

# Operating Instructions

Language **English**  
Translation  
Document No. 5.01051.03  
Part No. 354845  
Status 21.07.2011

**be in motion** **be in motion**



**b maXX drive PLC**

**BM4-O-PLC-01**

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### Overview of Revisions

Version	Status	Changes
5.01051.01	13.11.2002	Creation
5.01051.02	20.11.2003	General revision
5.01051.03	25.05.2011	Added PLC version "Economy" (ECO-PLC)

**Notes:**

# INTRODUCTION

These operating instructions are an important component of your b maXX 4400; this means that you must thoroughly read this document, not least to ensure your own safety.

In this chapter, we will describe the first steps that you should carry out after getting this unit. We will define terms that are used in this documentation on a consistent basis and will inform you about the responsibilities you must consider when using this unit.

For more detailed information on operating and deploying the module, refer to the documentation entitled "b maXX PLC Application Manual".

## 1.1 First Steps

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- ◆ Check the shipment see [►Packaging and transportation◄](#) from page 17 onward.
- ◆ Pass on all the documentation that was supplied with the plug-in module to the appropriate departments in your company.
- ◆ Deploy suitable personnel for assembly and commissioning.
- ◆ Pass on these operating instructions to this personnel and ensure that they have read and understood the safety instructions and that they are following them.

## 1.2 Terms Used

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In this documentation, we will also refer to Baumüller's "**b maXX**" product as "option module", "plug-in module", or "BM4-O-PLC-01".

We will also use the term "b maXX" for the "Basic Unit b maXX 4400" product. The controller in the basic unit is also referred to as the "b maXX controller". For a list of the abbreviations that are used, refer to [► Appendix A Abbreviations ◄](#) from page 51 onward.





# BASIC SAFETY INSTRUCTIONS

We have designed and manufactured each Baumüller plug-in module in accordance with the strictest safety regulations. Despite this, working with the plug-in module can be dangerous for you.

In this chapter, we will describe the risks that can occur when working with a Baumüller plug-in module. Risks are illustrated by icons. All the symbols that are used in this documentation are listed and explained.

In this chapter, we cannot explain how you can protect yourself from specific risks in individual cases. This chapter contains only general protective measures. We will go into concrete protective measures in subsequent chapters directly after information about the individual risk.

## 2.1 Hazard information and instructions

---



Hazard information will show you the dangers, that can lead to injuries or even to death. Always follow the hazard information given in this document.

---

Hazards are always divided into three danger classifications. Each danger classification is identified by one of the following words:

### **DANGER**

- Considerable damage to property
- Serious personal injury
- Death **will** occur

### **WARNING**

- Considerable damage to property
- Serious personal injury
- Death **can** occur

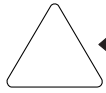
### **CAUTION**

- Damage to property
- Slight to medium personal injury **can** occur

## 2.1 Hazard information and instructions

### 2.1.1 Structure of hazard information

The following two examples show how hazard information is structured in principle. A triangle is used to warn you about danger to living things. If there is no triangle, the hazard information refers exclusively to damage to property.



A triangle indicates that there is danger to living things.  
The color of the border shows how severe the hazard is: the darker the color, the more severe the hazard is.



The icon in the rectangle represents the hazard.  
The color of the border shows how severe the hazard is: the darker the color, the more severe the hazard is.



The icon in the circle represents an instruction. Users must follow this instruction.  
(The circle is shown dashed, since an instruction is not available as an icon for each hazard advisory).



The circle shows that there is a risk of damage to property.



The icon in the rectangle represents the hazard.  
The color of the border shows how severe the hazard is: the darker the color, the more severe the hazard is. (The rectangle is shown dashed, since the danger is not represented as an icon with every hazard advisory)

The text next to the icons is structured as follows:

#### THE SIGNAL WORD IS HERE THAT SHOWS THE DEGREE OF RISK




Here we indicate whether one or more of the results below occurs if you do not observe this warning.


- Here, we describe the possible results. The worst result is always at the extreme right.

*Here, we describe the hazard.*

Here, we describe what you can do to avoid the hazard.


## 2.1.2 Hazard advisories that are used

If a signal word is preceded by one of the following danger signs:  or  or , the safety information refers to injury to people.

If a signal word is preceded by a round danger sign: , the safety information refers to damage to property.

### 2.1.2.1 Hazard advisories about injuries to people

To be able to differentiate visually, we use a separate border for each class of hazard information with the triangular and rectangular pictograms.

For danger classification **DANGER**, we use the  danger sign. The following hazard information of this danger classification is used in this documentation.

#### DANGER



The following **will occur**, if you do not observe this danger information:

- serious personal injury
- death

*Danger from: **electricity**. The hazard may be described in more detail here.*

Here, we describe what you can do to avoid the hazard.

#### DANGER




The following **will occur**, if you do not observe this danger information:

- serious personal injury
- death

*Danger from: **mechanical effects**. The hazard may be described in more detail here.*

Here, we describe what you can do to avoid the hazard.

For danger classification **WARNING**, we use the  danger sign. The following hazard information of this danger classification is used in this documentation.

#### WARNING




The following **may occur**, if you do not observe this warning information:

- serious personal injury
- death

*Danger from: **electricity**. The hazard may be described in more detail here.*

Here, we describe what you can do to avoid the hazard.

For danger classification **CAUTION**, we use the  danger sign. The following hazard information of this danger classification is used in this documentation.

## 2.1 Hazard information and instructions



### CAUTION

The following **may occur**, if you do not observe this caution information:

- minor to medium personal injury.

*Danger from: **sharp edges**. The hazard may be described in more detail here.*

Here, we describe what you can do to avoid the hazard.



### CAUTION

The following **may occur**, if you do not observe this danger information:

- environmental pollution.

*Danger from: **incorrect disposal**. The hazard may be described in more detail here.*

Here, we describe what you can do to avoid the hazard.

### 2.1.2.2 Hazard advisories about damage to property

If a signal word is preceded by a round danger sign: ⓘ, the safety information refers to damage to property.



### CAUTION

The following **may occur**, if you do not observe this caution information:

- property damage.

*Danger from: **electrostatic discharge**. The hazard may be described in more detail here.*

Here, we describe what you can do to avoid the hazard.

### 2.1.2.3 Instruction signs that are used



wear safety gloves



wear safety shoes

## 2.2 Information signs

---

**NOTE**

This indicates particularly important information.

---

## 2.3 Legal information

---

This documentation is intended for technically qualified personnel that has been specially trained and is completely familiar with all warnings and maintenance measures.

The equipment is manufactured to the state of the art and is safe in operation. It can be put into operation and function without problems if you ensure that the information in the documentation is complied with.

Operators are responsible for carrying out servicing and commissioning in accordance with the safety regulations, applicable standards and any and all other relevant national or local regulations with regard to cable rating and protection, grounding, isolators, over-current protection, etc.

Operators are legally responsible for any damage that occurs during assembly or connection.

## 2.4 Appropriate Use

---

You must always use the plug-in module appropriately. Some important information is listed below. The information below should give you an idea of what is meant by appropriate use of the plug-in module. The information below has no claim to being complete; always observe all the information that is given in these operating instructions.

- You must only install the plug-in module in series b maXX 4400 units.
- Configure the application such that the plug-in module is always operating within its specifications.
- Ensure that only qualified personnel works with this plug-in module.
- Mount the plug-in module only in the specified slot/slots.
- Install the plug-in module as specified in this documentation.
- Ensure that connections always comply with the stipulated specifications.
- Operate the plug-in module only when it is in technically perfect condition.
- Always operate the plug-in module in an environment that is specified in the technical data.
- Always operate the plug-in module in a standard condition.  
For safety reasons, you must not make any changes to the plug-in module.
- Observe all the information on this topic if you intend to store the plug-in module.

You will be using the plug-in module in an appropriate way if you observe all the comments and information in these operating instructions.

### 2.5 Inappropriate Use

---

Below, we will list some examples of inappropriate use. The information below should give you an idea of what is meant by inappropriate use of the plug-in module. We cannot, however, list all possible cases of inappropriate use here. Any and all applications in which you ignore the information in this documentation are inappropriate; particularly, in the following cases:

- You installed the plug-in module in units that are not Series b maXX 4400.
- You ignored information in these operating instructions.
- You did not use the plug-in module as intended.
- You handled the plug-in module as follows
  - you mounted it incorrectly,
  - you connected it incorrectly,
  - you commissioned it incorrectly,
  - you operated it incorrectly,
  - you allowed non-qualified or insufficiently qualified personnel to mount the module, commission it and operate it,
  - you overloaded it,
- You operated the module
  - with defective safety devices,
  - with incorrectly mounted guards or without guards at all,
  - with non-functional safety devices and guards
  - outside the specified environmental operating conditions
- You modified the plug-in module without written permission from Baumüller Nürnberg GmbH.
- You ignored the maintenance instructions in the component descriptions.
- You incorrectly combined the plug-in module with third-party products.
- You combined the drive system with faulty and/or incorrectly documented third-party products.
- Your self-written PLC software contains programming errors that lead to a malfunction.

