified by pollution degree 2 in standard IEC 60664 can result in dangerous failures. It is extremely important that you ensure a proper operating environment.

Danger!

In order to guarantee a specific voltage supply, a SELV power supply that conforms to IEC 60204 must be used to supply the bus, SafeIO and SafeLOGIC controller. This also applies to all digital signal sources that are connected to the modules.

If the power supply is grounded (PELV system), then only a GND connection is permitted for grounding. Grounding types that have ground connected to +24 VDC are not permitted.

The power supply of SAFETY potential groups must generally be protected using a fuse with a maximum of 10 A.

10.1.5 Safe state

If an error is detected by the module (internal or wiring error), the modules enable the safe state. The safe state is structurally designed as a low state or cutoff and cannot be modified.

Danger!

Applications in which the safe state must actively switch on an actuator cannot be implemented with this module. In these cases, other measures must be taken to meet this safety-related requirement (e.g. mechanical brakes for hanging load that engage on power failure).

10.1.6 Mission time

All safety modules are designed to be maintenance-free. Repairs are not permitted to be carried out on safety modules.

All safety modules have a maximum mission time of 20 years.

This means that all safety modules must be taken out of service one week (at the latest) before the expiration of this 20-year time span (starting from B&R's delivery date).

Danger!

Operating safety modules beyond the specified mission time is not permitted! The user must ensure that all safety modules are replaced by new safety modules or removed from operation before their mission time expires.

10.2 Protection against electrostatic discharge

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

10.2.1 Packaging

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

10.2.2 Guidelines for proper ESD handling

Electrical components with a housing

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

Electrical components without a housing

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

- Any persons handling electrical components or devices with installed electrical components must be grounded.
- Components are only permitted to be touched on their narrow sides or front plate.
- Components must always be placed on or stored in a suitable medium (ESD packaging, conductive foam, etc.). Metallic surfaces are not suitable storage surfaces!
- Components must not be subjected to electrostatic discharge (e.g. caused by charged plastics).
- Observe a minimum distance of 10 cm from monitors and television sets.
- Measuring instruments and equipment must be grounded.
- Probe tips of galvanically isolated measuring instruments must be temporarily discharged on suitably grounded surfaces before taking measurements.

Individual components

- ESD protective measures for individual components are thoroughly implemented at B&R (conductive floors, footwear, arm bands, etc.).
- Increased ESD protective measures for individual components are not required for handling B&R products at customer locations.

10.3 Transport and storage

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

10.4 Installation

- Devices are not ready for use immediately upon delivery. They must be installed and wired according to the requirements of this documentation in order for EMC limit values to be observed.
- Installation must be performed according to this documentation using suitable equipment and tools.
- Devices are only permitted to be installed by qualified personnel and when the power is switched off. Before installation, voltage to the control cabinet must be switched off and prevented from being switched on again.
- General safety guidelines and national accident prevention regulations must be observed.
- Electrical installation must be carried out in accordance with applicable guidelines (e.g. wire cross sections, fuses, protective ground connections).

10.5 Environmentally friendly disposal

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

10.5.1 Separation of materials

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

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

Table 21: Environmentally friendly disposal

Disposal must take place in accordance with applicable legal regulations.

10.6 Security concept

To protect plants, systems, machines and networks against cyber threats, it is required to implement (and continuously maintain) an integrated security concept that is state of the art. B&R products and solutions form only one part of such a concept.

The user is responsible for preventing unauthorized access to his plants, systems, machines and networks. Systems, machines and components should only be connected to the corporate network or Internet if and to the extent necessary and appropriate protective measures (e.g. use of firewalls and network segmentation) have been taken.

B&R products and solutions are constantly being developed further to make them even more secure. B&R strongly recommends that updates be performed as soon as the corresponding updates are available and that only the latest product versions are used. Using outdated or unsupported versions can increase the risk of cyber threats.

10.7 Third-party software updates

This product contains third-party software (e.g. drivers, etc.). B&R only assumes warranty for updates/patches to the third-party software if they have been officially released by B&R. Otherwise, updates/patches are undertaken at your own risk.

10.8 Administrator accounts

A user with administrator rights has extensive access and manipulation options available on the system.

Therefore, make sure that your administrator accounts are adequately secured to prevent unauthorized changes. Use secure passwords and a standard user account for regular operation. Additional measures such as the use of security policies are to be applied as needed.

11 EC declaration of conformity

This document was originally written in the German language. The German edition therefore represents the original documentation in accordance with the 2006/42/EC Machinery Directive. Documents in other languages are to be interpreted as translations of the original documentation.

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The place of jurisdiction, in accordance with article 17 of the European Convention on Courts of Jurisdiction and Enforcement, is A-4910

Ried im Innkreis, Austria, commercial register court: Ried im Innkreis, Austria

Commercial register number: FN 111651 v.

The place of fulfillment in accordance with article 5 of the European Convention on Courts of Jurisdiction and Enforcement is A-5142 Eggelsberg, Austria

VATIN: ATU62367156

The EC declarations of conformity for B&R products can be downloaded from the B&R website www.br-automation.com.