

# **ETAL410.103B-1**

## **User's manual**

Version: **1.00 (December 2020)**  
Order no.: **User's manual**

### **Translation of the original documentation**

B&R reserves the right to make changes to the content without prior notice. B&R assumes no liability for typographical errors or for any other information in this document as far as legally possible. Liability claims against B&R regarding the content of delivery and documentation of third-party components used in the product are excluded in any case. The user is responsible for compliance with all relevant and professionally pertinent safety measures as well as the intended use. B&R points out that the software and hardware designations and brand names of the respective companies are subject to the legal protection regulations of intellectual property law.

<b>Chapter 1 Introduction.....</b>	<b>3</b>
1 Manual history.....	3
2 Note regarding additional documentation.....	3
3 Organization of notices.....	3
<b>Chapter 2 Intended use.....</b>	<b>4</b>
1 Protection against electrostatic discharge.....	4
2 Regulations and measures.....	4
3 Transport and storage.....	5
4 Operation.....	5
5 Security concept.....	5
<b>Chapter 3 Safety notices.....</b>	<b>7</b>
1 Safety notices.....	7
2 Usage.....	7
3 Electronics.....	7
4 Responsibilities of the operator.....	7
<b>Chapter 4 System characteristics.....</b>	<b>8</b>
1 General information.....	8
2 Order data.....	8
3 Content of delivery.....	8
<b>Chapter 5 Technical data.....</b>	<b>10</b>
<b>Chapter 6 Commissioning.....</b>	<b>11</b>
1 Operation.....	11
2 Construction.....	11
3 Safety.....	12
4 Power supply.....	13
<b>Chapter 7 Maintenance.....</b>	<b>14</b>
1 Cleaning.....	14
2 Repairing B&R products.....	14
<b>Chapter 8 Accessories.....</b>	<b>15</b>
1 Required accessories.....	15
2 Optional accessories.....	18
<b>Chapter 9 Environmentally friendly disposal.....</b>	<b>21</b>
1 Separation of materials.....	21

# Chapter 1 • Introduction

## 1 Manual history

Version	Date	Change
0.10	May 2019	First internal version

### 1.1 INFOBOX: Current user's manual

#### Information:

B&R makes every effort to keep documents as current possible. The most current versions can be downloaded from the B&R website ([www.br-automation.com](http://www.br-automation.com)).

## 2 Note regarding additional documentation

This documentation describes the entire product and its intended use in addition to safety guidelines for using the product.

For information about the components used in the product, see the documentation of the individual components on our website. For an overview of the components used, see the technical data of this product.

## 3 Organization of notices

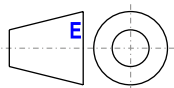
### Safety guidelines

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

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

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

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



European dimension standards apply to all dimension diagrams.

#### All dimensions in millimeters.

Unless otherwise specified, the following general tolerances apply:

Nominal dimension range	General tolerance per DIN ISO 2768 medium
Up to 6 mm	±0.1 mm
Over 6 to 30 mm	±0.2 mm
Over 30 to 120 mm	±0.3 mm
Over 120 to 400 mm	±0.5 mm
Over 400 to 1000 mm	±0.8 mm

## Chapter 2 • Intended use

---

These products are developed and produced exclusively for training and development in the area of automation. Any use beyond this is not permitted, in particular the integration of these products or parts thereof in machines, systems or other devices and processes. B&R does not assume liability for damages of any kind that occur when using the products outside of training and development or for harm that results from modifying the products. Expansions using products from the ETA system or ETA light system series are permitted.

In addition, the products are only permitted to be used in closed rooms (such as laboratories, offices and classrooms) that do not require separate protective equipment. Trainers shall inform the trainees of the relevant safety guidelines and precautions before using the product.

### 1 Protection against electrostatic discharge

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

#### 1.1 Packaging

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

#### 1.2 Regulations for proper ESD handling

##### Electrical assemblies with housing

- 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.). 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.

