

# **4XP0000.00-K42**

## **Technical documentation**

Version: **1.30 (January 2014)**  
Model no.: **4XP0000.00-K42**

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# 1 Views

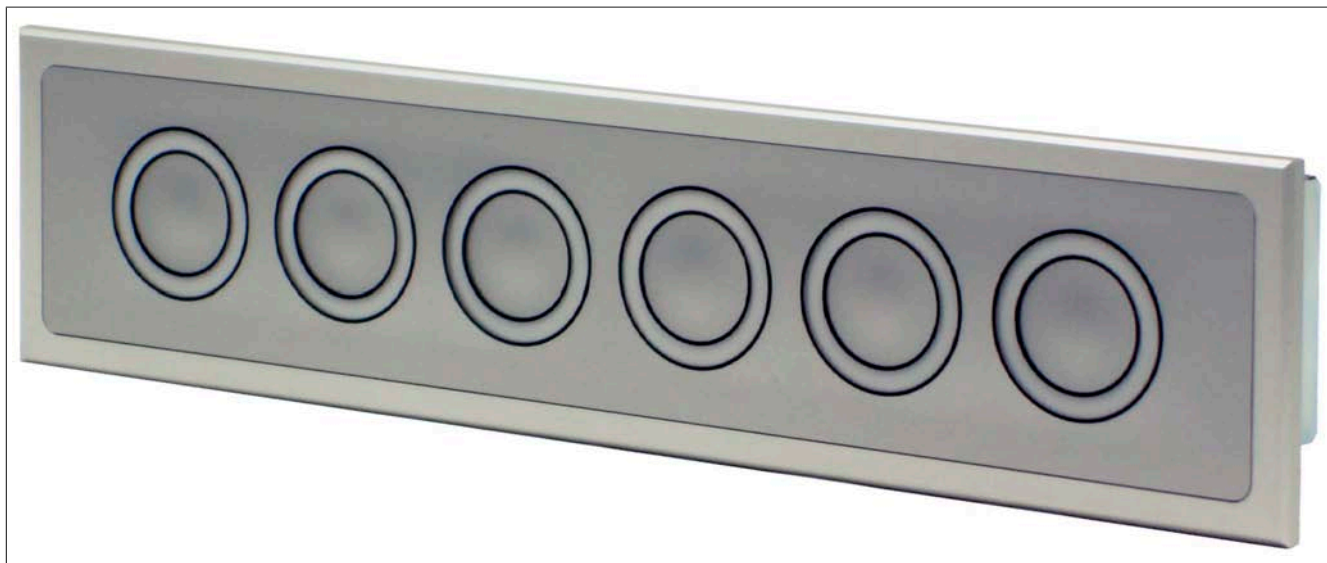


Figure 1: 4XP0000.00-K42 - Oblique view



Figure 2: 4XP0000.00-K42 - Rear view

## 2 General information

### Information:

B&R keeps the printed version of technical descriptions as current as possible. The latest version of this technical description can be downloaded in PDF format from the B&R website at [www.br-automation.com](http://www.br-automation.com).

### 2.1 Order data


Model number	Short description	Figure
	<b>Keypad modules</b>	
4XP0000.00-K42	X2X keypad module, 6 B&R illuminated ring keys, 4 colors (red, green, yellow, white), X2X interface, 24 VDC supply, IP65 protection (from front), order 1x 0TB1108.8110 terminal block separately.	
	<b>Required accessories</b>	
	<b>Terminal blocks</b>	
0TB1108.8110	Accessory terminal block, 8-pin, cage clamp, 1.5 mm <sup>2</sup> , protected against vibration by the screw flange	
	<b>Included</b>	
0TB703.81	Accessory 3 pole T.BLOCK (CLAMP), RM3,5	

Table 1: 4XP0000.00-K42 - Order data

#### 2.1.1 Description

The 4XP0000.00-K42 is a custom X2X keyboard with the following features:

- Dimensions 212 x 50 mm (W x H)
- Anodized aluminum front
- Panel overlay inset to protect edges, 'thin' edge protection design.
- PP21/41 retaining clips
- Cord gasket on the back
- IP65 protection on front
- Panel overlay with B&R design (white aluminum)
- Keyboard with 6 B&R illuminated ring keys, each with four-color illumination (red, yellow, green, white)
- All keys can be marked with slide-in labels and evaluated via X2X
- Steel cover, galvanized surface

#### 2.1.2 Version information

Version	Date	Comment	Responsible
1.00 (starting with Rev. A0)	13-Apr-10	First edition	Manuel Edtmayr
1.10	26-Apr-10	Release of technical documentation V1.00	Hannes Leitner
1.20 (starting with Rev. A0)	03-May-10	Key assignments added	Hannes Leitner
1.30 (starting with Rev. G0)	21-Jan-14	Revised technical documentation.	Anna Sigl

Table 2: Version information

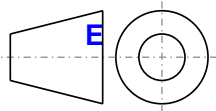
### 2.2 Organization of safety notices

Safety notices in this manual are organized as follows:

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

Table 3: Organization of safety notices

## 2.3 Guidelines



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

All dimensions are specified in mm.

