

Instruction Handbook

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BAUMÜLLER

b maXX

BM4-O-ECT-01

EtherCAT slave module

BM4400, BM4400 ES

BM4600, BM4600 ES

BM4700, BM4700 ES

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Read instruction handbook before beginning to work!

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1

GENERAL

1.1 Information on this Instruction handbook

The **ECT-01 (EtherCAT slave module)** can be operated in combination with a **b maXX 4000**, only.

Therefore this Instruction handbook is an addition to the Instruction handbook of **b maXX BM4400, BM4400 ES, BM4600, BM4600 ES, BM4700, BM4700 ES** (short **b maXX 4000**) 5.12008.

The basic prerequisite for safe working is compliance with all the safety and handling instructions stated in the instruction handbook **b maXX 4000**.

Additionally, the valid accident prevention regulations and general safety regulations applicable to the scope of application the device must be complied with.

Read this Instruction handbook and the Instruction handbook **b maXX 4000**, particularly the safety notes chapter, completely before beginning any work on the device. This Instruction handbook is part of the product and must be kept accessible to personnel at all times in the immediate vicinity of the device.

1.2 Key to symbols

Warning notes

Warning notes are identified by symbols in this Instruction handbook. The notes are introduced by signal words that express the extent of the danger.

It is imperative that these notes be complied with and are conscientiously regarded in order to prevent accidents, personal injury and material damage.



DANGER!

...this indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING!

...this indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION!

...this indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



NOTICE!

...indicates a hazardous situation which, if not avoided, may cause material damage.

Recommendations



NOTE!

...highlights useful hints and recommendations, as well as information for the efficient and trouble-free use.

1.3 Limitation of liability

All specifications and notes in these instruction handbook were compiled taking into account the applicable standards and regulations, the state of the art and our knowledge and experience of many years.

The manufacturer assumes no liability for damages due to:

- noncompliance with the instruction handbook
- usage for other than the intended purpose
- usage by untrained personnel

The actual scope of delivery can vary in case of optional equipment, laying claim to additional order options, or on account of the latest technical changes to the explanations and representations described herein.

The user bears the responsibility for performing service and initial operation in accordance with the safety regulations of the applicable standards and all other relevant governmental or local regulations concerning the dimensioning and protection of conductors, grounding, disconnectors, overcurrent protection, etc.

The person who carried out the mounting or installation is liable for any damage incurred when assembling or connecting the device.

1.4 Copyright protection

The instruction handbook must be treated confidentially. It is to be used exclusively by personnel who work with the device. The consignment of the instruction handbook to third persons without the written permission of the manufacturer is prohibited.



NOTE!

The specific contents, text, drawings, images and other representations are copyrighted and subject to industrial property rights. Any prohibited usage is punishable by law.

CANopen[®] is a registered trademark of CAN in Automation e.V

EtherCAT[®] is a registered trademark of Beckhoff Automation GmbH, 33415 Verl, Germany

b maXX[®] is a registered trademark of Baumüller Nürnberg GmbH

1.5 Other applicable documents

Components of other manufacturers are integrated into the device. For these purchased parts, hazard assessments have been performed by the respective manufacturers. The compliance of the design construction with the applicable European and national regulations has been declared for the components by the respective manufacturers.

1.6 Spare parts



WARNING!

False or flawed spare parts can lead to damage, malfunction or complete failure, thus endangering safety.

Therefore:

- Only use original spare parts of the manufacturer.

Procure spare parts through an authorized dealer or directly from the manufacturer.

1.7 Disposal

Insofar as no take-back or disposal agreement has been made, please disassemble units correctly and properly recycle the constituent parts.

See also **b maXX 4000** 5.12008, chapter Disposal.

1.8 Guarantee provisions

The guarantee provisions are stated in a separate document of the sales documents.

The devices described herein may only be operated in accordance with the stipulated methods, procedures and conditions. Anything else not presented here, including the operation of devices in mounted positions, is not permitted and must be cleared with the plant on a case-by-case basis. If the devices are operated in any other manner than as described within this Instruction handbook, then all guarantee and warranty rights are rendered null and void.

1.9 Customer service

Our customer service is available to provide you with technical information.

Info on the responsible contact persons is available at all times via telephone, fax, mail or the Internet.

1.10 Terms used

The term „option module“ or the designation „BM4-O-ECT-01“ is also used in this documentation for the Baumüller product „**b maXX ECT-01 (EtherCAT slave module)**“ in combination with standard controller.

A list of the abbreviations used can be found in **b maXX 4000** 5.12008, Appendix A: Abbreviations.

1.11 List of associated documentations

Instruction hand- book

	Doc No.	Part No. German	Part No. English
Manual basic unit b maXX 4400 (ES), 4600 (ES), 4700 (ES)	5.12008	444495	444496

Parameter hand- book

	Doc No.	Part No. German	Part No. English
Parameter manual basic unit b maXX 4400, 4600, 4700	5.03039	376339	377548

Instruction hand- book function modules

	Doc No.	Part No. German	Part No. English
Analog IO module BM4-F-AIO-XX	5.01045	354844	372665
Digital IO module BM4-F-DIO-XX	5.01046	354843	372666
Encoder module BM4-F-ENC-XX	5.01042	354842	372861
Encoder emulation BM4-F-IEE-XX, BM4-F-SIE-01	5.12041		

Instruction hand- book option modules

	Doc No.	Part No. German	Part No. English
DISC-NT slave BM4-O-DNT-XX	5.03007	367670	-
CANopen slave BM4-O-CAN-03	5.02014	368692	368693
CANopen slave programming handbook for controller	5.02065	368694	372860
CANopen over POWERLINK programming handbook	5.07017	413208	432414
CANopen slave for b maXX PLC application handbook	5.03057	376486	376487
b maXX drive PLC	5.01051	366197	354845
b maXX drive PLC application handbook	5.02004	366198	372017
BM4-O-ETH-01, BM4-O-ETH-02, BM4-O-CAN-04 for b maXX PLC	5.03001	366202	372042
BM4-O-ETH-01, BM4-O-ETH-02, BM4-O-CAN-04 CANopen master for b maXX PLC application handbook	5.03002	366203	372043
CANsync master for b maXX PLC	5.02056	366199	372025
CANsync slave for b maXX	5.02064	366201	372041
CANsync for b maXX PLC application handbook	5.02066	366200	372039
IEI for b maXX PLC	5.02013	366204	372044
PROFIBUS-DP slave for b maXX	5.03040	376488	376489
PROFIBUS-DP slave for b maXX PLC application handbook	5.03058	376490	376491
PROFIBUS-DP slave for b maXX controller programming handbook	5.03045	376757	377294
SERCOS slave module BM4-O-SER-01	5.04012	380910	381069
SERCOS slave module BM4-O-SER-01 parameter handbook	5.04013	381652	381653
EtherCAT® slave module BM4-O-ECT-01	5.06003	394953	394954

1.11 List of associated documentations

	Doc No.	Part No. German	Part No. English
Ethernet with EtherCAT® master for b maXX drive PLC	5.07001	407996	407997
Ethernet with EtherCAT® master for b maXX drive PLC application handbook	5.07002	407998	407999
Ethernet with EtherCAT® for b maXX drive PLC	5.10018	433997	
POWERLINK Controlled Node BM4-O-ECT-01/ECT-01 ES instruction handbook	5.12072	444497	444498
POWERLINK Controlled Node BM4-O-ECT-01 ES Application handbook	5.13013	445131	445132

2

SAFETY

This section provides an overview of all of the important safety aspects for optimum protection of personnel as well as for the safe and problem-free operation.

2.1 Contents of the Instruction handbook

Each person who is tasked with performing work on or with the device must have read and understood this Instruction Handbook and the Instruction Handbook of **b maXX 4000 5.12008** before working with the device. This also applies if the person involved with this kind of device or a similar one, or has been trained by the manufacturer.

2.2 Changes and modifications to the device

In order to prevent hazards and to ensure optimum performance, no changes, additions or modifications may be undertaken on the device that have not been explicitly approved by the manufacturer.

2.3 Appropriate use

The **b maXX ECT-01 (EtherCAT slave module)** is used compliant with its intended purpose, if it is built-in/operated within **b maXX 4000** controller, only.

The **ECT-01 (EtherCAT slave module)** is considered as being used compliant with its intended purpose if all notes and information of this Instruction handbook and the Instruction handbook **b maXX 4000** 5.12008 are adhered to.



WARNING!

Danger arising from usage for an unintended purpose!

Any usage that goes beyond the intended purpose and/or any non-compliant use of the device can lead to dangerous situations.