Version 1.1 of Baumüller Nürnberg GmbH's General Conditions of Sale and Conditions of Delivery dated 2/15/02 or the respective latest version applies in all cases. These will have been available to you since the conclusion of the contract at the latest.

### 2.6 Protective equipment

---

In transit, the plug-in modules are protected by their packaging. Do not remove the plug-in module from its packaging until just before you intend to mount it.

The cover on the b maXX units' controller sections provides IP20 protection to the plug-in modules from dirt and damage due to static discharges from contact. This means that you must replace the cover after successfully mounting the plug-in module.

## 2.7 Personnel training



### WARNING

The following **may occur**, if you do not observe this warning information:

- serious personal injury
- death

Only qualified personnel are allowed to mount, install, operate and maintain equipment made by Baumüller Nürnberg GmbH.

Qualified personnel (specialists) are defined as follows:

#### Qualified Personnel

Electrical engineers and electricians of the customer or of third parties who are authorized by Baumüller Nürnberg GmbH and who have been trained in installing and commissioning Baumüller drive systems and who are authorized to commission, ground and mark circuits and equipment in accordance with recognized safety standards.

Qualified personnel has been trained or instructed in accordance with recognized safety standards in the care and use of appropriate safety equipment.

#### Requirements of the operating staff

The drive system may only be operated by persons who have been trained and are authorized.

Only trained personnel are allowed to eliminate disturbances, carry out preventive maintenance, cleaning, maintenance and to replace parts. These persons must be familiar with the Operating Instructions and act in accordance with them.

Commissioning and instruction must only be carried out by qualified personnel.

## 2.8 Safety measures in normal operation

- At the unit's place of installation, observe the applicable safety regulations for the plant in which this unit is installed.
- Provide the unit with additional monitoring and protective equipment if the safety regulations demand this.
- Observe the safety measures for the unit in which the plug-in module is installed.

## 2.9 Responsibility and liability

To be able to work with this plug-in module in accordance with the safety requirements, you must be familiar with and observe the hazard information and safety instructions in this documentation.

### 2.9.1 Observing the hazard information and safety instructions

In these operating instructions, we use visually consistent safety instructions that are intended to prevent injury to people or damage to property.



### WARNING

The following **may occur**, if you do not observe this warning information:

- serious personal injury
- death

Any and all persons who work on and with Series b maXX units must always have available these Operating Instructions and must observe the instructions and information they contain – this applies in particular to the safety instructions.

Apart from this, any and all persons who work on this unit must be familiar with and observe all the rules and regulations that apply at the place of use.

---

### 2.9.2 Danger arising from using this module

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The plug-in module has been developed and manufactured to the state of the art and complies with applicable guidelines and standards. It is still possible that hazards can arise during use. For an overview of possible hazards, refer to the chapter entitled [►Basic Safety Instructions ◀](#) from page 9 onward and to [►Figure3](#) on page 23.

We will also warn you of acute hazards at the appropriate locations in this documentation.

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### 2.9.3 Warranty and Liability

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All the information in this documentation is non-binding customer information; it is subject to ongoing further development and is updated on a continuous basis by our permanent change management system.

Warranty and liability claims against Baumüller Nürnberg GmbH are excluded; this applies in particular if one or more of the causes listed in [►Inappropriate Use ◀](#) from page 14 onward or below caused the fault:

- Disaster due to the influence of foreign bodies or force majeure.



## PACKAGING AND TRANSPORTATION

We package every Baumüller unit before shipping such that it is highly unlikely that it will be damaged in transit.

### 3.1 Transportation

---

The plug-in modules are packed at the factory in accordance with the order.

- Avoid severe vibrations and jolts (max. 1 g) in transit.
- Avoid static discharges to the plug-in modules' electronic components.
- Do not remove the plug-in module from its protective packaging until just before you intend to mount it.

### 3.2 Unpacking

---

After receiving the unit while it is still packaged:

- Check whether there is any visible damage!

If there is:

- Complain to the delivery company. Have your complaint confirmed in writing and contact immediately your nearest Baumüller Nürnberg GmbH subsidiary.

#### CAUTION

The following **may occur**, if you do not observe this caution information:

- property damage.

*Danger from: **electrostatic discharge**. If you touch the plug-in module, and especially its electronic components, and subject them to electrostatic discharges, the module can be damaged or even totally destroyed.*

When handling the plug-in module, always observe the regulations and information on handling electrostatically sensitive components.



### 3.3 Disposing of the packaging

---

If no damage is visible:

- Open the unit's packaging.
- Check the scope of supply against the delivery note.

The scope of supply is:

- **drive PLC**
- these Operating Instructions including the declaration of conformity/manufacture declaration
- complain to your local Baumüller subsidiary if you find damage or if the delivery is not complete.

### 3.3 Disposing of the packaging

---

The packaging consists of cardboard and plastic.

- Observe local disposal regulations if you intend to dispose of the packaging.

### 3.4 Observe during transportation

---

The unit was packaged at the manufacturer's plant for initial transportation. If you have to transport the unit at a later date, please note the following points:

- Use the original packaging material
- or
- Use packaging that is suitable for electrostatic sensitive devices.

Ensure that the following conditions always apply during transportation:

- 2 K 3 (Climatic category)
- - 30° C to + 70° C (Temperature range)
- Max. 1 g (Vibration, shock, repetitive shock)

# DESCRIPTION OF THE B maXX PLC OPTION MODULE

In this chapter, we will describe the b maXX PLC plug-in module and explain the type code on the plug-in module.

## 4.1 General

---

The b maXX PLC is a drive-integrated PLC for implementing distributed intelligent automation technology. As an option, you can enhance the b maXX 4400 basic unit with controller by adding on the b maXX PLC.

The b maXX PLC System helps to implement the functionality of a drive-integrated PLC, e.g. configurable control engineering, cam disk, position acquisition, digital and analog inputs and outputs or synchronous bus system.

*You can link HMIs like operator panels, touchscreens, etc. via the integrated RS485 port by means of a software interface module to the 3964R<sup>®</sup> procedure (data block link). As an alternative, you can operate this interface via a software interface module to the USS protocol<sup>®</sup>, with the b maXX PLC functioning as the master that can activate several USS protocol<sup>®</sup>-capable slaves.*

***The 3964R<sup>®</sup> procedure and the USS protocol<sup>®</sup> are registered trademarks of Siemens AG.***

You carry out open- and closed-loop programming of the b maXX PLC via the standard RS232 port on the b maXX controller as a point-to-point connection.

### Option modules

In addition, it is possible to extend the range of functions using option modules in five option slots on the basic unit. The following option modules are available, for example:

- IEI-01 for acquiring positions and print marks via one channel.
- EtherCAT-Slave
- EtherCAT-Master (can not combined with PLC version Economy)

---

### NOTE



The generally limitation of the PLC version Economy is that you only can combine it with slave option modules, but not with master option modules. More details for the version Economy see chapter [►Functionality ◀](#) on page 22 and chapter [►Preparation ◀](#) from page 26 onward.

---

### IEC 61131-3 programming languages

You carry out open- and closed-loop programming in a modular way using PROPROP wt II from Version 3.0 and ProProg wt III programming environment in the following programming languages:

- Sequential Function Chart SFC,
  - Structured text, ST
  - Statement List, STL
  - Control System Flowchart, CSF
  - Ladder Diagram, LAD
- 

### NOTE



The PLC-version Economy is only available for ProProg wt III from version 1.2.2 with its own PLC-template "BM4\_O\_ECO01".

---

### Technology functions

Apart from this, you can implement use libraries to implement intelligent technological functions, like:

- Cam disk
  - Register controller
  - Winder
- 

### NOTE



Technology functions are not available for the PLC version Economy.

---

In addition to the PROPROP wt II IEC 61131-3 programming environment, you can integrate into the global machine concept an OPC server for linking visualization tasks and parameterizations via OPC clients.

## 4.2 Structure

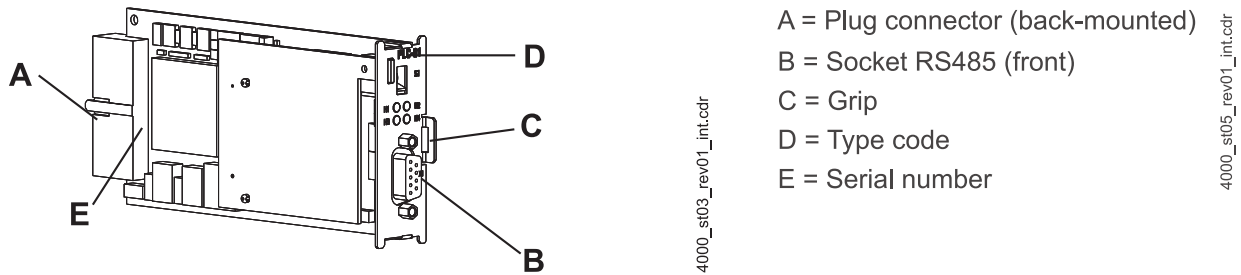


Figure1: PLC plug-in module

### 4.2.1 Slot for controlling the PLC

Slot **H** is provided for the PLC option module.