### 2 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) must be observed in accordance with applicable national and international regulations. This also applies to all other connected devices, such as drives.

## 2.1 Dual use

Servo drives, inverter modules and frequency inverters from B&R are not dual-use goods per appendix I of Council Regulation (EC) No. 428/2009 | 3A225, amended by Commission Delegated Regulation (EU) No. 2015/2420.

## 3 Transport and storage

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

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.

## 4 Operation

### 4.1 Protection against contact with electrical parts

Before switching on programmable logic controllers, operating and monitoring devices and uninterruptible power supplies, 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!

### 4.2 Ambient conditions - Dust, moisture, aggressive gases

The use of operating and monitoring devices (e.g. industrial PCs, Power Panels, Mobile Panels) and uninterruptible power supplies in dusty environments must be avoided. This can otherwise result in dust deposits that affect the functionality of the device, especially in systems with active cooling (fans), which may no longer ensure sufficient cooling.

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.

### 4.3 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) or via networks or the Internet poses a potential threat to the system. It is the direct responsibility of the user to avert these dangers and to take appropriate measures such as virus protection programs and firewalls to protect against them and to use only software from trustworthy sources.

## 5 Security concept

B&R products communicate via a network interface and were developed for integration into a secure network. The network and B&R products are affected by the following hazards (not a complete list):

- Unauthorized access
- Digital intrusion
- Data leakage
- Data theft
- A variety of other types of IT security breaches

It is the responsibility of the operator to provide and maintain a secure connection between B&R products and the internal network as well as other networks, such as the Internet, if necessary. The following measures and security solutions are suitable for this purpose:

- Segmentation of the network (e.g. separation of the IT and OT networks)
- Firewalls for the secure connection of network segments
- Implementation of a security-optimized user account and password concept
- Intrusion prevention and authentication systems
- Endpoint security solutions with modules for anti-malware, data leakage prevention, etc.
- Data encryption

It is the responsibility of the operator to take appropriate measures and to implement effective security solutions.

B&R Industrial Automation GmbH and its subsidiaries are not liable for damages and/or losses resulting from, for example, IT security breaches, unauthorized access, digital intrusion, data leakage and/or data theft.

Before B&R releases products or updates, they are subjected to appropriate functional testing. Independently of this, the development of customized test processes is recommended in order to be able to check the effects of changes in advance. Such changes include, for example:

- Installation of product updates
- Notable system modifications such as configuration changes
- Deployment of updates or patches for third-party software (non-B&R software)
- Hardware replacement

These tests should ensure that implemented security measures remain effective and that systems behave as expected.

# Chapter 3 • Safety notices

## 1 Safety notices

### Warning!

#### Observe safety notices

Disregarding safety notices can result in serious damage to property and personal injury.

The safety notices on the product and in the documentation must be observed.

Products that cannot be ensured as safe due to damage, for example, are not permitted to be started up under any circumstance. Disturbances that impair general safety must be eliminated immediately.

## 2 Usage

This product is designed and manufactured for training and development. General safety guidelines must be observed at all times.

### Caution!

#### Risk of injury

Disregarding safety notices can result in serious damage to property and personal injury.

The data sheets of components and the safety notices contained therein must be observed.

For a list of the components used, see the technical data of this product.

## 3 Electronics

The product is prewired and prepared for use. No additional wiring examples are required.

The power supply and communication, e.g. Ethernet, are implemented via cables with standard connector systems such as RJ45.

### Caution!

#### Electric shock

Incorrect or faulty supply elements can result in damage to property and personal injury.

Only power supply unit 0TP650.07, which is available as an accessory, is permitted to be used for the power supply.

Connecting or disconnecting connectors and elements is only permitted in a voltage-free state.

## 4 Responsibilities of the operator

The operator is the person who operates the product or who provides it for use/application by a 3rd party while carrying legal product responsibility for the protection of the user, personnel or other 3rd parties.