Therefore:

- Only use the device compliant with its intended purpose.
- Note all specifications of this Instruction handbook and the Instruction handbook **b maXX 4000** 5.12008.
- Ensure that only qualified personnel work with/on this device.
- When configuring, ensure that the device is always operated within its specifications.
- The device may only be operated in a technically flawless condition.
- Only operate the device in combination with components approved by Baumüller Nürnberg GmbH.

2.4 Responsibility of the operating company

The device will be used in commercial areas. Thus, the proprietor of the device is subject to the legal work safety regulations.

Along with the notes on work safety in this Instruction handbook and the Instruction handbook **b maXX 4000** 5.12008, the safety, accident prevention and environmental protection regulations valid for the area of application of this device must be complied with. Whereby:

- The operating company must inform himself about the applicable work health and safety regulations and ascertain, in a hazard assessment, any additional hazards that could arise from the special working conditions in the use area of the device. These must then be implemented in the form of operating instructions for operation of the device.
- This Instruction handbooks must be kept accessible to personnel working with the device at all times in the immediate vicinity of the device.
- The specifications of the Instruction handbooks must be adhered to completely and without exception.
- The device may only be operated in a technically faultless and operationally safe condition.

2.5 Training of the personnel



WARNING!

Risk of injury due to insufficient qualifications!

Improper handling can lead to significant personal injury and material damage.

Therefore:

- Certain activities can only be performed by the persons stated in the respective chapters of this Instruction handbook.

In this Instruction handbook, the following qualifications are stipulated for various areas of activity:

- **Operating personnel**

- The drive system may only be operated by persons who have been specially trained, familiarized and authorized.
- Troubleshooting, maintenance, cleaning, maintenance and replacement may only be performed by trained or familiarized personnel. These persons must be familiar with the Instruction handbook and act accordingly.
- Initial operation and familiarization may only be performed by qualified personnel.

- **Qualified personnel**

- Electrical engineers authorized by Baumüller Nürnberg GmbH, and qualified electricians of the customer or a third party who have learned to install and maintain Baumüller drive systems and are authorized to ground and identify electrical power circuits and devices in accordance with the safety engineering standards of the company.
- Qualified personnel have had occupational training or instruction in accordance with the respective locally applicable safety engineering standards for the upkeep and use of appropriate safety equipment.

2.6 Special hazards

In the following section, the remaining marginal risks will be stated that have been identified as a result of the hazard analysis.

Observe the safety notes listed here and the warning notes in the further chapters of this manual to reduce health risks and dangerous situations.

Electrical current



DANGER!

Risk of fatal injury from electrical current!

There is an immediate risk of fatal injury if live electrical parts are contacted. Damage to the insulation or individual components can be life-threatening.

Therefore:

- Switch off the electrical power immediately in case of damage to the power supply insulation.
- Only allow work on the electrical system to be performed by qualified personnel.
- Switch off the current when any kind of work is being performed on the electrical system and ensure safety before switching on again.

Danger from residual energy



DANGER!

Risk of fatal injury from electrical current!

Stored electric charge.

Discharge time of the system = discharge time of the device with the longest DC link discharge time connected to the DC link.

See Instruction handbook **b maXX 4000** 5.12008, chapter Electrical Data.

Therefore:

- Do not touch electrically live parts before taking into account the discharge time of the capacitors.
- Pay attention to the corresponding notes on the device.
- If additional capacitors are connected to the DC link, the DC link discharge can take a much longer time. In this case, the necessary waiting period must itself be determined or a measurement made as to whether the equipment is de-energized. This discharge time must be posted, together with an IEC 60417-5036 (2002-10) warning symbol, on a clearly visible location of the control cabinet.

Moving components



WARNING!

Risk of injury from moving components!

Rotating components and/or components moving linearly can result in severe injury.

Therefore:

- Do not touch moving components during operation.
- Do not open any covering during operation.
- The amount of residual mechanical energy depends on the application. Powered components still turn/move for a certain length of time even after the power supply has been switched off. Ensure that adequate safety measures are taken.

2.7 Fire fighting



DANGER!

Risk of fatal injury from electrical current!

There is a risk of electric shock if an electrically-conductive, fire-extinguishing agent is used.

Therefore:

- Use the following fire-extinguishing agent:



ABC powder / CO₂

2.8 Safety equipment



WARNING!

Risk of fatal injury due to non-functional safety equipment!

Safety equipment provides for the highest level of safety in a facility. Even if safety equipment makes work processes more awkward, under no circumstances may they be circumvented. Safety can only be ensured by intact safety equipment.

Therefore:

- Before starting to work, check whether the safety equipment is in good working order and properly installed.

2.9 Behavior in hazardous situations or at accidents

Preventive measures

- Always be prepared for accidents or fire!
- Keep first-aid equipment (e.g. first-aid kits, blankets, etc.) and fire extinguishers readily accessible.
- Familiarize personnel with accident signalling systems, first aid equipment and life saving equipment.

And if something does happen: respond properly.

- Stop operation of the device immediately with an EMERGENCY Stop.
- Initiate first aid measures.
- Evacuate persons from the danger zone.
- Notify the responsible persons of the site.
- Alarm medical personnel and/or the fire department.
- Keep access routes clear for rescue vehicles.

2.10 Signs and labels

The following symbols and information signs are located in the working area. They refer to the immediate vicinity in which they are affixed.



WARNING!

Risk of injury due to illegible symbols!

Over the course of time, stickers and symbols on the device can become dirty or otherwise unrecognizable.

Therefore:

- Maintain all safety, warning and operating labels on the device in easily readable condition.



Electrical voltage

Only qualified personnel may work in work areas that identified with this.

Unauthorized persons may not touch working materials marked correspondingly.



DANGER!

Risk of fatal injury from electrical current!

See [▶Danger from residual energy◀](#) on page 14.



CAUTION!

Risk of injury due to hot surface!

Therefore:

- Wear protective gloves



TECHNICAL DATA

The **POWERLINK Controlled Node** module connects the **b maXX 4000** with devices using the real-time Ethernet protocol POWERLINK.

3.1 Operation conditions

The operation conditions of **b maXX 4000** are valid, see Instruction Handbook **b maXX 4000** 5.12008.

Transport temperature range	- 25 °C to + 70 °C
Transport climatic class EN 60721-3-2	2 K 3
Storage temperature range	- 25 °C to + 55 °C
Storage climatic class EN 60721-3-1	1 K 4



NOTICE!

Normally, non-conductive pollution occurs. Conductive pollution is unacceptable. Conductive pollution can lead to the destruction of the device. The customer is responsible for destructions, which were caused by pollution due to conductive materials or components.

3.2 Technical data

3.2 Technical data

Standard controller

	BM4-O-ECT-01-00	BM4-O-ECT-01-01	BM4-O-ECT-01-02
Power supply	5 V, internal via controller part		
Current consumption	ca. 350 mA, internal via controller	ca. 450 mA, internal via controller	ca. 350 mA, internal via controller
No. of bus connections	1 IN / 1 OUT		
Bus connection	RJ 45		
Data width of parameter	16 / 32 Bit		
Baud rate	10 / 100 Mbit/s		

ES controller

	ECT-01
No. of bus connections	1 IN / 1 OUT
Bus connection	RJ 45
Data width of parameter	16 / 32 bit
Baud rate	10 / 100 Mbit/s

DESIGN AND OPERATION

A **b maXX BM4000** device consists of power unit and controller part

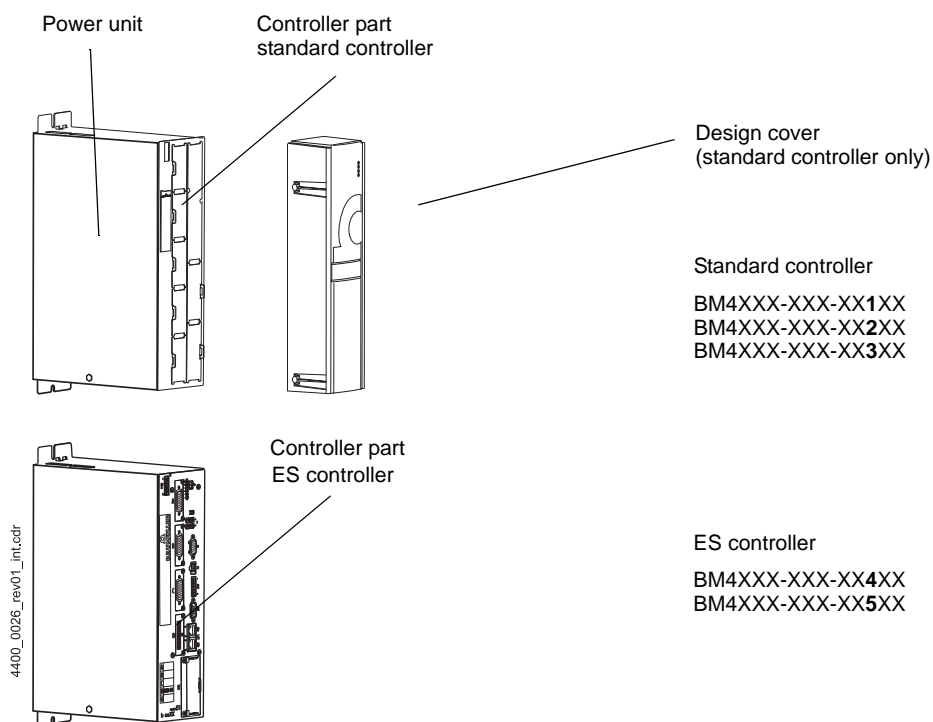


Figure 1: **b maXX BM4000**

The **BM4-O-ECT-01 (EtherCAT slave module)** is designed as plug-in module within the standard controller and can be replaced or upgraded.