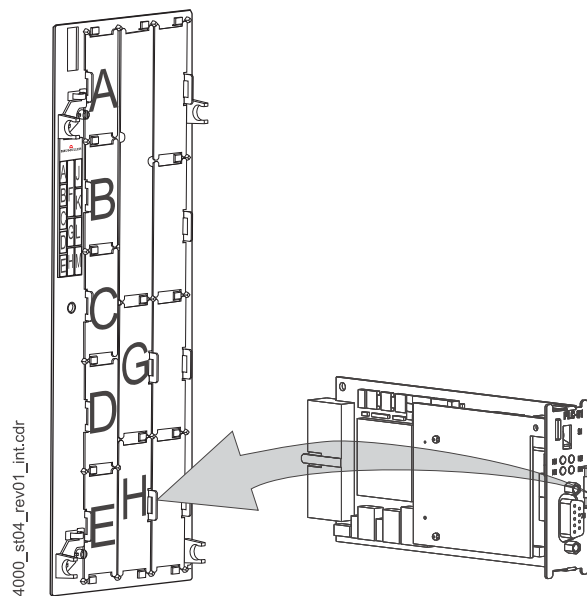


Figure2: b maXX option module, slot H

#### NOTE



if you plug a plug-in module into an unsuitable slot, it does not function. We have taken measures to ensure that the plug-in module is not damaged if you do this.

### 4.3 Functionality

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#### 4.3.1 BM4-O-PLC-01

---

- 120 MHz 32-bit RISC-CPU
- 1 MB Flash memory for storing the bootproject
- 2046 kB of program memory (SDRAM) for
  - A maximum of 400,000 STL lines (LD/ST statements to global variables)
  - Typically 120,000 STL lines (typical STL statements to structures and instance variables)
- Variable 2048 kB SDRAM (= entire "non-retentive flag range")
- 1460 kB of dynamic memory for debug and logic analyzer functions
- memory for retentive flag range (remanent data, optional), see [►Labeling of the controller – type code ◀](#) from page 23 onward.
- Cycle time of approximately 100 µs per 1000 lines of statement list (STL)
- RS485 serial terminal port of the b maXX PLC, optically decoupled
- Up to five addressable option slots
- You can plug two types of option modules:
  - I/O modules e.g. IEI (incremental counter module)
  - Field bus slave and master modules, e.g. EtherCAT slave or master, CANopen slave or master, Profibus-DP slave or master
- Power consumption approximately 2 W

#### 4.3.2 BM4-O-PLC-01 / version Economy (ECO-PLC)

---

- 120 MHz 32-bit RISC-CPU
- 1 MB Flash memory for storing the bootproject
- 1022 kB of program memory (SDRAM) for
  - A maximum of 200,000 STL lines (LD/ST statements to global variables)
  - Typically 60,000 STL lines (typical STL statements to structures and instance variables)
- Variable 1024 kB SDRAM (= entire "non-retentive flag range")
- 1460 kB of dynamic memory for debug and logic analyzer functions
- memory for retentive flag range (remanent data, optional), see [►Labeling of the controller – type code ◀](#) from page 23 onward
- Cycle time of approximately 100 µs per 1000 lines of statement list (STL)
- RS485 serial terminal port of the b maXX PLC, optically decoupled
- Up to five addressable option slots
- You can plug two types of option modules (only slave, no master):
  - I/O modules e.g. IEI (incremental counter module)
  - Field bus slave modules, e.g. EtherCAT slave, CANopen slave, Profibus-DP slave
- ECO-PLC only available without Motion Control functionality and without technology functions
- Power consumption approximately 2 W

#### 4.4 Danger zones

The b maXX 4400 basic unit that is plugged into this module represents the greatest hazard. Observe all the safety instructions of the b maXX 4400 basic unit. The illustration below gives you an overview of the danger zones in the plug-in module.

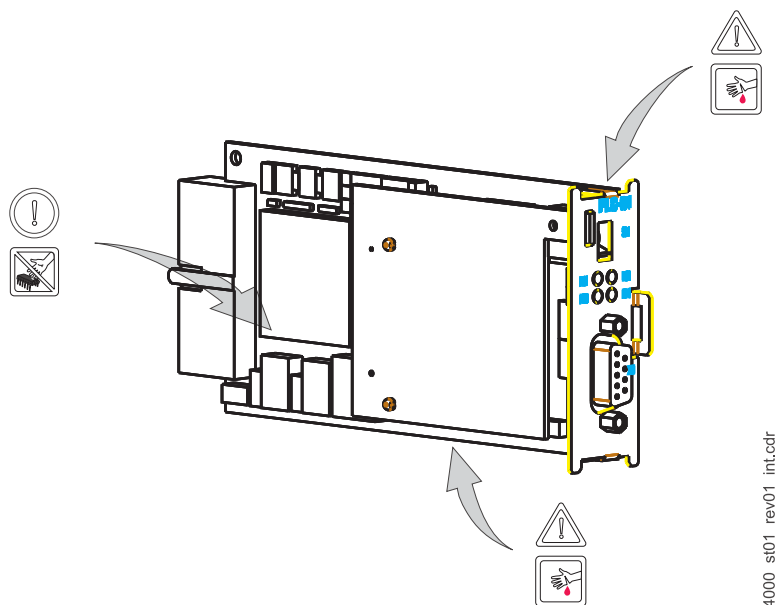


Figure3: Danger zones

#### 4.5 Labeling of the controller – type code

On the front panel, you will find the type code ("D" in [Figure1](#) on page 21) of the plug-in module.

##### NOTE

This type code applies only to controller module PLC of series b maXX 4400. Other plug-in modules have their own type codes.

BM4 - <u>B</u> M4 - O - PLC - XX - YY - ZZ	Device generation in which you can install the plug-in module
BM4 - <u>O</u> - PLC - XX - YY - ZZ	Option module
BM4 - O - <u>PLC</u> - XX - YY - ZZ	Plug-in module type (b maXX PLC)
BM4 - O - PLC - <u>XX</u> - YY - ZZ	Version
	01: Standard version
BM4 - O - PLC - XX - <u>YY</u> - ZZ	Hardware version
	See version table
BM4 - O - PLC - XX - YY - <u>ZZ</u>	Software version
	See version table

## 4.5 Labeling of the controller – type code

Version table (- YY - ZZ)

- YY	Meaning
00	0 kB remanent data (NOVRAM) (Motion Control Single Axis)
01	56 kB remanent data (NOVRAM) 4 MB Flash (Motion Control Multi Axis and CAM data from CAM manager)
02	Type ECO-PLC 56 kB remanent data (NOVRAM) 0 MB Flash memory (no Motion Control, no CAM)
03	Type ECO-PLC 0 kB remanent data (NOVRAM) 0 MB Flash memory (no Motion Control, no CAM).

- ZZ	Meaning
00	-----
01	Operation system with Cache
02	Operation system with Cache and Motion Control functionality
03	Operation system version Economy (ECO-PLC) with Cache but without Motion Control functionality and without technology functions

This type code is located on both the front and back of the front panel. The type code contains the plug-in module's basic data. On the basis of the type code, you will be able to find more data in the chapter entitled "Technical Data". For a list of all the technical data, refer to [►Appendix D Technical Data◄](#) from page 59 onward.



## ASSEMBLY AND INSTALLATION

In this chapter, we will describe mechanical assembly and electrical installation of a b maXX PLC option module.

Assembly/installation consists of the following steps:

- 1 Mount the plug-in module.
- 2 Connect the plug-in module to the signal cables.

To open the spagnolet lock, you may need a 3-mm wide screwdriver.

### 5.1 General safety regulations

- Observe the information in chapters [►Basic Safety Instructions ◀](#) from page 9 onward.
- Observe all areas on the b maXX unit that could be dangerous when you are carrying out assembly.

The figure below gives you an overview of the danger zones on the plug-in module.

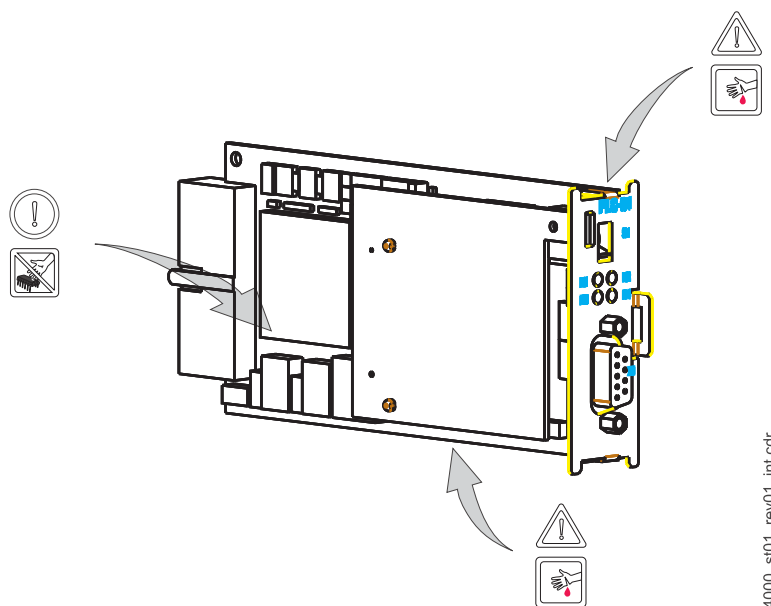


Figure 4: Danger zones

### 5.2 Requirements of the personnel carrying out work



#### DANGER

The following **will occur**, if you do not observe this danger information:

- serious personal injury
- death

*Danger from: **electricity**. The unit and the vicinity of the control cabinet may carry dangerous voltages.*

Before starting any work, ensure that the unit and its vicinity are free of voltage.