- The operator is obliged to know and implement the applicable industrial safety regulations.
- The operator is obliged to know and implement national, local and plant-specific regulations.
- The operator is obliged to clearly define and manage responsibilities for installation, operation, fault correction, maintenance and cleaning.
- The operator is obliged to ensure that responsible personnel have read and understood this user's manual.

## Chapter 4 • System characteristics

### 1 General information

In ETAL410.103B-1, motion control tasks can be implemented in no time using ACOPOSmicro. These include simple single-axis applications as well as electronic gearbox, compensation gears or cams.

#### ETAL410.103B-1 - ACOPOSmicro servo technology EnDat

- State-of-the-art servo motor control in the smallest spaces
- 2 servo motors with EnDat interface
- Single-axis positioning applications
- Drive coupling with electronic gearboxes
- Compensation gear and phase shifts
- Connecting drives using cams
- Cam automat
- Drive control and drive configuration
- Parameter identification and autotuning
- Compact dimensions

### 2 Order data

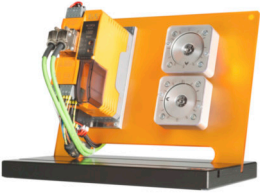
Model number	Short description	Figure
	<b>Motion control</b>	
ETAL410.103B-1	ETA light system for motion control / servo technology, state-of-the-art servo motor control in minimum space, 2 servo motors with EnDat interface, single-axis positioning applications, drive coupling with electronic gearboxes, differential gear and phase shift, drive coupling via cams, cam automat, drive control and drive configuration, parameter identification and autotuning, compact dimensions	
	<b>Required accessories</b>	
ETAL100.0000-2	Black-coated wooden plate with B&R logo, two milled grooves for holding ETA light systems, groove distance: 8 cm.	
	<b>POWERLINK/Ethernet cables</b>	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	<b>Optional accessories</b>	
	<b>Accessories</b>	
0TP370.76	Attachment cable to wide-range desktop power supply unit for office and laboratory use, CEE 7/7 to IEC C13 connector typical application: power supply for ETA light evaluation and training systems	
0TP650.07	Wide-range desktop power supply unit for office and laboratory use, output parameters: 24 VDC, 2.5 A, connection: low voltage connector 5.5 mm / 2.1 mm (+ pin inside), typical application: power supply for ETA light evaluation and training systems	
ETAL100.1Y05-0	ETA light system Y-current distributor, for connecting two ETA light systems to a desktop power supply unit, 1x DC 5.5 x 2.1 mm female connector, 2x DC 5.5 x 2.1 mm male connector, max. current 5 A, max. voltage 24 VDC, length including connections: 45 cm	

Table 1: ETAL410.103B-1 - Order data

### 3 Content of delivery

This product contains the following materials:

80VD100PD.C000-01  
 8LVA13.B1030D000-0  
 8BYM0X55.10023-0

8BCF00X7.1121B-0  
80XB120A2.36-00

For details and additional technical data, see the data sheets for the individual products.

## Chapter 5 • Technical data

<b>Model number</b>	<b>ETAL410.103B-1</b>
<b>General information</b>	
Input voltage	24 VDC -15% / +20%
B&R ID code	0xF40A
Reverse polarity protection	Yes
<b>24 VDC power supply</b>	
Connection	Low voltage female connector 5.5 mm / 2.1 mm (0TP650.07)
<b>Mechanical properties</b>	
Dimensions	
Width	300 mm
Height	230 mm
Depth	210 mm
Weight	4.1 kg
<b>Brief overview</b>	
Content of delivery	<p>This product contains the following materials:</p> <p>80VD100PD.C000-01  8LVA13.B1030D000-0  8BYM0X55.10023-0  8BCF00X7.1121B-0  80XB120A2.36-00</p> <p>For details and additional technical data, see the data sheets for the individual products.</p>

Table 2: ETAL410.103B-1 - Technical data

# Chapter 6 • Commissioning

## 1 Operation

The following is required for operation:

- 1x 24 V power supply unit OTP650.07 from the ETA light system product series
- 1x cold appliance power supply cable (OTP370.76)
- 1x module bracket ETAL100.0000-2
- Controller such as PowerPanel or an X20 controller.