The **ECT-01 (EtherCAT slave module)** is mounted stationary in the ES controller.



NOTE!

The operation with ProDrive is described, only. Please contact Baumüller Nürnberg GmbH or visit our website www.baumueller.de for download, if the software is not available.

4.1 Function

Standard controller

with slots for function and option modules (even for later upgrade), e.g. encoder modules, digital IOs or field bus connection



NOTICE!

Plug-in module, which has not been manufactured from Baumüller Nürnberg GmbH. Modules of other manufacturers can damage/destroy the device.

Only use BM4-F-XXX- and BM4-O-XXX-plug-in modules.

ES controller

with stationary mounted function and option modules.

The **BM4-O-ECT-01 (EtherCAT slave module)** is designed as plug-in module in the standard controller, the **ECT-01 (EtherCAT slave module)** is mounted stationary in the ES controller.

EtherCAT slave module

The EtherCAT slave module supplies 2 connectors for connection to the EtherCAT line (pin assignment see [▶Pin assignment◀](#) on page 49).

The data of the EtherCAT slave module can be found at [▶Technical Data◀](#) from page 19, suitable cables see [▶Cables◀](#) on page 69.

4.2 BM4-O-ECT-01 in the standard controller

The module **BM4-O-ECT-01 (EtherCAT slave module)** can be plugged in the standard controller of the b maXX.

The **BM4-O-ECT-01 (EtherCAT slave module)** is connected to the controller part with a connector on the back side.

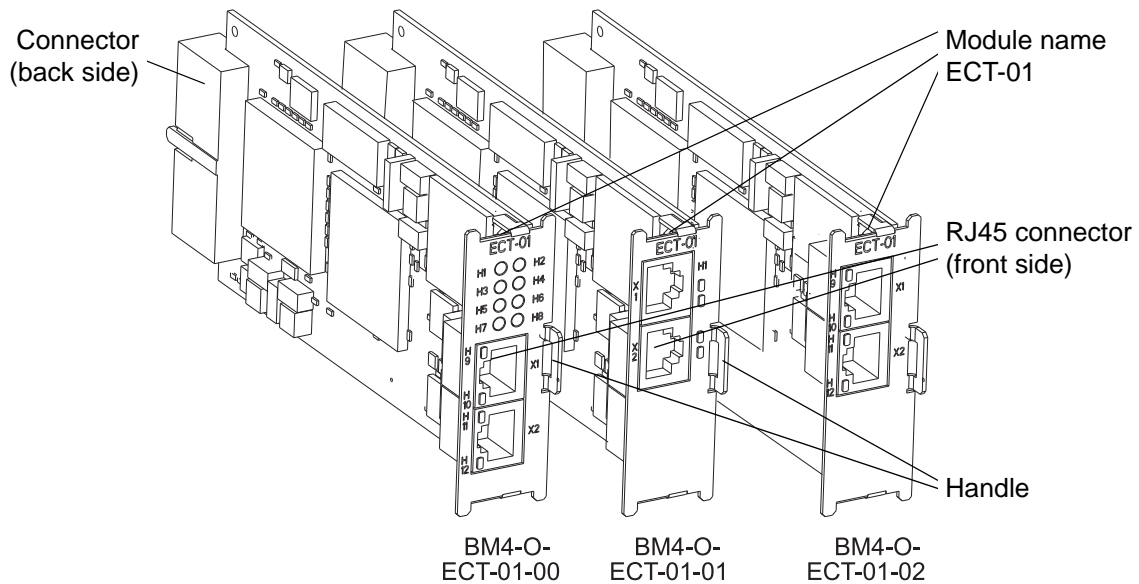


Figure 2: EtherCAT slave module in the standard controller

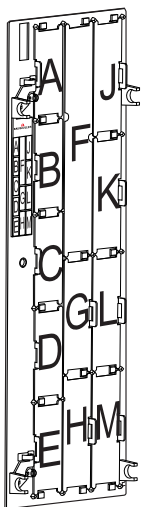
4.2 BM4-O-ECT-01 in the standard controller

4.2.1 Slots BM4-O-ECT-01 in the standard controller

Function and option modules can be plugged in the slots of the controller part. Each position is clearly identified by a character.

The EtherCAT slave module must be plugged in a not used slot of the BM4000. The slots **G** or **H** can be used.

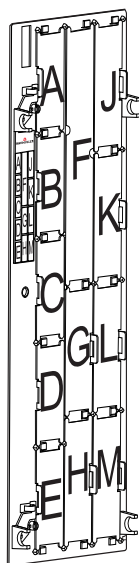
The slots J, K, L and M can be used, if the module is operated as EtherCAT slave for b maXX drive PLC.



A	
B	
C	
D	
E	
F	
G	BM4-O-ECT-01
H	BM4-O-ECT-01
J	forbidden , module can be damaged
K	BM4-O-ECT-01 , only in combination with b maXX drive PLC
L	BM4-O-ECT-01 , only in combination with b maXX drive PLC
M	BM4-O-ECT-01 , only in combination with b maXX drive PLC

Optional plug-in modules (function or option modules) can be upgraded independent on the existing controller type.

Possible combinations function modules/option modules



	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-02/03/04 (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 encoder emulation)	BM4-F-UME-XX (mains voltage measurement)		BM4-O-SER-XX (Sercos slave)	BM4-O-PRO-01 (Profibus slave)	BM4-O-CAN-03 (CANopen slave)	BM4-O-ECT-01 (EtherCAT slave) for controller	BM4-O-PLK-01 (POWERLINK Controlled Node) für Regler	BM4-O-EIP-01 (Ethernet-IP) für Regler	BM4-O-PLC-XX (SPS)	BM4-O-CAN-04* (CANopen master)	BM4-O-IEI-XX* (incremental counter module)	BM4-O-ETH-01* (Ethernet)	BM4-O-ETH-02* (Ethernet + CANopen master)	BM4-O-ECT-01* (EtherCAT slave) for PLC	BM4-O-ECT-02* (Ethernet + EtherCAT master)	BM4-O-ECT-03* (Ethernet + EtherCAT cluster)
A	X	-	-	-	o	o	-	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B	-	X	-	-	o	o	-	X	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C	-	-	-	-	o	o	X	-	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D	-	-	-	X	X	X	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E	-	-	X	X	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F	Controller unit																							
G	-	-	-	-	-	-	-	-	-	o	o	o	o	o	o	o	X	X	X	X	X	X	X	X
H	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	o	-	o	o	o	o	o	o
J	-	-	-	-	-	-	-	-	-	-	P	P	-	-	-	-	o	o	o	o	o	-	-	-
K	-	-	-	-	-	-	-	-	-	-	P	P	-	-	-	-	o	o	o	o	o	o	o	o
L	-	-	-	-	-	-	-	-	-	-	P	P	-	-	-	-	o	o	o	o	o	o	o	o
M	-	-	-	-	-	-	-	-	-	-	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) operates 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.



NOTE!

Only 2 analog outputs can be parametrized or linked even more than one AIO module is plugged.

Steckkarten_Rev19_e

4.2 BM4-O-ECT-01 in the standard controller



NOTE!

EtherCAT option modules **must not** be plugged in slot **J** of a 3-rowed controller unit, because the module can be damaged.

In case another BM4X-X-XXX plug-in module is plugged in an unsuitable slot, it will not operate. We have made sure, that neither the module nor the device are damaged.

4.2.2 Type plate BM4-O-ECT-01 in the standard controller

The type plate can be found on the connector on the back side of the **BM4-O-ECT-01 (EtherCAT slave module)**.

The type code and the serial No. are printed on the type plate.