Observe the relevant safety regulations when handling current-carrying units.

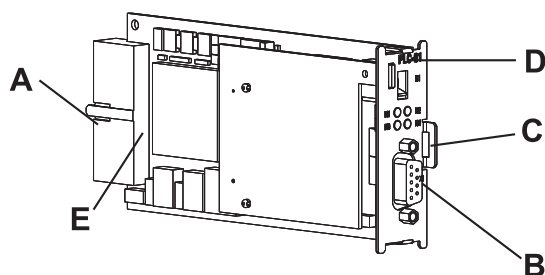
Ensure that only qualified personnel assembles and installs this plug-in module.

Qualified personnel is considered to be people whose training, experience and knowledge of relevant standards and regulations, accident prevention regulations and conditions in the plant has led to their being authorized by the plant safety manager to carry out activities that are needed in each case while recognizing and avoiding any possible hazards that might arise. The qualifications that are necessary for working with the unit include, for example:

- Trained or instructed in accordance with recognized safety standards in the care and use of appropriate safety equipment

### 5.3 Preparation

- Consult the type code (see "D" in ►Figure 5 on page 26) to ensure that you have the correct plug-in module.



A = Plug connector (back-mounted)

B = Socket RS485 (front)

C = Grip

D = Type code

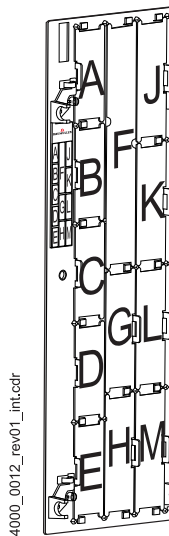
E = Serial number

4000\_st05\_rev01\_int.cdr

Figure5: b maXX option module

- Determine the correct slot (see ►Figure 6 on page 27).

## 5.3.1 PLC version „standard“



	Function modules									Option modules														
A	X	-	-	-	o	o	-	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
B	-	X	-	-	o	o	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
C	-	-	-	-	o	o	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
D	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
E	-	-	X	X	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
F	Controller unit, permanently installed																							
G	-	-	-	-	-	-	-	-	-	o	o	o	o	o	o	o	X	X	X	X	X	o	X	X
H	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	-	o	-	o	o	X	o	o
J	-	-	-	-	-	-	-	-	-	-	P	P	P	-	-	o	o	o	o	o	o	-	-	-
K	-	-	-	-	-	-	-	-	-	-	P	P	P	-	-	o	o	o	o	o	o	-	o	o
L	-	-	-	-	-	-	-	-	-	-	P	P	P	-	-	o	o	o	o	o	o	-	o	o
M	-	-	-	-	-	-	-	-	-	-	P	P	P	-	-	o	o	o	o	o	o	-	o	o

### X: preferred slot

Baumüller Nürnberg GmbH recommends, in order to reach the highest functional range, to insert the plug-in modules into these slots.

### o: possible slot

only if the preferred slot is occupied, we recommend in order to reach the highest functional range, to insert the plug-in modules into this slot.

### P: only possible, if on slot G or H a PLC module (PLC) is plugged and the PLC (and not the controller) executes the communication to the field bus slave module.

-: not possible - card doesn't work in this slot.

\* Precondition for these cards is an inserted PLC module (PLC).

Figure 6: Combinations of slots

### 5.3.2 PLC version „Economy“ (ECO-PLC)

4000\_0012\_rev01\_int.cdr

Steckkarten\_Rev14\_e

	Function modules										Option modules									
	BM4-F-ENC-XX (encoder 1 for motor control recommended)	BM4-F-ENC-XX (encoder 2)	BM4-F-AIO-01 (analog I/O)	BM4-F-AIO-02/03 (analog I/O)	BM4-F-DIO-XX (digital I/O)	BM4-F-FIO-XX (fast digital I/O)	BM4-F-IEE-XX (incremental encoder emulation)	BM4-F-SIE-XX (SSI-SSI encoder emulation)	BM4-F-CAN-01 (CANsync slave) <b>in prep.</b>	BM4-O-SER-XX (Sercos slave)	BM4-O-CAN-05 (CANsync slave)	BM4-O-PRO-01 (Profibus slave)	BM4-O-CAN-03 (CANopen slave)	BM4-O-DNT-XX (DISC-NT slave module)	BM4-O-PLC-XX (SPS)	BM4-O-IEI-XX* (incremental encoder emulation)	BM4-O-ETH-01* (Ethernet)	BM4-O-ECT-01 (EtherCAT slave)		
A	X	-	-	-	o	o	-	o	-	-	-	-	-	-	-	-	-	-		
B	-	X	-	-	o	o	-	X	-	-	-	-	-	-	-	-	-	-		
C	-	-	-	-	o	o	X	-	X	-	-	-	-	-	-	-	-	-		
D	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-		
E	-	-	X	X	o	o	-	-	-	-	-	-	-	-	-	-	-	-		
F	Controller unit, permanently installed																			
G	-	-	-	-	-	-	-	-	-	o	o	o	o	o	o	X	X	o		
H	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	o	o	X		
J	-	-	-	-	-	-	-	-	-	-	P	P	P	-	-	o	o	-		
K	-	-	-	-	-	-	-	-	-	-	P	P	P	-	-	o	o	P		
L	-	-	-	-	-	-	-	-	-	-	P	P	P	-	-	o	o	P		
M	-	-	-	-	-	-	-	-	-	-	P	P	P	-	-	o	o	P		

**X: preferred slot**  
Baumüller Nürnberg GmbH recommends, in order to reach the highest functional range, to insert the plug-in modules into these slots.

**o: possible slot**  
only if the preferred slot is occupied, we recommend in order to reach the highest functional range, to insert the plug-in modules into this slot.

**P:** only possible, if on slot G or H a PLC module (PLC) is plugged and the PLC (and not the controller) executes the communication to the field bus slave module.

**-:** not possible - card doesn't work in this slot.

**\*** Precondition for these cards is an inserted PLC module (PLC).

Figure 7: Combinations of slots „Economy“ version (ECO-PLC)

## 5.4 Assembly

- 1 Switch off the b maXX 4400 unit and secure it from being unintentionally restarted during assembly.

### DANGER

The following **will occur**, if you do not observe this danger information:

- serious personal injury
- death

*Danger from: **electricity**. The unit and the vicinity of the control cabinet may carry dangerous voltages.*

Before starting any work, ensure that the unit and its vicinity are free of voltage. Observe the relevant safety regulations when handling current-carrying units.



- 2 Pull the cover forward from the controller section: you can now see the slots.
- 3 Look for the intended slot (**H**) on the controller section.

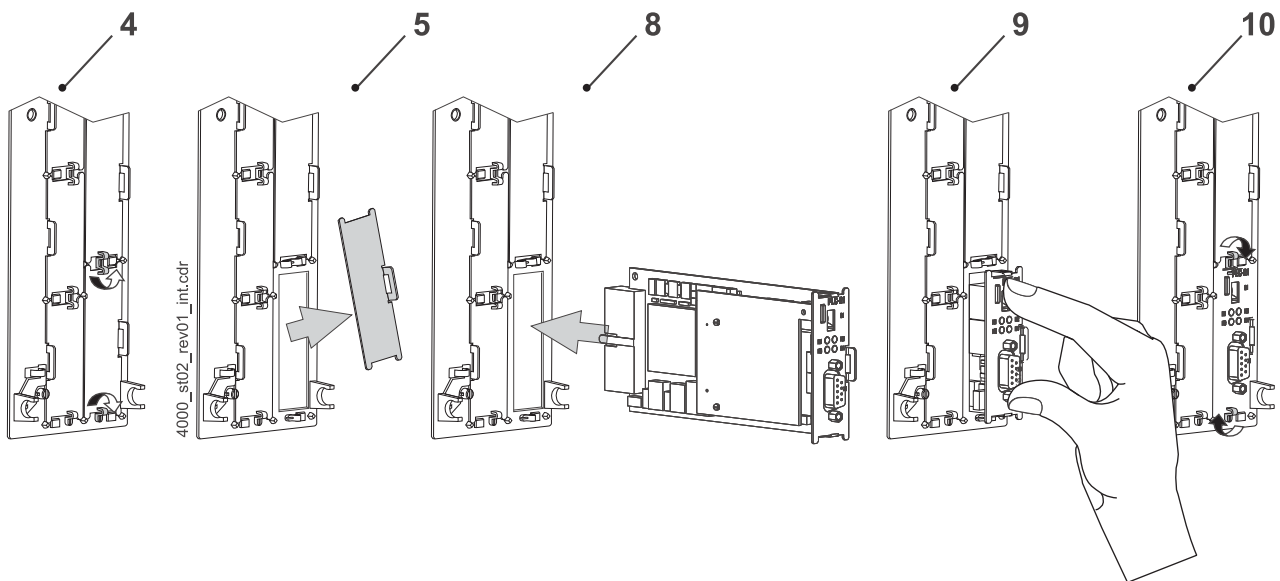


Figure8: Assembly

- 4 Turn the spagnolet locks above and below this slot by 90°. The spagnolet locks are now horizontal. You can use a screwdriver that is up to 3 mm wide.