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

Table 4: Range of nominal sizes

## 3 Complete system - Technical data

### 3.1 +24 VDC supply voltage

Input voltage: 24 VDC  $\pm 25\%$

The pinout is listed in the following table and printed on the sticker. The supply is internally protected so that the device cannot be damaged if there is an overload or if the voltage supply is connected incorrectly. When dimensioning the power supply, the maximum power consumption of the Automation Panel being used must be taken into consideration.

The 3-pin male connector required for the supply voltage connection is not included in delivery. This can be ordered from B&R using model number 0TB703.81 (cage clamp).


Supply voltage		
Protected against reverse polarity		3-pin, male 
Pin	Description	
1	+	
2	Functional ground	
3	-	
Accessories		
0TB703.81	Accessory 3-pin cage clamp, RM 3.5	



Table 5: 24 VDC supply voltage connection

### 3.2 X2X interface

The panel is equipped with one X2X interface. The 8-pin male multipoint connector is electrically isolated.


X2X interfaces			
Connection	Description		<div><div>18</div></div>
1	X2X	X2X IN	
2	X2X ⊥		
3	X2X \		
4	SHLD		
5	X2X	X2X OUT	
6	X2X ⊥		
7	X2X \		
8	SHLD		

Table 6: X2X interface

### 3.3 LED status indicators

LED status indicators		
LED	Color	Description
Run	Green	Connection to X2X bus established
Error	Red	No connection to X2X bus possible

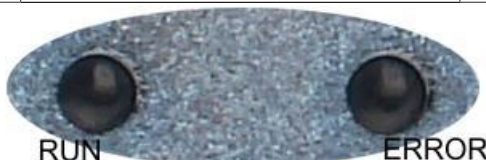


Table 7: LED status indicators

### 3.4 Technical data

<b>Product ID</b>	<b>4XP0000.00-K42</b>
<b>General information</b>	
LEDs	1x round (green), 1x error (red)
Certification CE	Yes
<b>Interfaces</b>	
X2X	
Type	X2X slave
Design	8-pin male multipoint connector
Internal bus supply	Yes
Distance between 2 stations	100 m
Electrical isolation	No
<b>Keys</b>	
Illuminated ring keys	6x B&R illuminated ring keys
Illuminated ring keys Color	Red, green, white, yellow
<b>Electrical characteristics</b>	
Nominal voltage	24 VDC $\pm 25\%$ , electrically isolated
Starting current	Max. 20 A for $< 1$ ms
Power consumption	240 mA
<b>Operating conditions</b>	
Protection in accordance with EN 60529	Back: IP20 Front: IP65 / NEMA 250 type 4X, dust and sprayed water protection
<b>Environmental conditions</b>	
Temperature	
Operation	0 to $+50^{\circ}\text{C}$
Storage	$-10$ to $+60^{\circ}\text{C}$
Transport	$-10$ to $+60^{\circ}\text{C}$
Relative humidity	
Operation	$T \leq 40^{\circ}\text{C}$ : 5 to 90%, non-condensing $T > 40^{\circ}\text{C}$ : $< 75\%$ , non-condensing
Storage	$T \leq 40^{\circ}\text{C}$ : 5 to 90%, non-condensing $T > 40^{\circ}\text{C}$ : $< 75\%$ , non-condensing
Transport	$T \leq 40^{\circ}\text{C}$ : 5 to 90%, non-condensing $T > 40^{\circ}\text{C}$ : $< 75\%$ , non-condensing
Altitude	
Operation	Max. 3000 m
<b>Mechanical characteristics</b>	
Housing	
Material	Metal
Front	
Frame	Naturally anodized aluminum
Design	RAL 9006
Panel membrane	
Material	Polyester
Gasket	Flat gasket around display front
Dimensions	
Width	212 mm
Height	50 mm
Depth	34.6 mm
Weight	362 g