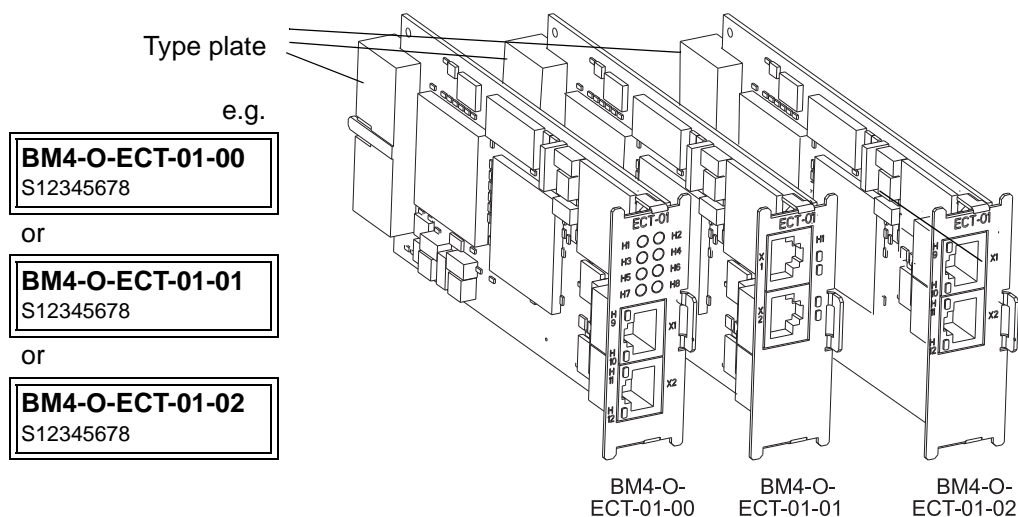


Figure 3: Type plate EtherCAT slave module in the standard controller

4.2.3 Type code BM4-O-ECT-01 in the standard controller



NOTE!

This type code is valid for the EtherCAT plug-in module **BM4-O-ECT-01** exclusively. For other plug-in modules are different type codes available.

Type code:

BM4 - O - ECT - 01 - YY - ZZ Device family, in which the plug-in module can be built in

BM4 - O - ECT - 01 - YY - ZZ Type of plug-in module (option module)

BM4 - O - ECT - 01 - YY - ZZ Name of plug-in module (EtherCAT)

BM4 - O - ECT - 01 - YY - ZZ Version of plug-in module (EtherCAT-Slave)

BM4 - O - ECT - 01 - YY - ZZ Hardware type

BM4 - O - ECT - 01 - 00 - ZZ Software type

00, 02: EtherCAT slave for b maXX controller, Sercos profile
01: EtherCAT slave for b maXX controller, CANopen profile

BM4 - O - ECT - 01 - 01 - ZZ Software type

00, 02, 04, 05: EtherCAT slave for b maXX controller, Sercos profile
01, 03: EtherCAT slave for b maXX controller, CANopen profile
11: EtherCAT slave for b maXX drive PLC, CANopen profile

BM4 - O - ECT - 01 - 02 - ZZ Software type

00: EtherCAT slave for b maXX controller, Sercos profile
01: EtherCAT slave for b maXX controller, CANopen profile DSP402

4.2.4 Danger areas BM4-O-ECT-01 in the standard controller

The **BM4-O-ECT-01** can be operated in combination with **BM4000**, only. Please note all safety notes of the basic unit **b maXX BM4000**.

4.3 ECT-01 in the ES controller

The **ECT-01 (EtherCAT slave module)** is mounted stationary in the ES controller.

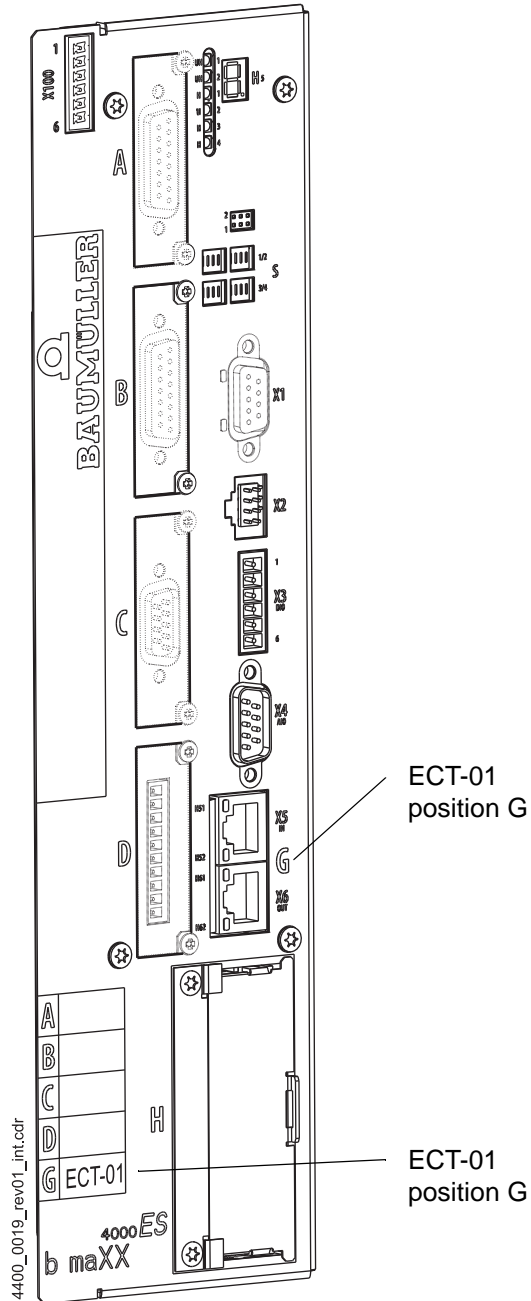
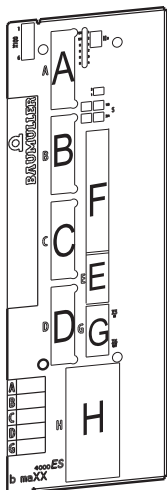


Figure 4: EtherCAT slave module in the ES controller

The controller is ordered with the desired function/option modules, these are mounted stationary and cannot be changed.

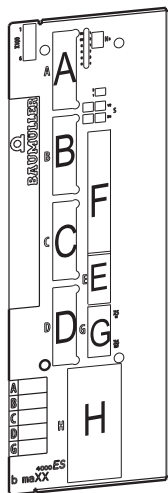
4.3.1 Position ECT-01 in the ES controller

Each position is clearly identified by a character.
The ECT-01 can be used at the following position.



A	
B	
C	
D	
F	Controller
G	ECT-01
H	

Combinations function modules/option modules



	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-02/03/04 (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 encoder emulation)	BM4-O-ECT-01 (EtherCAT slave) for controller	BM4-O-PLK-01 (POWERLINK Controlled Node) for controller	BM4-O-VAR-01 (VARAN slave) for controller	BM4-O-SER-XX (Sercos slave) for controller	BM4-O-PRO-XX (Profibus slave) for controller	BM4-O-CAN-03 (CANopen slave) for controller	BM4-O-EIP-01 (Ethernet-IP) for controller	BM4-O-PLC-XX (SPS)
A	X	-	-	o	o	o	-	o	-	-	-	-	-	-	-	-
B	-	X	-	o	o	o	-	X	-	-	-	-	-	-	-	-
C	-	-	-	o	o	o	X	-	-	-	-	-	-	-	-	-
D	-	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-
E	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-
F	Controller unit with RS232- or Ethernet interface															
G	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
H	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X

- X: preferred slot
- F: permanently installed
- o: possible slot, only the preferred slot is occupied
- not possible

Steckkarten_ES_Rev02_e

4.3 ECT-01 in the ES controller



NOTE!

Only 2 analog outputs can be parametrized or linked even more than one AIO module is available.

4.3.2 Type plate ECT-01 in the ES controller

The type code of the **ECT-01 (EtherCAT slave module)** is included in the type plate of the basic unit.

4.3.3 Type code ECT-01 in the ES controller

The type code has the form:

BM4XXX - XXX - XXXXX[Ryy] - [XXXXXX] - [XXX] - XX.

Only the shown section is valid for the **ECT-01** in ES controller.

BM4XXX - XXX - XXXXX[Ryy] - [XXXXXXXXXX] - [XXX] - XX Device generation

BM4XXX - XXX - XXXXX[Ryy] - **XX**XXXXXXXX - [XXX] - XX ES controller field bus interface, position G

00 no field bus

10 EtherCAT for controller, SoE, standard

see BM4-O-ECT-01

11 EtherCAT for controller, CoE, standard

12 EtherCAT for PLC, CoE

4.4 Display and operation elements

4.4.1 BM4-O-ECT-01-00 in the standard controller

The state of the EtherCAT slave module is displayed via 12 LEDs H1 to H12. In addition to further error messages can be displayed by the operation program ProDrive.