### CAUTION

The following **may occur**, if you do not observe this caution information:

- minor to medium personal injury.

*Danger from: **sharp edges**. The components of the b maXX PLC option module, sheet steel parts, PCBs can have sharp edges!*

Watch out for sharp edges and wear appropriate gloves.



- 5 Take out the front panel cover forward. Keep this cover. If you remove plug-in modules, you must close the unit again using the cover.



### CAUTION

The following **may occur**, if you do not observe this caution information:

- property damage.

*Danger from: **electrostatic discharge**. The *b maXX* option module contains ESD components.*

Observe the described ESD measures when handling the plug-in module.

Only hold the plug-in module by the gripping piece (see "C" in ►Figure 5 on page 26).

- 6 Observe the described ESD measures when handling the modules.
- 7 Remove the *b maXX* option module from the transportation packaging: Avoid contact with the plug-in module's electronic components.
- 8 Plug the *b maXX* option module into the slot's guide rails. The gripping piece must face the same way as the other gripping pieces in this slot rail slot rail (in the case: the right-hand side).
- 9 Keep pressing two fingers on the front panel until you feel the module engage in the end position inside the unit.
- 10 Turn the spagnolet locks above and below this slot by 90° to the vertical position (locked position).
- 11 Remount the cover on the unit.

This completes assembly of the *b maXX* PLC option module. Connecting lines and commissioning is shown in the following sections.

## 5.5 Installation

At installation, carry out cabling of the b maXX option module.

### NOTE



It is not absolutely necessary to carry out cabling of the RS485 interface. This is only necessary when connecting an annunciator, etc.

### 5.5.1 Connection diagram

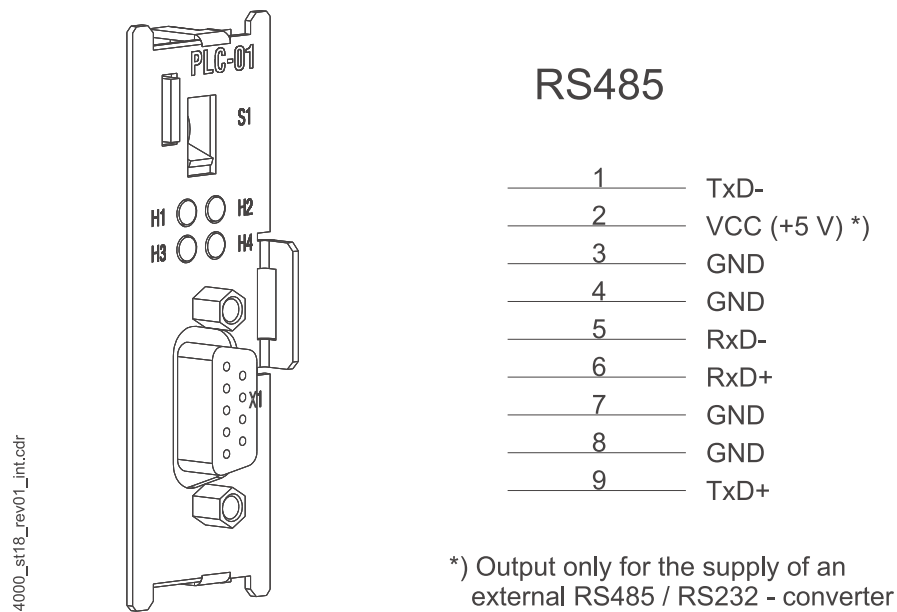


Figure 9: Connection diagram of b maXX PLC option module

### 5.5.2 Requirements of electrical connection



#### CAUTION

The following **may occur**, if you do not observe this caution information:

- property damage.

Danger from: **electrical voltage**. *If you are not able to ensure the plug-in module's requirements of the electrical connection, the plug-in module can be damaged or destroyed.*

Ensure that you comply with the connection values that are specified in the technical data and that the connections were made in accordance with the stipulations.

Prevent short-circuits between inputs/outputs. In the case of a short-circuit between inputs/outputs, the plug-in module can be destroyed.

The +5 V at Pin 2 of the Sub-D socket on the b maXX option module is intended only to supply external Baumüller-specific RS485/RS232 converters; you must not short-circuit or ring connect it with others.

To be able to comply with Standard EN 60 204-1 (Electrical Equipment of Machines), you must use the cables that are suggested in the standard. The connectors must not drop; otherwise, there is a risk of short-circuits or external voltages, etc.

- Ensure EMC-appropriate laying of the connection cables.

### 5.5.3 Requirements of the connection cable

Baumüller has released the following cables for use:

You must use a twisted pair cable with a cross-section surface area of a maximum of 0.5 mm<sup>2</sup>; sheath PVC and sheathing of galvanized woven copper.

Example: Type LIYCY 6 x 2 x 0.14 mm<sup>2</sup>

For more information, refer to [►Appendix B Accessories◄](#) from page 53 onward.

### 5.5.4 Sequence of installation

- Ensure that the b maXX unit is deenergized
  - Remove the front cover from the unit.
  - The b maXX PLC option module is in slot H, see [►Figure 6](#) on page 27.
  - Connect the 9-pin Sub-D socket on the front panel of the b maXX option module to the connection cable for a terminal or ..., connection assignment see [►Pin assignment Sub-D socket RS485 port ◄](#) on page 61.
  - Remount the cover on the unit.
  - Lay the connecting lines as stipulated in the control cabinet
- This completes installation.



# COMMISSIONING

In this chapter, we will describe how you commission the b maXX PLC option module that you just assembled and installed (see [►Assembly and installation ◄](#) from page 25 onward). Commissioning ensures that the b maXX PLC option module functions correctly. For more information on programming, refer to the "b maXX PLC Application Manual".

Before starting commissioning, ensure that the following conditions have been met:

- 1 The plug-in module has been assembled correctly.
- 2 The plug-in module has been installed correctly.
- 3 All the safety equipment has been commissioned.
- 4 The b maXX unit is ready for use.

## 6.1 General safety regulations

- Observe the [►Basic Safety Instructions ◄](#) from page 9 onward.



### DANGER

The following **will occur**, if you do not observe this danger information:

- serious personal injury
- death



Danger from: **mechanical effects**. *At commissioning, the drive can rotate.*

Keep far enough the rotating parts. Note that when drives are starting up machine parts can be set in motion. In all cases, activate the machine's safety devices.

## 6.2 Requirements of the personnel carrying out work

Commissioning work must only be carried out by trained specialists who have understood the safety regulations and information and can implement them.

## 6.3 Description/inspection of the safety and monitoring systems

Before you commission the b maXX PLC option module, you must eliminate any errors/error messages that may be present on the b maXX 4400 unit. These errors may be due

to faulty assembly (e.g. defective cables) or faulty installation (e.g. no power supply). You must not continue with commissioning until you have eliminated the errors.

### 6.4 Description and inspection of the controls and displays

#### 6.4.1 LEDs for displaying operating status conditions

The b maXX PLC option module has two red and two green LEDs as display elements. These LEDs are used primarily to show PLC-specific operating status conditions after the b maXX 4400 units is switched on and before the system executes the user program on the b maXX PLC option module.

After the start-up phase is completed, users can use the LEDs for their own purposes.

Green LEDs      Red LEDs

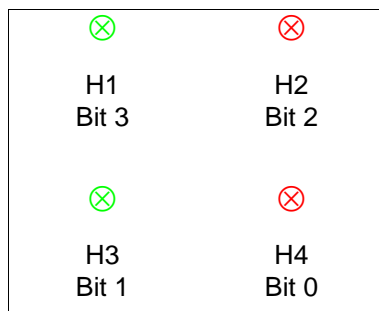


Figure 10: LEDs of the b maXX PLC option module

Displaying operating status conditions after switching on the unit:

- All the option modules in the b maXX 4400 unit must have reached a specific internal operating status after switching in the supply voltage before they may be actuated by the b maXX controller and the b maXX PLC option module.  
This stage, in which the system waits for a global ready message of all option modules is displayed by a clockwise-rotating LED bit pattern. This means that an LED lights up every 500 ms in the sequence H4 → H2 → H1 → H3 → H4 etc.
- After the global ready message of all modules has been issued, the b maXX PLC option module must wait until the b maXX controller recognizes and preinitializes it. This stage is indicated by a counterclockwise-rotating bit pattern. This means an LED sequence of H4 → H3 → H1 → H2 → H4 etc. every 500 ms.