Table 8: 4XP0000.00-K42 - Technical data

### 3.5 Dimensions

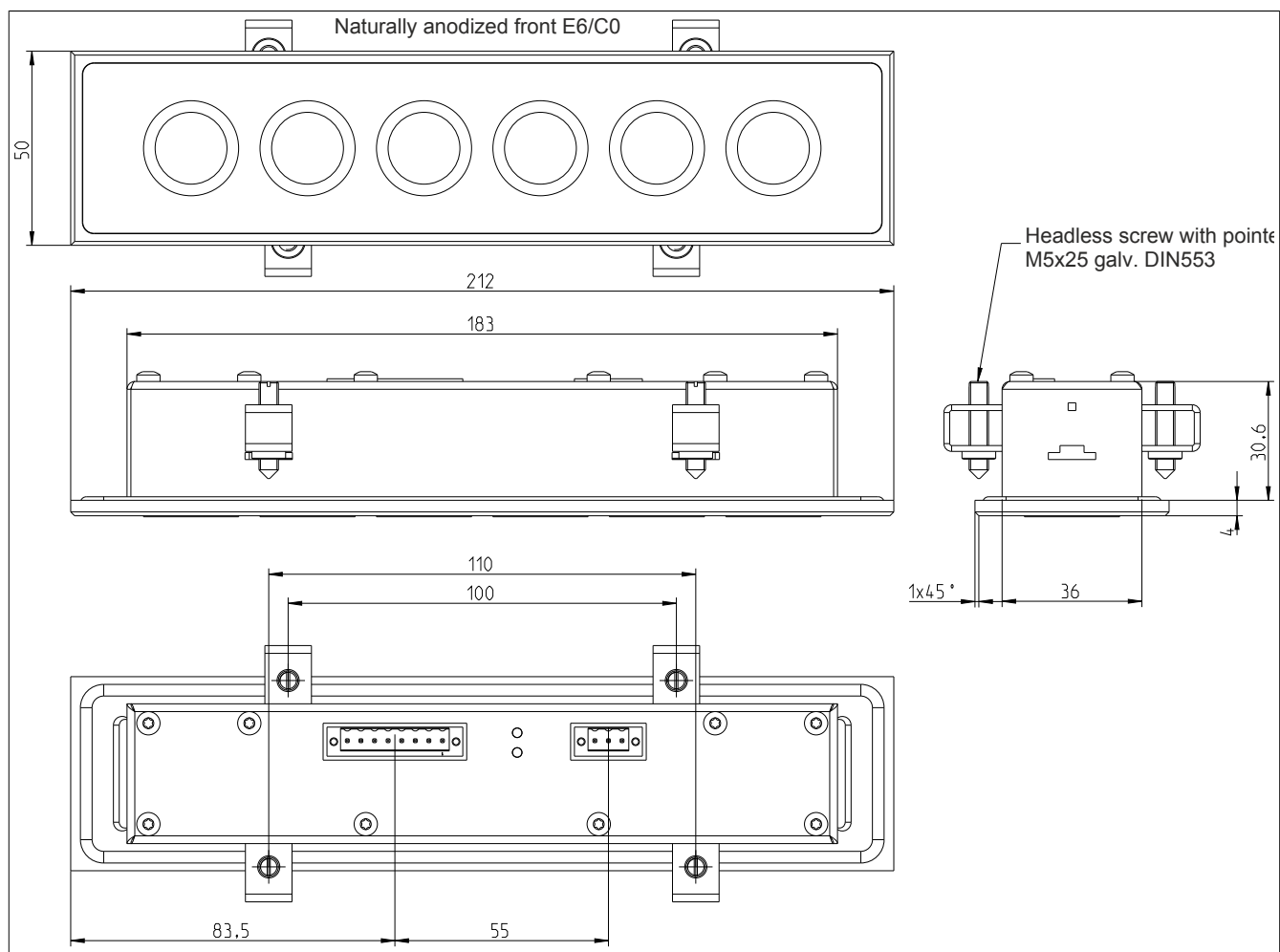


Figure 3: 4XP0000.00-K42 - Dimensions

### 3.6 Panel overlay design

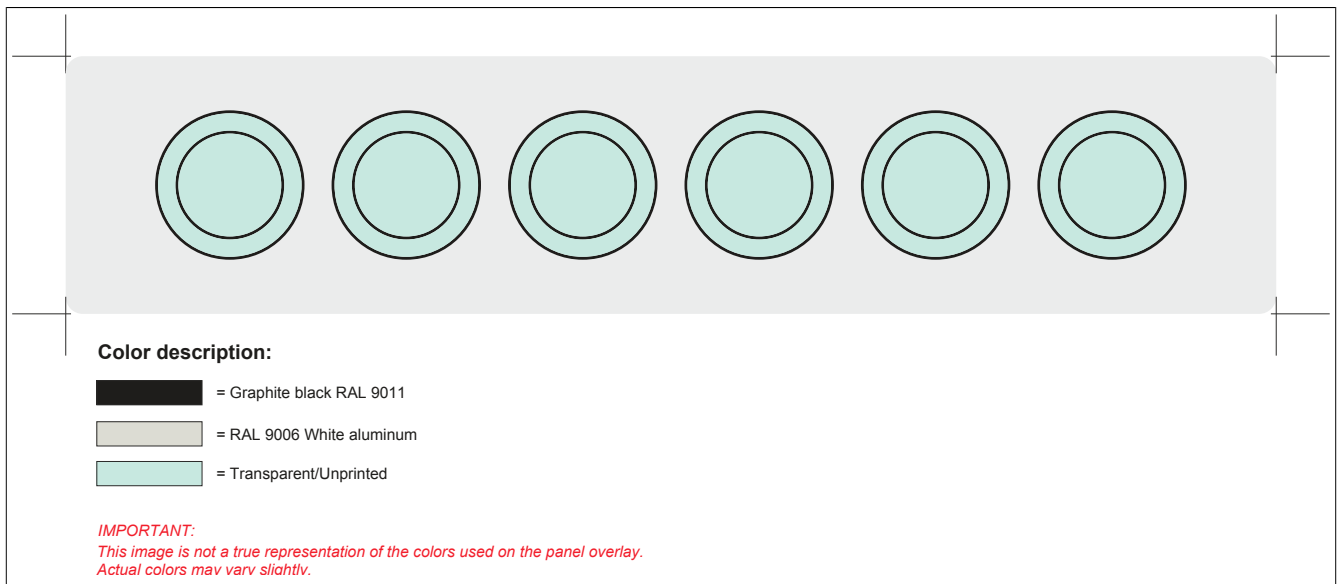


Figure 4: 4XP0000.00-K42 - Panel overlay design

3.7 Key and LED matrix

Keys and LEDs are controlled and evaluated via the X2X interface.

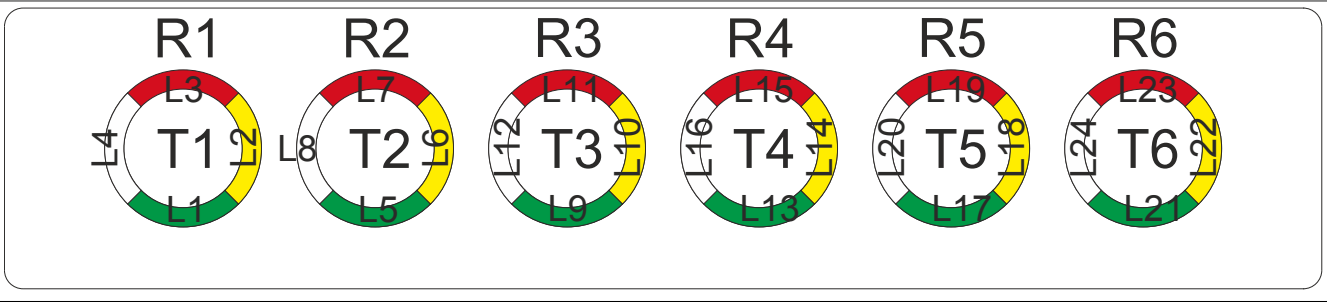


Figure 5: 4XP0000.00-K42 - Key and LED matrix

T....Key e.g. Automation Studio: DigitalInput01 to DigitalInput06 = T1 to T6

R....Illuminated ring e.g. Automation Studio: DigitalOutput01 to DigitalOutput04 = R1

L.....LED L1 = Green L2 = Yellow L3 = Red L4 = White Automation Studio: DigitalOutput05 to DigitalOutput08 = R2 L5 = Green L6 = Yellow L7 = Red L8 = White, etc...

3.8 Contents of delivery

Amount	Description
1	4XP0000.00-K42
1	24 VDC power connector
4	Retaining clips on the cover
4	Headless screw M5 x 25 mm

Table 9: Contents of delivery

## 4 Safety guidelines

### 4.1 Intended use

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

### 4.2 Protection against electrostatic discharge

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

#### 4.2.1 Packaging

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

#### 4.2.2 Guidelines for proper ESD handling

##### Electrical components with a housing

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

##### Electrical components without a housing

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

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

##### Individual components

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

### 4.3 Policies and procedures

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

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

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

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

### 4.4 Transport and storage

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

### 4.5 Installation

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

### 4.6 Operation

#### 4.6.1 Protection against touching electrical parts

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

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

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

#### 4.6.2 Environmental conditions - Dust, humidity, aggressive gases

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

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

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

### 4.6.3 Viruses and dangerous programs

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

## 4.7 Environmentally friendly disposal

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

### 4.7.1 Separation of materials

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

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

Table 10: Environmentally friendly separation of materials

Disposal must comply with applicable legal regulations.