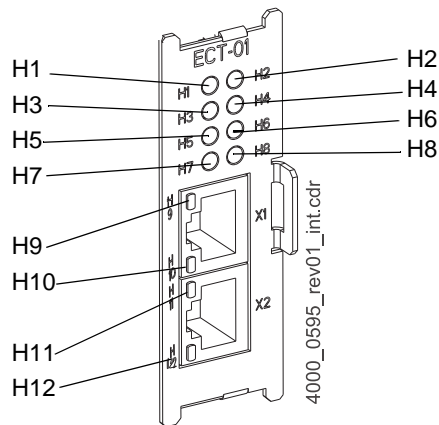


Figure 5: EtherCAT slave module **BM4-O-ECT-01-00**

LEDs

LED	Flashing pattern	Meaning
H1		without
H2		according H9
H3		without
H4		according H11
H5		without
H6	off	INIT
	500 ms on / 500 ms off	Pre operation
	200 ms on / 1 s off	Safe operation
	on	Operation
H9	off	X1: Link/Activity, no connection (No link)
	on	X1: Link/Activity, connection (Link)
	flashing	X1: Link/Activity, data communication (Act)
H10	off	X1: Speed, 10 MBit/s
	on	X1: Speed, 100 MBit/s

4.4 Display and operation elements

LED	Flashing pattern	Meaning
H11	off	X2: Link/Activity, no connection (No link)
	on	X2: Link/Activity, connection) (Link)
	flashing	X2: Link/Activity, data communication (Act)
H12	off	X2: Speed, 10 MBit/s
	on	X2: Speed, 100 MBit/s

LED	Flashing pattern				
H7	on	flashing on /off	off	off	aus
H8	X	flashing on /off	500 ms on / 500 ms off	200 ms on / 1 s off	on
	ERROR	INIT	PRE OPERATIONAL	SAFE OPERATIONAL	OPERATIONAL

Code switch S500 For CoE profile (**BM4-O-ECT-01-00-01**): without function
 For SoE profile (**BM4-O-ECT-01-00-00**): set switch 1 to „ON“

4.4.2 BM4-O-ECT-01-01 and BM4-O-ECT-01-02 in the standard controller

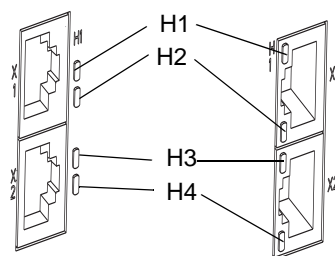


NOTE!

The plug-in option module BM4-O-ECT-01 is **not** available in ES controller!
The field bus interface is integrated in the ES controller.

The state of the EtherCAT slave module is displayed via 4 LEDs H1 to H4.

In addition to further error messages can be displayed by the operation program Pro-Drive.



BM4-O-ECT-01-01 BM4-O-ECT-01-02

Figure 6: Front side EtherCAT slave module **BM4-O-ECT-01-01/02** in standard controller

LEDs

LED	Flashing pattern	Meaning
H1 red	see below	Error
H2 green	off	X1: Link/Activity, no connection (No link)
	on	X1: Link/Activity, connection (Link)
	flashing	X1: Link/Activity, data communication (Act)
H3 green	see below	Status
H4 green	off	X1: Link/Activity, no connection (No link)
	on	X1: Link/Activity, connection (Link)
	flashing	X1: Link/Activity, data communication (Act)

LED	Blinkmuster				
H1 red	on	flashing off/on	off	off	off
H3 green	X	off	500 ms on / 500 ms off	200 ms on / 1 s off	on
	ERROR	INIT	PRE OPERATIONAL	SAFE OPERATIONAL	OPERATIONAL

BM4-O-ECT-01-01 Address switch SW13000, SW13100

Address switch SW13000 and SW13100 set in combination a 16 bit value, used as

- offset to basis IP address

192.168.1.1 + [offset value].

SW13000: High byte offset value
SW13100: Low byte offset value

Example for SW13100:

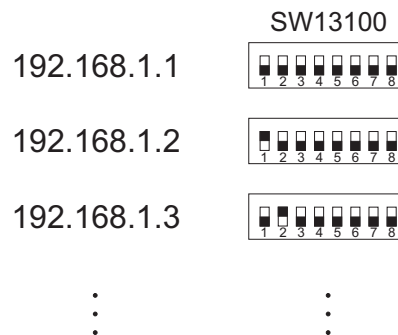


Figure 7: Address switch SW13100

and/or

- identifier „station address alias“ for EtherCAT master option „optional slave“ (software version and higher **BM4-O-ECT-01-01-01-001-002** or **BM4-O-ECT-01-01-01-001-001**)

You can find a detailed description of this feature in the application handbook of EtherCAT master.

BM4-O-ECT-01-01-0X

EtherCAT slave for controller, SoE profile and CoE profile.

An 8 bit offset value of basis IP address can be set with SW13100:

192.168.1.1 + [Offset value].

SW13000: 0
SW13100: 8 bit offset value

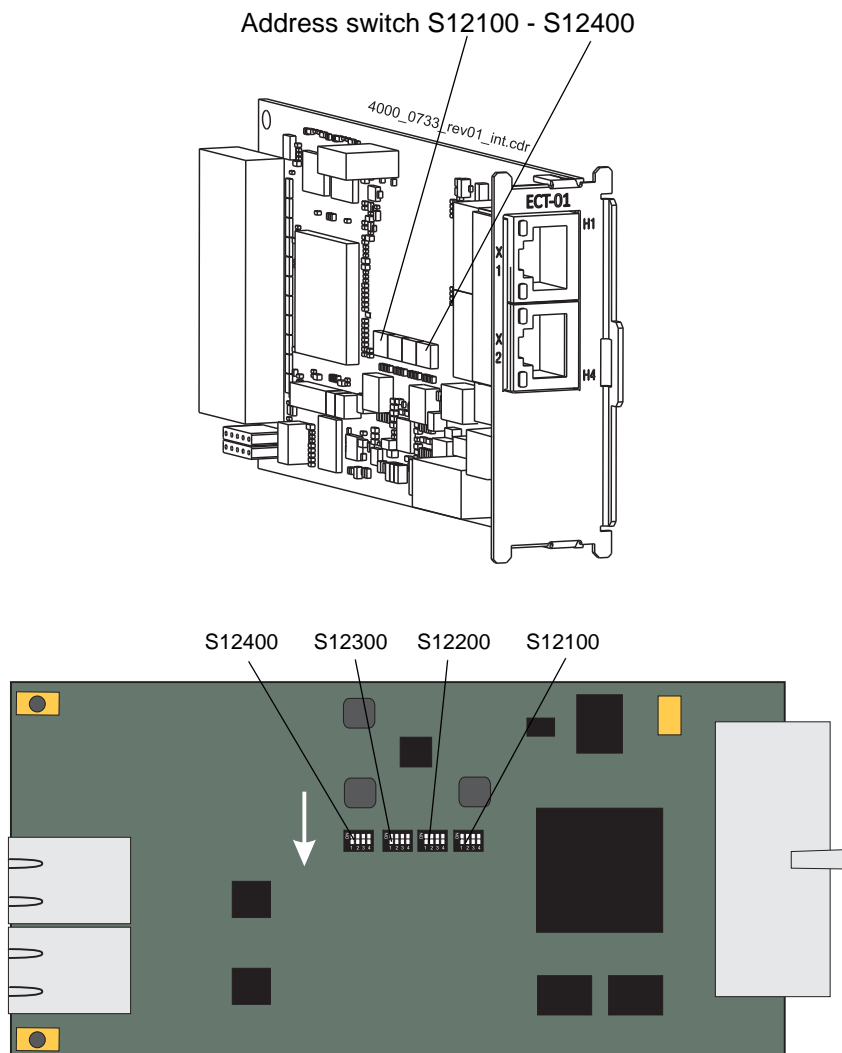
The identifier „station address alias“ for the EtherCAT master option „optional slave“ (software version and higher

BM4-O-ECT-01-01-01-001-002 or **BM4-O-ECT-01-01-01-001-001**)

is set as 16 bit value

SW13000: High byte of offset value
SW13100: Low byte of offset value

BM4-O-ECT-01-02 Address switch S12100, S12200, S12300, S12400



Example 1:

Use of the address switch for EtherCAT slave ID

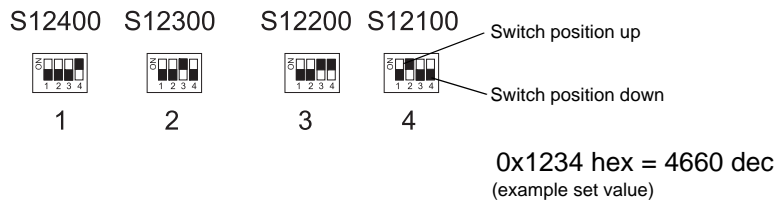


Figure 8: Slave ID of BM4-O-ECT-01-02 in the standard controller

4.4 Display and operation elements

Example 2:

Use of the address switch for setting the IPv4 address

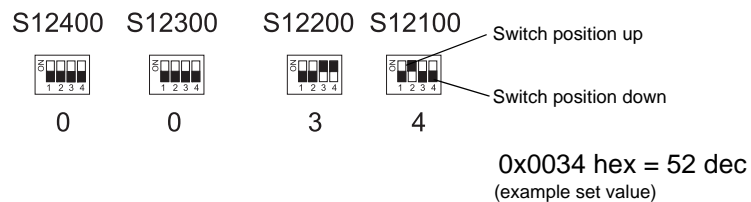
EtherCAT slave for drive controller, SoE profile and CoE profile

Set an 8 bit offset value to basis IP address with the switches S12100 and S12200:

Example basis IPv4 address = 192.168.1.1

192.168.1.1 + [offset value].

SW12400: 0 (set switch to 0!)
SW12300: 0 (set switch to 0!)
SW12200: High nibble of 8 bit offset value
SW12100: Low nibble of 8 bit offset value



Resulting IPv4 address = 192.168.1.53

4.4.3 ECT-01-02 in ES controller

The state of the EtherCAT slave module is displayed via 4 LEDs H51 to H62. In addition to further error messages can be displayed by the operation program Pro-Drive.

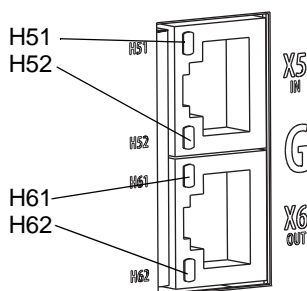


Figure 9: Front side EtherCAT slave module ECT-01-02 in ES controller

LEDs

LED	Flashing pattern	Meaning
H51 red	see below	Error
H52 green	off	X5: Link/Activity, no connection (No link)
	on	X5: Link/Activity, connection (Link)
	flashing	X5: Link/Activity, data communication (Act)
H61 green	see below	Status
H62 green	off	X6: Link/Activity, no connection (No link)
	on	X6: Link/Activity, connection (Link)
	flashing	X6: Link/Activity, data communication (Act)

LED	Flashing pattern				
	H51 red	on	flashing off/on	off	off
H61 green	X	off	500 ms on / 500 ms off	200 ms on / 1 s off	on
	ERROR	INIT	PRE OPERATIONAL	SAFE OPERATIONAL	OPERATIONAL

Address switch

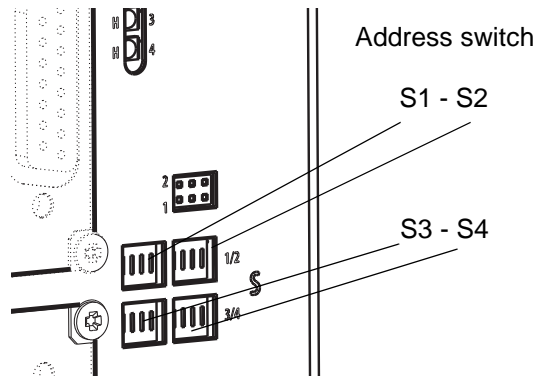
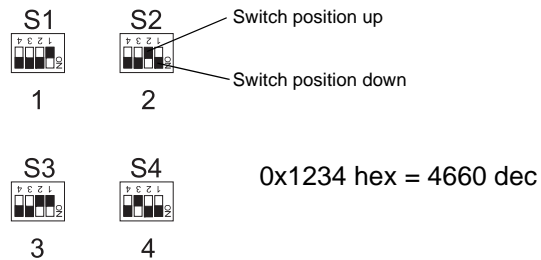


Figure 10: Address switch ECT-01-02 in ES controller

Example 1:

Use of the address switch for EtherCAT slave ID



Example 2:

Use of the address switch for setting the IPv4 address

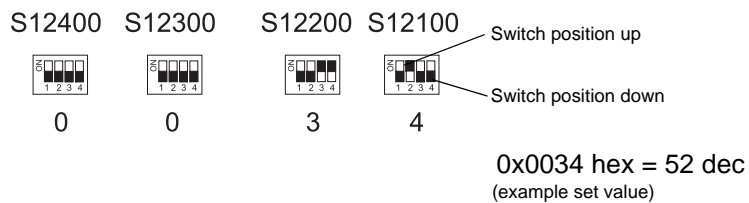
EtherCAT slave for drive controller, SoE profile and CoE profile

Set an 8 bit offset value to basis IP address with the switches S3 and S4:

Example basis IPv4 address = 192.168.1.1

192.168.1.1 + [offset value].

- S1: 0 (set switch to 0!)
- S2: 0 (set switch to 0!)
- S3: High nibble of 8 bit offset value
- S4: Low nibble of 8 bit offset value



Resulting IPv4 address = 192.168.1.53

TRANSPORT AND PACKAGING

5.1 What to observe when transporting

For initial transport the **BM4-O-ECT-01 (EtherCAT slave module)** for standard controller is packed at the manufacturer. If the device is to be further transported, ensure that the following conditions are met throughout the entire transport:

- Climate class 2 K 3 as per EN 60721-3-2
- Temperature range - 30 °C up to + 70 °C
- Vibration, shock, continuous shock class 2 M 1 as in EN 60721-3-2

5.2 Transport inspection

Upon receiving the delivered goods, immediately examine them for completeness and transport damage.

If there is outwardly visible transport damage, proceed as follows:

- Do not accept the delivery or conditionally accept it with reservations.
- Note the extent of the damage on the transport documents or on the delivery note of the transport agent.
- Immediately file a complaint with the freight carrier. Have the complaint confirmed in writing and immediately contact the responsible representative of Baumüller Nürnberg GmbH.

**NOTE!**

The device may not be operated if there is visible transport damage!

5.3 Unpacking

After having received the still packaged device:

- ▶ Avoid transport shocks and hard jolts, e.g. when putting an item down.

If no transport damage is visible:

- ▶ Open the packaging of the device.
- ▶ Verify the delivery scope based on the delivery note.

File a claim with the responsible Baumüller representative if the delivery is incomplete.



NOTE!

Claim each individual deficiency as soon as it has been detected. Damage claims can only be validly asserted within the claim registration period.

5.4 Disposal of the packaging

The packaging consists of cardboard, plastic, metal parts, corrugated cardboard and/or wood.

- ▶ When disposing of the packaging, comply with the national regulations.

MOUNTING

In this chapter we describe the mechanical mounting of the plug-in module **BM4-O-ECT-01 (EtherCAT slave module)** in the BM4400, BM4600, BM4700 with standard controller.



NOTE!

The **ECT-01** modules are mounted stationary in the BM4400, BM4600, BM4700 with ES controller and cannot be changed, therefore no mounting is necessary!

6.1 Preparation of mounting

- Check the marking **ECT-01**, whether the right plug-in module is available.

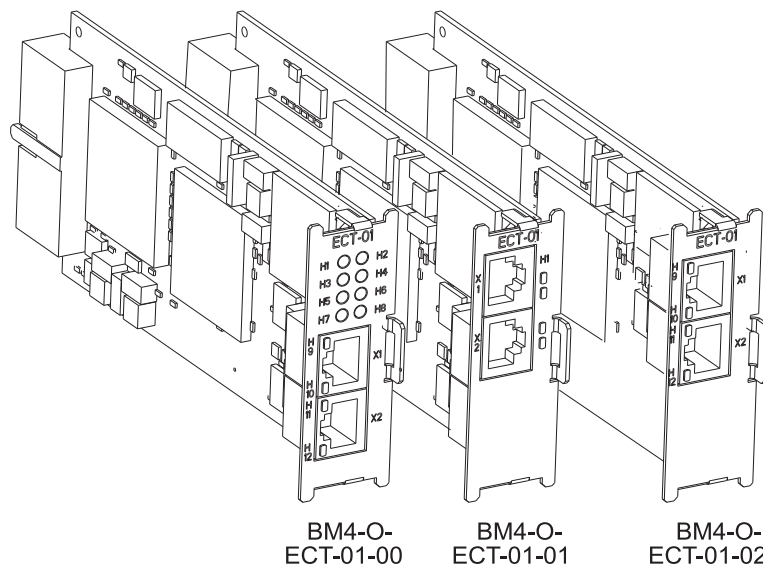


Figure 11: BM4-O-ECT-01 in standard controller

- Determine the suitable slot (see also ► [Slots BM4-O-ECT-01 in the standard controller](#) on page 24).