The two sequences that we have just described can be completed very quickly, which means that you do not necessarily have to observe the associated operating displays.

After this, a PC and the b maXX PLC option module can, in principle, carry out PRO-PROG communication via the serial RS232 port on the b maXX controller.

From now on, PROPROG communication is also possible by means of TCP/IP if an option module with Ethernet functionality is present that has been configured for communication with the b maXX PLC option module.

- If a boot project is present, the system now loads it. The top two LEDs (H2 and H1) flash rapidly to show that the boot project is being loaded.

At the end of the start-up phase, the LEDs show the following PLC-specific operating status conditions:

- No project available, status "POWER ON":  
→ LEDs H3 (green) and H4 (red) light up.
- Project available, status "STOP":  
→ Only LED H4 (red) lights up.
- Project available, status "INIT", the controller is at the cold boot or warm restart stage:  
→ Only LED H3 (green) lights up.
- Project available, status "RUN":  
→ LEDs H1 (green) and H3 (green) light up.

In the "RUN" status, users can freely program the four LEDs. For information on programming, see the b maXX PLC Application Manual in the chapter entitled "b maXX PLC Board Functions / LED Function Block".

#### 6.4.2 S1 switch/pushbutton for changing operating status conditions



Pushbutton upward:	RESET
Switch in middle:	STOP
Switch at bottom:	RUN

Figure 11: Switch S1 on the BM4-O-PLC-01 front panel

#### NOTE



The user project can only start up when switch/pushbutton S1 is in the bottom "RUN" position. The pushbutton upward **only** resets the b maXX PLC option module and not the controller.

#### DANGER



The following **will occur**, if you do not observe this danger information:

- serious personal injury
- death



Danger from: **mechanical effects**. *Cold restarting the controller can cause the drive to rotate.*

Keep far enough away from the rotating parts. Note that when drives are starting up machine parts can be set in motion. In all cases, activate the machine's safety devices.

### 6.5 Commissioning sequence

Commissioning is divided into the following procedures:

- 1 Activation.
- 2 Testing the function.

#### 6.5.1 Activation.

- Read and observe the [►General safety regulations ◀](#) from page 33 onward.
- You must have carried out correctly section "Assembly and Installation".
- Set switch S1 on the b maXX PLC option module to "STOP" (center position).
- Switch on the b maXX 4400 basic unit.



#### NOTE

You must not remove or plug in the b maXX PLC option module while the b maXX 4400 basic unit is switched on. Switch the unit off first.

#### 6.5.2 Testing the function

- After you switch on the b maXX unit, two status conditions can apply:
  - No boot project (= no user project on the PLC):  
LED H2 (at the top right) lights up briefly after a short time, the bottom LEDs H3 and H4 (red and green) are permanently lit up. This means that no project is present. In this "POWER ON" status, the PLC is waiting for communication.
  - Boot project present:  
When you switch on, the system loads the boot project. When you do this, the top LEDs flash. After a short time, LED H4 (at the bottom right) lights up red. The PLC is in the "STOP" status.
- While switch S1 on the b maXX PLC option module is set to "STOP" (centre position), an existing boot project cannot start up.  
If you want to start an existing boot project by setting switch S1 on the b maXX PLC option module to the "RUN" (bottom) position, **first** ensure that you have loaded the **correct** boot project for your application for **this** plant in **this** unit on the PLC!

Refer to the b maXX PLC Application Manual for more information on how to ensure that this is the case or how you can send a boot project to the PLC, for example



#### DANGER

The following **will occur**, if you do not observe this danger information:

- serious personal injury    • death

Danger from: **mechanical effects**. A boot project on the PLC can start up if you set switch S1 from "STOP" (center position) to "RUN" (bottom position) or if switch S1 is set to "RUN" when you switch on the b maXX unit. You can program the boot project such that the drive rotates!

Keep far enough away from the rotating parts. Note that when drives are starting up machine parts can be set in motion. In all cases, activate the machine's safety devices.

## OPERATION

For guides to operating the b maXX PLC option module, refer to the b maXX PLC Application Manual (BM4-O-PLC-01) and the PROPROG wt II Programming Manual.



# TROUBLESHOOTING AND ELIMINATING FAULTS

In this chapter, we will describe fault indications of the b maXX basic unit when there is a disturbance on the b maXX option module, the meanings of these indications and how you can respond to them.

## 8.1 Safety regulations

---

Observe the relevant safety regulations, see [►Basic Safety Instructions ◀](#) from page 9 onward.

Requirements of the personnel carrying out work:

The personnel who work with the b maXX unit, must have been instructed in operating the unit and be familiar with correctly operating it. Responding to error displays and status conditions in particular requires special knowledge that operators must demonstrate. Below, we will inform you about the various disturbances and the error messages that result from them. These disturbances can have mechanical or electrical causes.

## 8.2 Troubleshooting

---

- While the basic unit is starting up, the b maXX PLC option module waits for a global ready message from all the option modules (see [►LEDs for displaying operating status conditions ◀](#) from page 34 onward). This can be due to one of the following reasons:
  - One of the option modules is defective or has a connection fault.
    - Does the error also occur if only the b maXX controller and the PLC are plugged in?

You must only plug in and remove the modules when they are deenergized!

      - No: Keep adding the rest of the option modules until you have determined which one is faulty.
      - Yes: Check whether there are bent pins in the controller's basic unit slots and in the PLC.

Replace the controller or, if necessary, the PLC.  
Replace the basic unit.
- The b maXX controller does not detect the b maXX PLC option module while the basic unit is starting up. This can be due to one of the following reasons:

- The b maXX PLC option module being plugged in wrong or not plugged in all the way. Check [►Assembly and installation ◀](#) from page 25 onward.
- The wrong option module being plugged in. Check the board type on the basis of [►Labeling of the controller – type code ◀](#) from page 23 onward.
- A connection fault. Check the connections, see [►Figure9](#) on page 31.
- Disruptive return path ingress. Check EMC measures.
- Switching circuit defective in the b maXX PLC option module, replace the option module.



## MAINTENANCE

If you comply with the specified environmental operating conditions, see [►Appendix D Technical Data◄](#) from page 59 onward), the b maXX PLC option module for the b maXX basic unit 4400 is maintenance-free. If you find a defect in your b maXX PLC option module or think that it is defective, contact Baumüller Nürnberg GmbH.



# 10

## OVERHAUL

You cannot overhaul a defective b maXX PLC option module; contact Baumüller Nürnberg GmbH to obtain a replacement unit.



## DISMANTLING, STORAGE

In this chapter, we will describe how you decommission the b maXX PLC option module and store it. When doing this, observe the information in chapters [►Basic Safety Instructions ◀](#) from page 9 onward, [►Packaging and transportation ◀](#) from page 17 onward and [►Disposal ◀](#) from page 49 onward.

### 11.1 Safety regulations

You must switch off the b maXX 4400 basic unit to remove the b maXX PLC option module. Only specially trained personnel are allowed to dismantle the b maXX PLC. The safety regulations for commissioning apply analogously to dismantling.

#### WARNING



The following **may occur**, if you do not observe this warning information:

- serious personal injury
- death



*Danger from: **electricity**. The unit carries dangerous voltage and current and residual charges in the intermediate circuit.*

Ensure that all the electrical connections have been deenergized and are secured against re-starting.

Wait until the intermediate circuit has discharged before starting any dismantling work. The capacitors that are used in the unit have discharged automatically **10 min.** after the supply voltage is switched off such that you can dismount the connections without any risk.

Before starting work on the electrical connections, use appropriate measuring equipment to ensure that the connections are dead.

Do not dismount the connections until you are certain that they are dead.

## 11.2 Requirements of the personnel carrying out work

---



### CAUTION

The following **may occur**, if you do not observe this caution information:

- property damage.

The danger is: **electrical destruction**. *The sub-assembly may get destroyed electrically if it is removed with the supply voltage on .*

Ensure that all the electrical connections have been deenergized and are secured against re-starting.

Wait until the intermediate circuit has discharged before starting any dismantling work. The capacitors that are used in the unit have discharged automatically **10 min.** after the supply voltage is switched off such that you can dismount the connections without any risk.

Before starting work on the electrical connections, use appropriate measuring equipment to ensure that the connections are dead.

Do not dismount the connections until you are certain that they are dead.

---



### WARNING

The following **may occur**, if you do not observe this warning information:

- serious personal injury
- death

The danger is: **Uncontrollable characteristics of the machine/system**. *Removal of the module with switched on supply voltage can change the characteristics of the machine/system.*

Ensure that all the electrical connections have been deenergized and are secured against re-starting.

Wait until the intermediate circuit has discharged before starting any dismantling work. The capacitors that are used in the unit have discharged automatically **10 min.** after the supply voltage is switched off such that you can dismount the connections without any risk.