### Advice:

When combining with other products from the ETA light system product portfolio, you may need additional components. For additional information, see the documentation of the product used.

## 2 Construction

The product must be placed on a flat, stable surface with the module rack available in the accessories.

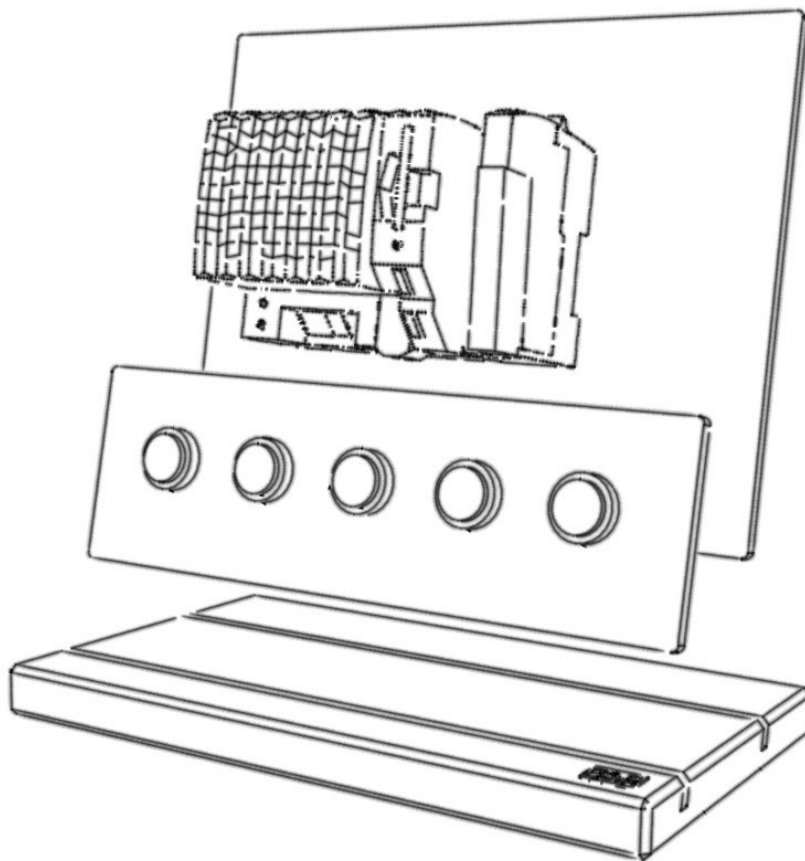


Figure 1: The figure does not have to correspond to the actual product!

The footprint for an ETA light system is about 40 x 40 cm.