6.2 Assembly



WARNING!

Danger as a result of faulty mounting!

The mounting requires qualified personnel with adequate experience. Faulty mounting can lead to life-threatening situations or substantial material damage.

Therefore:

- Only allow mounting to be performed by employees of the manufacturer or by other qualified personnel.

- 1 Switch off the **b maXX BM4000** and assure it against unintentional switching on during mounting.



DANGER!

Risk of fatal injury from electrical current!

There is an immediate risk of fatal injury if live electrical parts are contacted.

Therefore:

- Switch off the current when any kind of work is being performed on the electrical system and ensure safety before switching on again.
- Pay attention to the relevant safety instructions when handling electrical equipment carrying high voltages.
- Do not touch electrically live parts before taking into account the discharge time of the capacitors

- 2 Pull off the design cover towards the front from the controller unit
- 3 Look at the controller unit for the provided slot

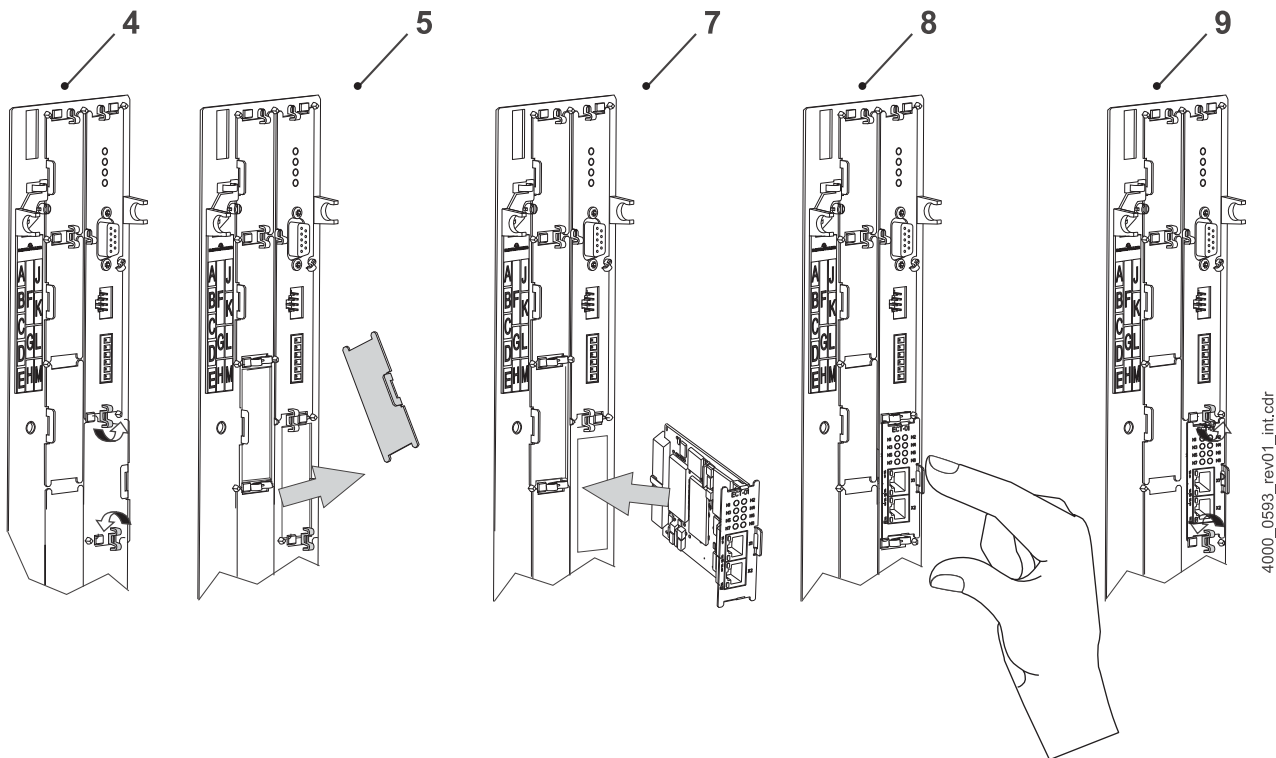


Figure 12: Mounting

- 4 Turn the twist lock beyond and beneath by 90°. The twist locks now are standing horizontally.
- 5 Take the front panel cover towards the front off. Keep this cover.

**NOTICE!**

Note **electrostatic discharge!**
The **BM4-O-ECT-01** module contains ESD sensible parts.

Therefore:

- Regard the described ESD procedures when handling the plug-in module.
- Touch the plug-in module only at its handle.

- 6 Take the **BM4-O-ECT-01** out of its transport packing. Avoid the contact with electronically parts of the plug-in module.
- 7 Plug the **BM4-O-ECT-01** module into the guide supports of the slot. The handle must point to the same side as the other handles in this slot strip (here: right side).
- 8 Press with two fingers on the front panel until the **BM4-O-ECT-01** module within the device sensible latches tightly into the end position.
- 9 Turn the twist lock beyond and beneath by 90° into the vertical position (locking position).
- 10 Connect cable(s) of the **BM4-O-ECT-01** module, see [▶ Connection BM4-O-ECT-01 standard controller](#) on page 47.
- 11 Put the design cover on the device again.



NOTE

If you, within the scope of a repair of the **BM4-O-ECT-01** module, simply displace it by a similar plug-in module, you can shorten the further operation, installation, commissioning and so on. Then you simply must put on the connector to the plug-in module, put on the design cover again and you can turn on the device again.

Thus the mounting of the **BM4-O-ECT-01** is completed.

INSTALLATION

In this chapter we describe the electrical installation of the **ECT-01 (EtherCAT slave module)**. The mechanical mounting is described in [►Mounting◄](#) from page 41 and not necessary for BM4400, BM4600 and BM4700 with ES controller.

7.1 Safety notes



DANGER!

Risk of fatal injury from electrical current!

There is an immediate risk of fatal injury if live electrical parts are contacted.
Therefore:

- Switch off the current when any kind of work is being performed on the electrical system and ensure safety before switching on again.
- Pay attention to the relevant safety instructions when handling electrical equipment carrying high voltages.
- Do not touch electrically live parts before taking into account the discharge time of the capacitors



WARNING!

Danger because of faulty installation and initial commissioning!

Installation and commissioning require qualified personnel with adequate experience. A installation fault can cause danger situations or large damage of property.

Therefore:

- Only personnel from manufacturer or qualified personnel operate while installation and initial commissioning

7.2 Requirements to the connection cables

7.2 Requirements to the connection cables

Use the recommended cables in order to comply with the standard EN 60 204-1 (Electrical Equipment of Machines). Short-circuits, external voltage etc. may occur, if the connectors are not fixed.



NOTE!

Pay attention to EMC compatible cabling, see instruction handbook **b maXX** BM4400, BM4400 ES, BM4600, BM4600 ES, BM4700, BM4700 ES (5.12008), chapter [Installation requirements with regard to EMC](#).

Completely assembled cables are available, see [►Cables◄](#) on page 69.

Baumüller Nürnberg GmbH is not responsible for the compliance with the EMC standards and the normal operation of the drive, if the cables are manufactured by the customer.