Before starting work on the electrical connections, use appropriate measuring equipment to ensure that the connections are dead.

Do not dismount the connections until you are certain that they are dead.

---

## 11.2 Requirements of the personnel carrying out work

---

The personnel that carries out dismantling must have the necessary knowledge and have been trained appropriately to carry out this work. Choose these persons such that they understand and can apply the safety instructions printed on the unit and parts of it and on the connections.

### 11.3 Dismantling

The personnel who carry out dismantling must meet the requirements above. The following materials are needed:

- Suitable packaging material for the b maXX PLC option module; if possible, use the original packaging material
- Metal covers to cover the slots
- Suitable tools for pulling out the board (e.g. pointed electronic pliers)

Dismantling is divided into the following stages:

- Switching the unit free of voltage and securing it from unintended restarting
- Removing the basic unit's cover
- Dismounting the female connector with the connections
- Turning by 90° the locks above and below the front panel of the b maXX option module (the unlocked position is horizontal)
- Pulling out the b maXX PLC option module forward out of the rackmount on the handle

#### CAUTION



The following **may occur**, if you do not observe this caution information:

- property damage.



Danger from: **electrostatic discharge**. *The electronic components on the PCB can be damaged or destroyed if you touch them with your hands.*

Only ever hold the b maXX PLC option module by the front panel.

#### CAUTION



The following **may occur**, if you do not observe this caution information:

- minor to medium personal injury.



Danger from: **sharp edges**. *The components of the b maXX PLC option module, sheet steel parts, PCBs can have sharp edges!*

Watch out for sharp edges and wear appropriate gloves.

- Place the b maXX PLC option module in the packaging material; when doing this, only hold the board by the front blanking plate
- Insert the covers in the open slot (the holder must point to the right) and turn the lock by 90° degrees (to the closed position)
- Mount the cover back on the unit
- Document dismantling of the b maXX PLC option module

If you want to dispose of the b maXX PLC option module, refer to chapter [►Disposal ◀](#) from page 49 onward for more information.

### 11.4 Storage conditions

---

Store the b maXX PLC option module in suitable packaging according to the storage conditions in [▶Technical Data ◀](#) from page 59 onward.

### 11.5 Recommissioning

---

If you want to recommission the b maXX PLC option module, observe the information in "Storage Conditions". Then, carry out [▶Commissioning ◀](#) from page 33 onward again.



## DISPOSAL

In this chapter we will describe how you can correctly and safely dispose of the b maXX option module of equipment range b maXX 4400. Most of the waste is electronic scrap.

- The condition for dismantling has already been met, see ► [Dismantling, storage](#) ◄ from page 45 onward.

### 12.1 Safety regulations

---

You must only carry out disposal in accordance with the safety regulations. If necessary, you must also comply with any local regulations. If you cannot safely dispose of the unit yourself, commission a suitable disposal company to carry it out on your behalf.

#### CAUTION



The following **may occur**, if you do not observe this caution information:

- minor to medium personal injury.



Danger from: **sharp edges**. *The components of the b maXX PLC option module, sheet steel parts, PCBs can have sharp edges!*

Watch out for sharp edges and wear appropriate gloves.

### 12.2 Requirements of the personnel carrying out work

---

The personnel that carries out disposal/dismantling must have the necessary knowledge and have been trained appropriately to carry out this work. Choose these persons such that they understand and can apply the safety instructions printed on the unit and parts of it.

### 12.3 Disposal guide

---



#### CAUTION

The following **can occur** if you do not observe this warning:

- Environmental pollution



Danger from: **incorrect disposal**. *The contents and materials in PCBs endanger the environment.*

Have the b maXX PLC option module recycled at an appropriate plant for electronic scrap.

---

#### 12.3.1 Disposal-conformant modules

---

**Electronic scrap** PCBs and components and modules of similar quality that do not need to be further-dis-mantled must be recycled as electronic scrap. When doing this, observe the relevant reg-ulations.

##### **Material:**

- Basic material: epoxy-resin fiberglass woven material, copper-clad on both sides and plated-through;
- various electronic components such as capacitors, resistors, relays, semiconductor components, etc.
- Front panel: Sheet iron, galvanized.

**Packaging** Dispose of the cardboard packaging in your local reusable paper system.



## APPENDIX A ABBREVIATIONS

<b>BACI</b>	Baumüller Component Interface
<b>CPU</b>	Central Processing Unit
<b>EMC</b>	Electromagnetic compatibility
<b>EN</b>	European standard
<b>EXT, ext</b>	External
<b>I/O</b>	Input/Output
<b>LED</b>	Light Emitting Diode
<b>SW</b>	Software
<b>USS®</b>	Trademark of Siemens, universal serial interface





## APPENDIX B ACCESSORIES

In this appendix, you will find a list of all the accessories that are available for Baumüller Nürnberg GmbH's b maXX PLC option module.

If you have any queries about accessories or suggestions for improvements, Baumüller's Product Management will be pleased to hear from you.

### B.1 List of all accessories

---

#### B.1.1 Programming cable (serial RS.232)

---

Line type: K-SS-01-xx (9-pin Sub-D, 9-pin Sub-D):

Type	Length [m]	Article Number
K-SS-01-03	3	213 846
K-SS-01-05	5	213 283
K-SS-01-15	15	231 086

---

#### NOTE



These cables are identical with the cable that you use for parameterizing the b maXX controller with WinBASS II.

---

#### B.1.2 Cable for linking HMIs (annunciators, touch screen, etc.) to the RS485 interface

---

Since the pin assignment of an RS485 interface is not standardized, Baumüller cannot offer a tailor-made cable.

You must use a twisted pair cable with a cross-section surface area of a maximum of 0.5 mm<sup>2</sup>; sheath PVC and sheathing of galvanized woven copper.

If necessary, you must contact the total screening with the metallic male or female cable connectors.

Example: Type LIYCY 6 x 2 x 0.14 mm<sup>2</sup>

For the pin assignment, see [►D.4 Pin assignment Sub-D socket RS485 port◄](#) from page 61 onward



## APPENDIX C DECLARATION OF CONFORMITY

In this section we provide general information about EU directives, the CE symbol and the Declaration of Conformity/by Manufacturer.

### C.1 What is an EU directive?

---

EU directives specify requirements. The directives are written by the relevant bodies within the EU and are implemented by all the member countries of the EU in national law. In this way the EU directives guarantee free trade within the EU.

An EU directive only contains essential minimum requirements. You will find detailed requirements in standards, to which references are made in the directive.

### C.2 What the CE symbol indicates

---

*a) The CE marking symbolizes conformity to all the obligations incumbent on manufacturers for the product by virtue of the Community directives providing for its affixing.*

...

*b) The CE marking affixed to industrial products symbolizes the fact that the natural or legal person having affixed or been responsible for the affixing of the said marking has verified that the product conforms to all the Community total harmonization provisions which apply to it and has been the subject of the appropriate conformity evaluation procedures.*

...

*Council Decision 93/465/EEC, Annex I B. a) + c)*

We affix the CE mark to the equipment and to the operating instructions as soon as we have established that we have satisfied the requirements of the relevant directives.

Control systems supplied by the Baumüller Nürnberg GmbH are not concerned of the Low Voltage Directive, because their operating voltage is less than 60 V DC or less than 75 V AC. Therefore a declaration of conformity to 2006/95/EC (Low Voltage Directive) cannot be issued.

The electrical safety and function of the control system will be checked with the harmonized standard EN 61131-2.

With specified application of this Baumüller equipment in your machinery, you can act on the assumption that the equipment satisfies the requirements of 2006/42/EC (machinery directive).

Therefore the equipment is developed and constructed in such a way, that the requirements of the harmonized standard EN 60204-1 can be met by the electrical installation.

Control systems supplied by the Baumüller Nürnberg GmbH satisfy the requirements of 2004/108/EC (EMC Directive) by satisfying the requirements of the harmonized standard EN 61131-2.

To enable you to market your machine within the EU, you must be in possession of the following:

- Conformity mark (CE mark)
- Declaration(s) of Conformity regarding the directive(s) relevant to the machine

---

**C.3 Definition of the term Declaration of Conformity**

---

A Declaration of Conformity as defined by this documentation is a declaration that the electrical equipment brought into circulation conforms to all the relevant fundamental safety and health requirements.

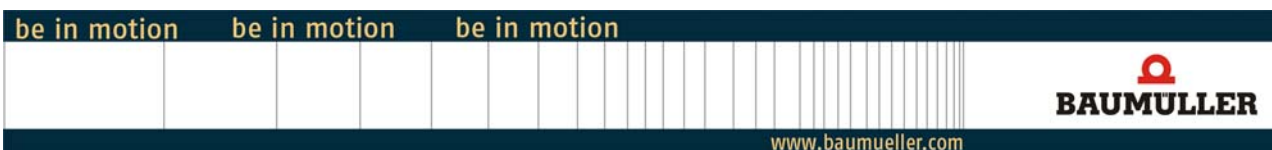
By issuing the Declaration of Conformity in this section the Baumüller Nürnberg GmbH declares that the equipment conforms to the relevant fundamental safety and health requirements resulting from the directives and standards which are listed in the Declaration of Conformity.