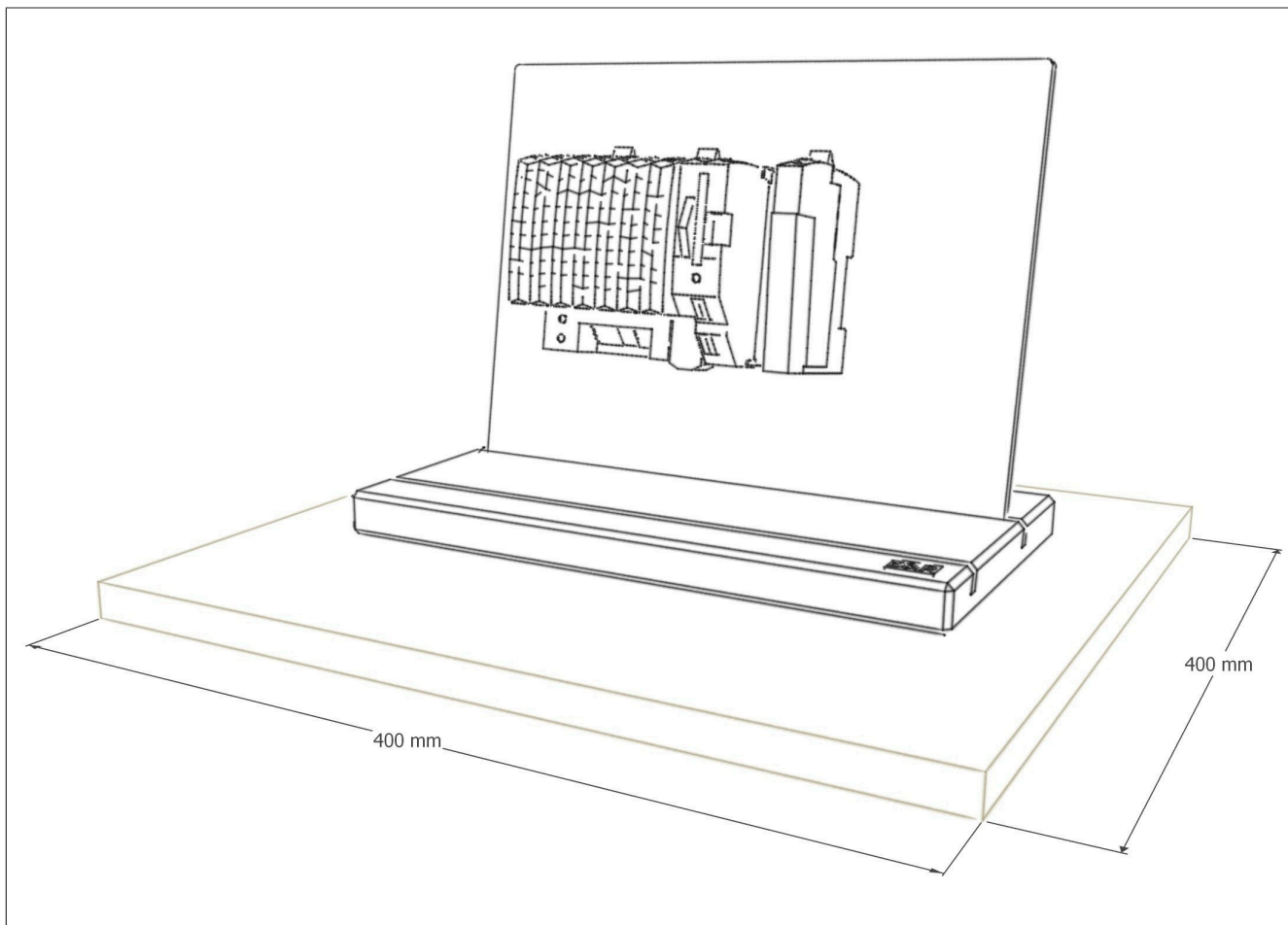


Figure 2: The figure does not have to correspond to the actual product!

## **Danger!**

### **Accessibility of safety equipment**

During installation, it must be ensured that safety equipment such as emergency stops or emergency stop buttons remain accessible.

## **Caution!**

### **Danger of falling**

Loose cables can result in injuries.

Make sure that the cables are laid cleanly.

## **3 Safety**

Check the following elements for visible defects (cracks, loose screw connections and the like) before commissioning.

- Electrical connections
- Safety devices and covers
- Mechanical components

## **Advice:**

Commissioning is only permitted to be carried out under the supervision of a specialist with the corresponding qualifications!

**Advice:**

Observe safety notices

For additional safety notices for the product, see chapter 3 "[Safety notices](#)" on page 7.

## 4 Power supply

Connect the ETA light system product with power supply unit OTP650.07 (see technical data), which is available in the accessories.

**Warning!****Sparking**

Plugging in devices when the power is switched on can result in sparking.

Always connect the power supply unit to the product first, then to the power supply. This prevents sparking and the resulting personal injury or material damage.

## Chapter 7 • Maintenance

---

The following chapter describes the maintenance work that can be carried out by a qualified and trained end user.