## 5 Adding a customized device in Automation Studio

### 5.1 Downloading components from the Internet

In order to download components from the Internet, it is first necessary to launch Automation Studio and open the project in which the new components (hardware modules, motion libraries, Visual Components Runtime, Automation Runtime) will be used. Selecting Tools / Upgrades from the main menu opens a window that lists the upgrades currently available on the B&R website:

The columns list the following information:

- Name of the component
- Version of the component
- Version of Automation Studio: Shows the earliest AS version with which the upgrade can be used. This column is only shown if the checkbox "Show upgrades for newer Automation Studio versions" has been enabled.
- Size of the data to be downloaded
- Description of components (also contains information about corrected errors). If there is a more detailed description for the upgrade available on the B&R website, the text in the description column is shown in blue and underlined. Clicking on this link opens it in the user's default web browser.

Selecting the component and then confirming the selection by clicking on the OK button copies the files required for the selected module (HWC, bitmaps, firmware) to the Automation Studio installation. If the installation already contains files with the same names, these are replaced without warning. Once this is done, the user can add the new hardware modules to the project's hardware tree and configure them as usual. The Automation Runtime version does not need to be changed. During the build, two additional B&R modules are created (ArFW.br for the firmware and ArHWD.br for the hardware definition) and then transferred to the target system. In order for AR to implement the changed hardware definition and configuration, a warm restart is performed automatically.

#### Information:

**Automation Runtime V2.92 or higher must be installed in order to successfully download hardware modules.**

**A minimum version (or possibly a higher one if additional code changes were necessary in AR to support this module) is listed in all reloadable HWC files. An error is reported during the build procedure if the AR version being used is too old.**

**If the user selects a motion library, it will be copied into the installation. The new version of the motion library can now be created in the project as usual. The same applies for Visual Components Runtime and Automation Runtime versions.**

Upgrades can also be installed without a project being open.

If two modules with the same model number and different version numbers are in the list of reloadable hardware modules, the one with the highest version number is shown. The same applies for Visual Components Runtime.

Selecting the checkbox "Show upgrades for newer Automation Studio versions" displays additional upgrades that cannot be installed with the current version of Automation Studio since they require a newer version. The "Automation Studio" column lists the minimum version of Automation Studio required to install each upgrade.

These upgrades cannot be selected, however. The minimum versions are only shown to indicate that a newer version of Automation Studio is required in order to be able to use these components. If dependencies exist between upgrades, they are shown under the respective upgrades. This is the case, for example, if a new Automation Runtime version has certain minimum firmware requirements for the hardware modules. These are only required under certain conditions since the hardware upgrades are only necessary when the corresponding hardware modules are actually being used in the project. These upgrades are therefore not downloaded automatically.

## 5.2 Version conflict when adding modules

If some of the hardware modules in the current project have a higher version than the ones currently open in Automation Studio, or if they are missing in the current installation, the following message is shown:

"Please select Tools/Upgrades from the main menu to install the upgrades for the modules shown in the window."

## 5.3 Customer-specific upgrades

If it is also necessary to see available customer-specific upgrades (e.g. for customized modules), then the "Show customer specific upgrades" checkbox can be enabled. Upgrades for the customized modules are shown after a successful login using username and password.

## 5.4 Loading components from local storage

If the workstation does not have Internet access, upgrades can be downloaded to another location from the B&R website and saved to a local storage device. They can then be loaded and installed from local storage in the upgrade window in Automation Studio by clicking on "Browse for local storage".

## 5.5 Editing an existing project

If components being used in an existing project are updated, then the newly loaded hardware module files (hardware configuration, bitmap, firmware), motion libraries, Visual Components Runtime and Automation Runtime will already be in use when the project is opened and compiled. This only applies for motion libraries and Automation Runtime, however, if the same version of the motion library or Automation Runtime is configured in the project. The version is not changed automatically.

## 5.6 Displaying downloaded components in Automation Studio

Information about which downloaded components have been installed can be accessed by clicking on the "Upgrades" button in the "About" window in Automation Studio (Help / About Automation Studio).

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