---

**C.4 Declaration of Conformity**

---



**Declaration of EC conformity****Doc.-No. 5.11011.00****Date: 08 June 2011****according to EMC Directive 2004/108/EC**

The manufacturer  
Baumüller Nürnberg GmbH  
Ostendstraße 80-90  
90482 Nürnberg, Germany,

declares, that the product with the

designation Programmable Logic Controller  
type BM4-O-PLC-01

manufactured since June 8, 2011

are developed, designed and manufactured in accordance with the EMC Directive 2004/108/EC.

Applied harmonized standards:

Standard	Title
EN 61131-2:2007	Programmable Controllers Part 2: Equipment requirements and tests

Attention must be paid to the safety instructions in the manual.

Nürnberg / June 8, 2011  
Location / Date

subject to change of this declaration of EC conformity without notice. Actual valid edition on request





## APPENDIX D TECHNICAL DATA

In this appendix, you will find the technical data for Baumüller Nürnberg GmbH's b maXX PLC option module (BM4-O-PLC-01).

### D.1 Connection values

---

Processor	SH3
Clock frequency	120 MHz
Power supply	5 V internal
Interfaces	<ul style="list-style-type: none"><li>• RS232 serial port for PROPROG wt II is located on the b maXX basic unit on the controller</li><li>• RS485 serial port for drive networking and visualization</li></ul>
Ambient conditions	Same as b maXX 4400 basic unit
Storage conditions	Same as b maXX 4400 basic unit

### D.2 Internal circuit elements of the b maXX PLC option module

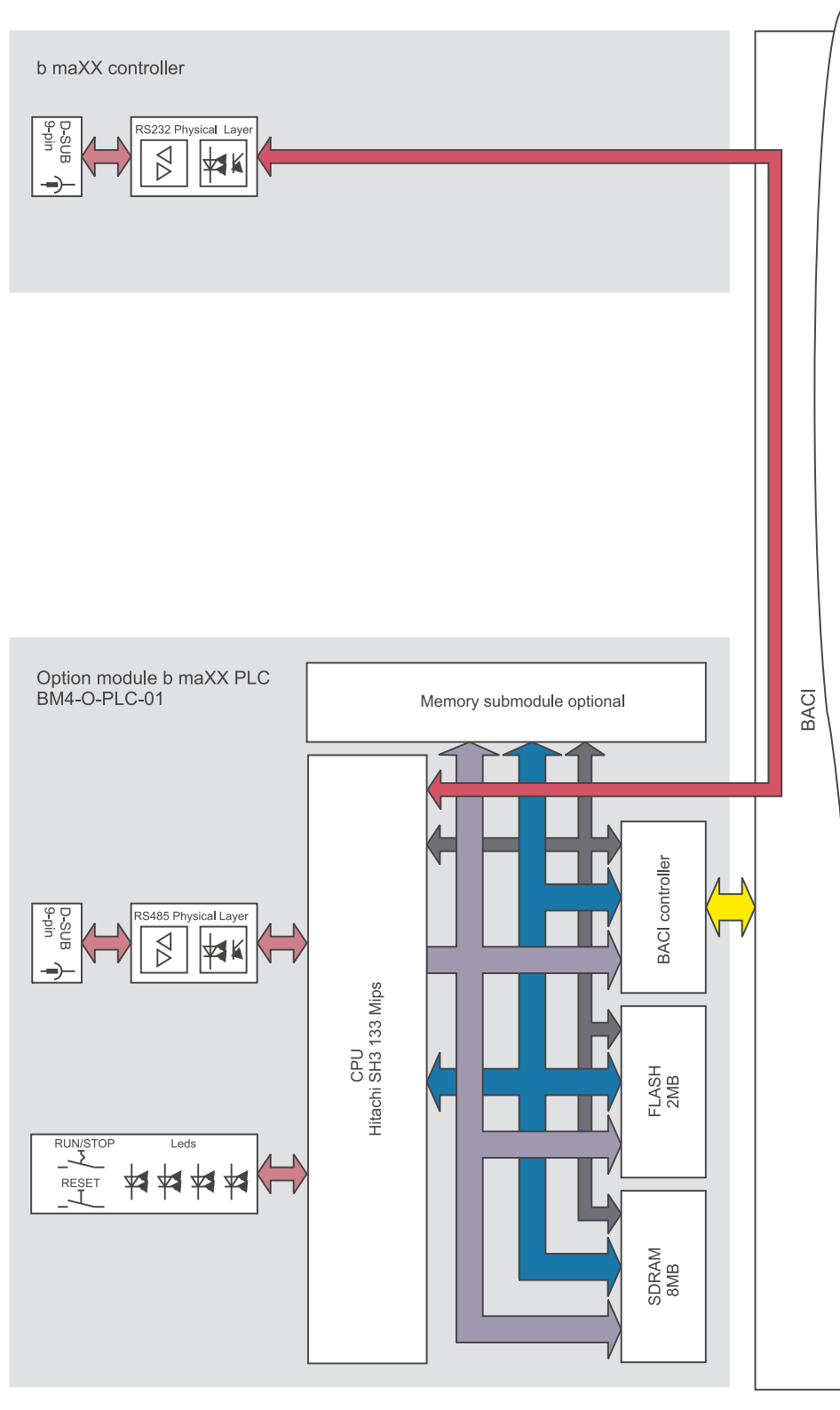


Figure 12: Internal circuit elements of b maXX PLC option module

### D.3 Front panel

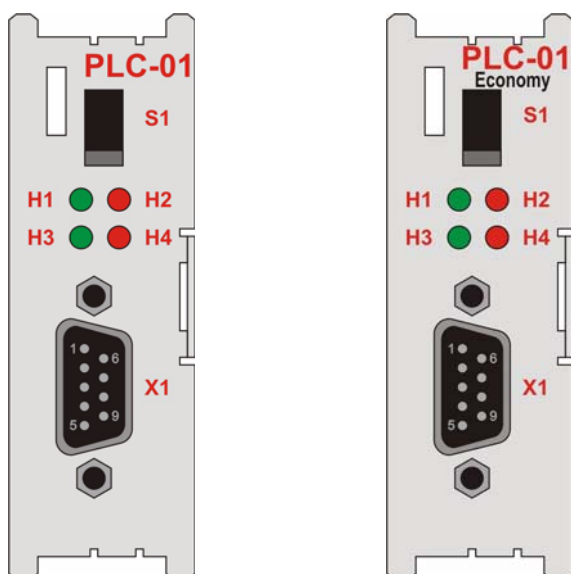
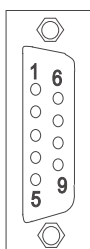


Figure 13: Front panel

Pushbutton (upward):	Reset
Switch (center position):	Stop
Switch (downward):	Run

### D.4 Pin assignment Sub-D socket RS485 port



9-pin SUB-D female connector

Pin No.	Assignment
1	TxD- (Transmit Data negative)
2	VCC (+5V output for supplying external RS485/RS232 converters)
3	GND (Signal Ground RS232/RS485)
4	GND (Signal Ground RS232/RS485)
5	RxD- (Receive Data negative)
6	RxD+ (Receive Data positive)
7	GND (Signal Ground RS232/RS485)
8	GND (Signal Ground RS232/RS485)
9	TxD+ (Transmit Data positive)



### CAUTION

The following **may occur**, if you do not observe this caution information:

- property damage.

Danger of: **electrical shortcircuit**. *An electrical shortcircuit can damage the unit.*

The +5 V at Pin 2 of the Sub-D socket on the b maXX option module is intended only to supply external Baumüller-specific RS485/RS232 converters; you must not short-circuit or ring connect it with others.

---



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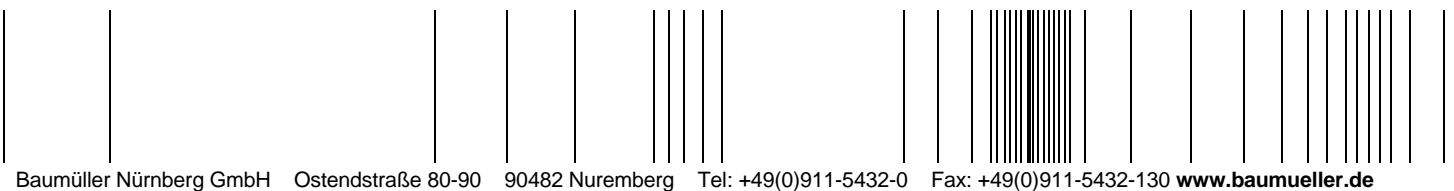
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**be in motion**



All the information in these Operating Instructions is non-binding customer information; it is subject to ongoing further development and is updated on a continuous basis by our permanent change management system. Note that all the data/numbers/information that are quoted are current values at the time of printing. This information is not legally binding for dimensioning, calculation and costing. Before using the information listed in these Operating Instructions as the basis for your own calculations and/or applications, make sure that you have the latest most current information. This means that we accept no responsibility for the accuracy of the information.