### Information:

Only components approved by B&R are permitted to be used for maintenance work.

### 1 Cleaning

#### Danger!

In order to prevent unintentional operation (by touching the touch screen or keys), the device is only permitted to be cleaned when the power is switched off.

Use a cloth moistened with dishwashing detergent, screen cleaner or alcohol (ethanol) to clean the device. Do not apply the cleaner directly to the device!

It is never permitted to use aggressive solvents, chemicals, abrasive cleaners, compressed air or steam cleaners.

### Information:

Displays with a touch screen should be cleaned at regular intervals.

### 2 Repairing B&R products

Damaged B&R products must be taken out of operation immediately!

#### Warning!

Personal injury and damage to property due to unauthorized repair work or tampering

Do not carry out any repair work on B&R products!

B&R products are only permitted to be repaired by trained, qualified personnel at B&R. Repair attempts by third parties are not permitted and result in the immediate loss of warranty and guarantee claims.

Do not tamper with B&R products!

Tampering with B&R products can cause malfunctions as well as irreparable damage to the products and result in the immediate loss of warranty and guarantee claims.

### Information:

B&R products are designed in such a way that the housing usually does not have to be opened.

The housing of B&R products is only permitted to be opened if this is necessary for assembly, installation, maintenance or repair work as required in the user documentation.

#### Handling repairs and complaints

The **B&R Material Return Portal** is available on the B&R website ([www.br-automation.com](http://www.br-automation.com)) for processing repair or complaint cases.

# Chapter 8 • Accessories

The following accessories have undergone functional testing by B&R in connection with the device used and can be operated with this device. Possible limitations regarding operation with individual components other than the complete system must be taken into account, however. All individual specifications of the components must be observed when operating the complete system.


All components listed in this manual have undergone intensive system and compatibility testing and been approved accordingly. B&R cannot assume any functional warranty for accessories that have not been approved.

## 1 Required accessories

**Advice:**

When combining with other products from the ETA light system product portfolio, you may need additional components. For additional information, see the documentation of the product used.

### 1.1 POWERLINK cables

Short description	
Length	POWERLINK cables
0.5 m	<a href="#">X20CA0E61.00050</a>
1 m	<a href="#">X20CA0E61.00100</a>
1.5 m	<a href="#">X20CA0E61.00150</a>
2 m	<a href="#">X20CA0E61.00200</a>
	
Length	Tolerances for cable lengths
X20CA0E61.xxxxx	
0.2 to 0.5 m	+0.01 m
1 to 5 m	+0.04 m

### 1.2 Technical data

1.3 X20CA0E61.xxxxx

Dimensions		
Length xxxx		
Pinout		
Male RJ45 connector		Male RJ45 connector

1.4 ETAL100.0000-2

1.4.1 General information

The base plate is made of wood and coated black. Up to two ETA light system products can be accommodated on one base plate.

ETAL100.0000-2 - Base plate for ETA light system modules

- Sturdy wooden base plate
- Possible to connect up to 2 ETA light system modules
- Compact dimensions

1.4.2 Order data

Model number	Short description	Figure
ETAL100.0000-2	Black-coated wooden plate with B&R logo, two milled grooves for holding ETA light systems, groove distance: 8 cm.	

Table 3: ETAL100.0000-2 - Order data

### 1.4.3 Technical data

Model number	ETAL100.0000-2
Mechanical properties	
Dimensions	
Width	300 mm
Height	230 mm
Depth	6 mm

Table 4: ETAL100.0000-2 - Technical data

## 2 Optional accessories

### 2.1 OTP370.76

#### 2.1.1 General information

Cold appliance power supply cable with a length of 2 meters suitable for a wide-range desktop power supply unit from the ETA light system.

#### OTP370.76 - 230 VAC cold appliance power supply cable 2 m

- 230 VAC cold appliance power supply cable with 2 m length
- Grounding connector (IEC 320-C13)

#### 2.1.2 Order data


Model number	Short description	Figure
OTP370.76	Attachment cable to wide-range desktop power supply unit for office and laboratory use, typical application: power supply for ETA light evaluation and training systems	

Table 5: OTP370.76 - Order data

#### 2.1.3 Technical data

Model number	OTP370.76
<b>Cable construction</b>	
Wire cross section	3x 0.75 mm <sup>2</sup>
Type	H05-VV-F3G
Supply lines	
Permissible operating voltage	250 VAC
Outer jacket	
Color	Black
<b>Mechanical properties</b>	
Length	2 m

Table 6: OTP370.76 - Technical data

## 2.2 OTP650.07

### 2.2.1 General information

ETA light systems are compatible with this power supply unit and can be connected directly to it.

#### Information:

**Connector compatibility: See the technical data of the product to be supplied!**

#### OTP650.07 - Desktop power supply unit 24 VDC, 2.5 A

- Wide-range power supply unit for office and laboratory use
- Low-voltage connector for secure connection
- Fanless operation
- 3-pole mains connection via IEC 320-C14
- Fully enclosed plastic housing

### 2.2.2 Order data


Model number	Short description	Figure
	<b>Accessories</b>	
OTP650.07	Wide-range desktop power supply unit for office and laboratory use, output parameters: 24 VDC, 2.5 A, connection: low voltage connector 5.5 mm / 2.1 mm (+ pin inside), typical application: power supply for ETA light evaluation and training systems	

Table 7: OTP650.07 - Order data

### 2.2.3 Technical data

Model number	OTP650.07
<b>General information</b>	
Input voltage	90 ~ 264 VAC - IEC 320-C14
<b>24 VDC voltage output</b>	
Voltage range	24 VDC
Output current	2.5 A
<b>Connector</b>	
Type	P1J 5.5 x 2.1
<b>Mechanical properties</b>	
Dimensions	
Width	50 mm
Height	31.5 mm
Depth	125 mm
Weight	310 g

Table 8: OTP650.07 - Technical data

## 2.3 ETAL100.1Y05-0

### 2.3.1 General information

Using a Y-cable, it is possible to supply two ETA light systems using only one power supply unit. Many products from the ETA light system can be supplied together due to the low power consumption.

#### ETAL100.1Y05-0 - 24VDC-Y cable, 5.5 x 2.1 male connector

- Supplies two ETA light systems with one power supply unit

### 2.3.2 Order data


Model number	Short description	Figure
	<b>Accessories</b>	
ETAL100.1Y05-0	ETA light system Y-current distributor, for connecting two ETA light systems to a desktop power supply unit, 1x DC 5.5 x 2.1 mm female connector, 2x DC 5.5 x 2.1 mm male connector, max. current 5 A, max. voltage 24 VDC, length including connections: 45 cm	

Table 9: ETAL100.1Y05-0 - Order data

### 2.3.3 Technical data

Model number	ETAL100.1Y05-0
<b>General information</b>	
Input voltage	Max. 24 VDC / Max. 2.5 A
B&R ID code	0xE7E7
<b>24 VDC power supply</b>	
Connection	Low voltage female connector 5.5 mm / 2.1 mm (0TP650.07)
<b>Cable construction</b>	
Wire cross section	On input 20 AWG / On output 24 AWG
Properties	Nickel-plated contacts
Outer jacket	
Material	PVC
<b>Mechanical properties</b>	
Length	450 mm

Table 10: ETAL100.1Y05-0 - Technical data

## Chapter 9 • 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 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 supplies Batteries and rechargeable batteries Cables	Electronics recycling
Paper/Cardboard packaging	Paper/Cardboard recycling
Plastic packaging material	Plastic recycling

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

**Publishing information**

B&R Industrial Automation GmbH

B&R Strasse 1

5142 Eggelsberg

Austria

Telephone: +43 7748 6586-0

Fax: +43 7748 6586-26

[office@br-automation.com](mailto:office@br-automation.com)