7.3 Connection diagrams

7.3.1 Connection BM4-O-ECT-01 standard controller

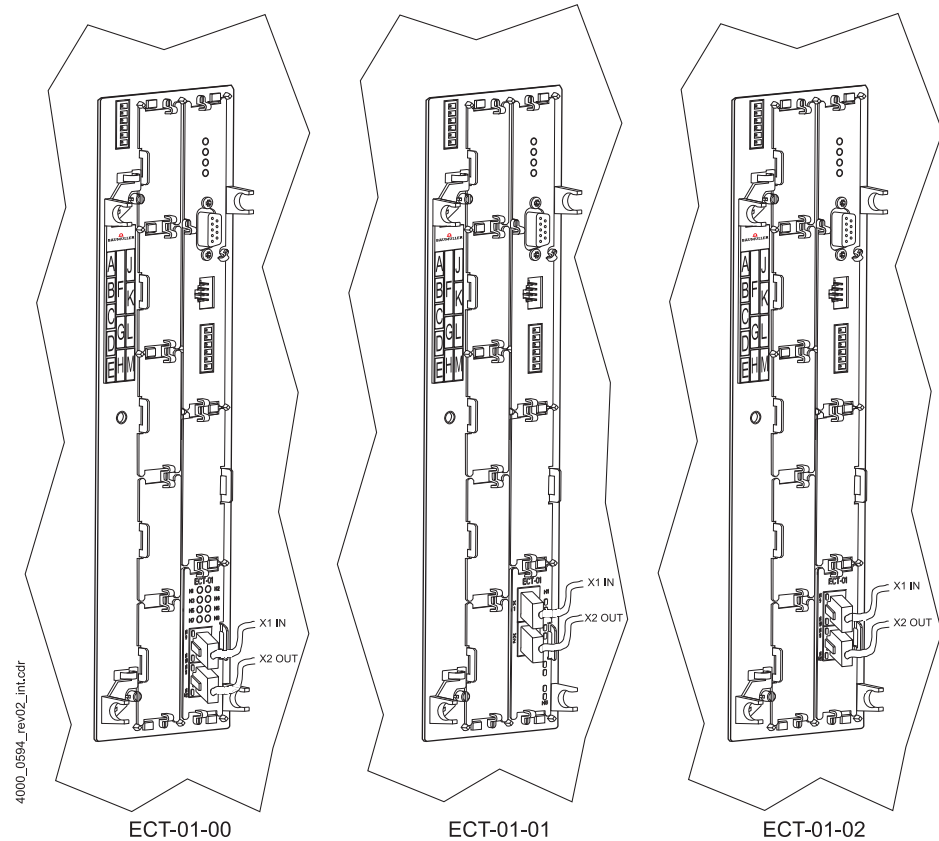


Figure 13: Connection diagram standard controller

Procedure of installation

- 1 Check whether the **b maXX** BM4400, BM4600, BM4700 is de-energized.
 - o Remove the design cover of the controller.
 - o The **BM4-O-ECT-01** is normally located in slot G or H.
- 2 Connect the **BM4-O-ECT-01** with Ethernet cables (cable outlet downward).
Pin assignment see [▶Pin assignment◀](#) on page 49,
Cable see [▶Cables◀](#) on page 69
- 3 Replace design cover.
- 4 Lay the cables in the control cabinet referring to the guidelines

7.3.2 Connection ECT-01 ES controller

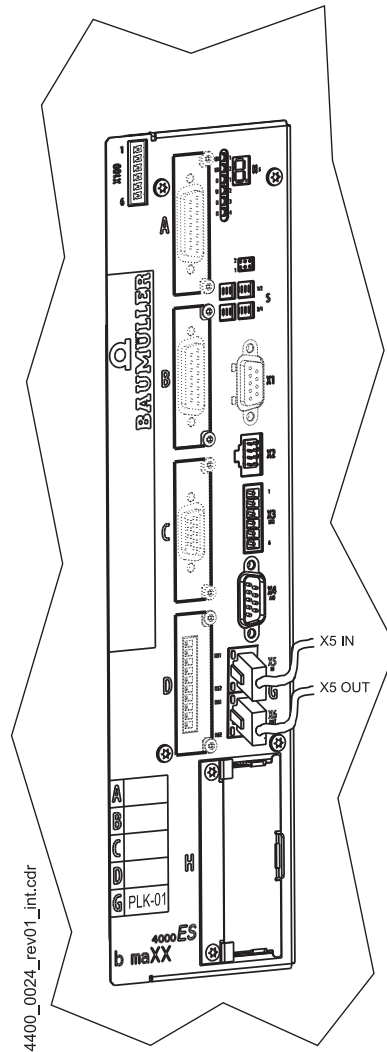


Figure 14: Connection ES controller

Procedure of installation

- 1 Check whether the **b maXX** BM4400, BM4600, BM4700 with ES controller is de-energized.
 - o The **BM4-O-ECT-01** is located in position G
- 2 Connect the **BM4-O-ECT-01** with Ethernet cables (cable outlet downward).
Pin assignment see [▶Pin assignment◀](#) on page 49,
Cable see [▶Cables◀](#) on page 69
- 3 Lay the cables in the control cabinet referring to the guidelines

7.3.3 Pin assignment

Pin assignment RJ45 connectors on front side:

BM4-O-ECT-01: X1 and X2

ECT-01: X5 and X6

Pin No.	Pin assignment
1	Transmit Data + TD +
2	Transmit Data - TD -
3	Receive Data + RD +
4	reserved
5	reserved
6	Receive Data - RD -
7	reserved
8	reserved

COMMISSIONING/OPERATION

For further information referring to commissioning and parameter setting of **EtherCAT slave** module, see parameter handbook **b maXX BM4000**.

Make sure before commissioning, that the following preconditions are fulfilled:

- 1 **BM4-O-ECT-01** is mounted correctly (standard controller).
- 2 The **BM4-O-ECT-01 module** is cabled correctly.
- 3 The control cabinet is properly closed and all safety devices are in operation.
- 4 The **BM4000** is ready for use.

8.1 Safety notes

Basics



WARNING!

Risk of injury due to improper operation!

Improper operation can lead to severe personal injury or material damage.

Therefore:

- Perform all operational steps according to the details of these instruction handbook.
- Before beginning any work, ensure that all coverings and protective devices are installed and are functioning properly.
- The control cabinet in which the device is installed should be protected against contact with electrically live parts.

Keep all doors of the control cabinet closed during operation.



NOTICE!

Environmental conditions that do not meet the requirements.

Environmental conditions that are non-compliant can lead to property damage.

Therefore:

- Ensure that the environmental conditions are kept compliant during operation (see instruction handbook **b maXX 4000**, operation conditions).



WARNING!

Risk of injury due to insufficient qualifications!

Inevitably, when operating this electrical device, certain parts of this device are energized with hazardous voltage. Improper handling can lead to significant personal injury and material damage.

Therefore:

- Only qualified personnel may work on this device!

8.2 Typical connection

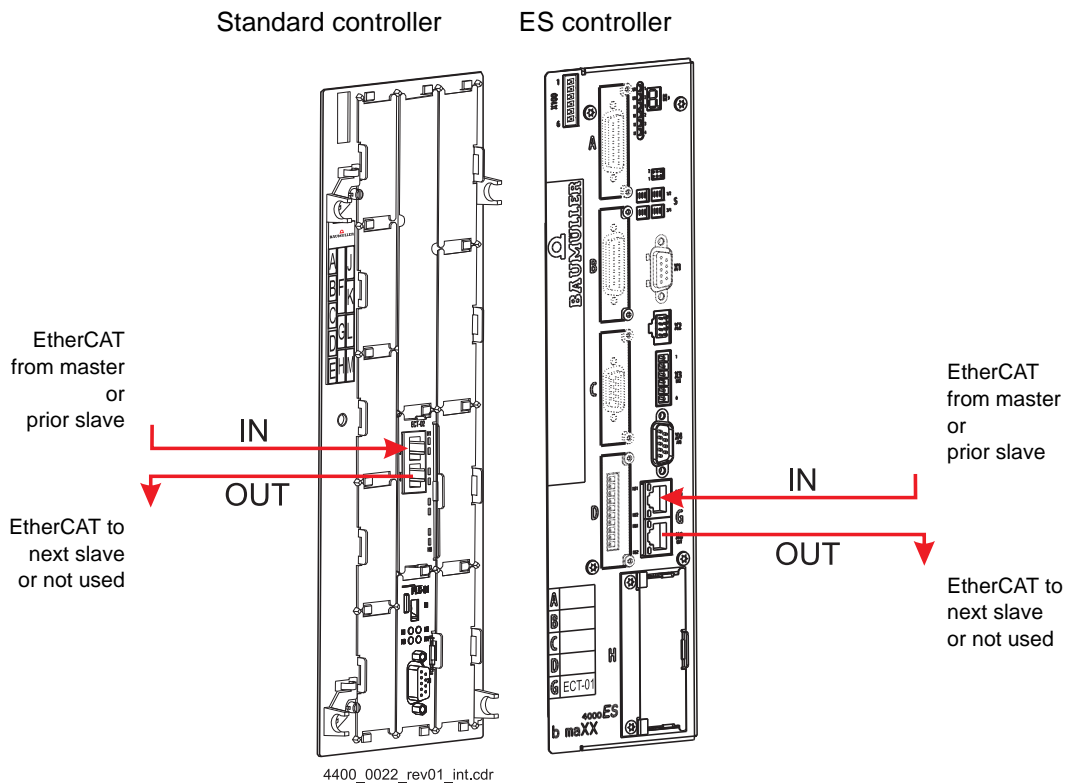


Figure 15: Typical connection

8.2.1 Identification of EtherCAT slave module for b maXX drive PLC



NOTE!

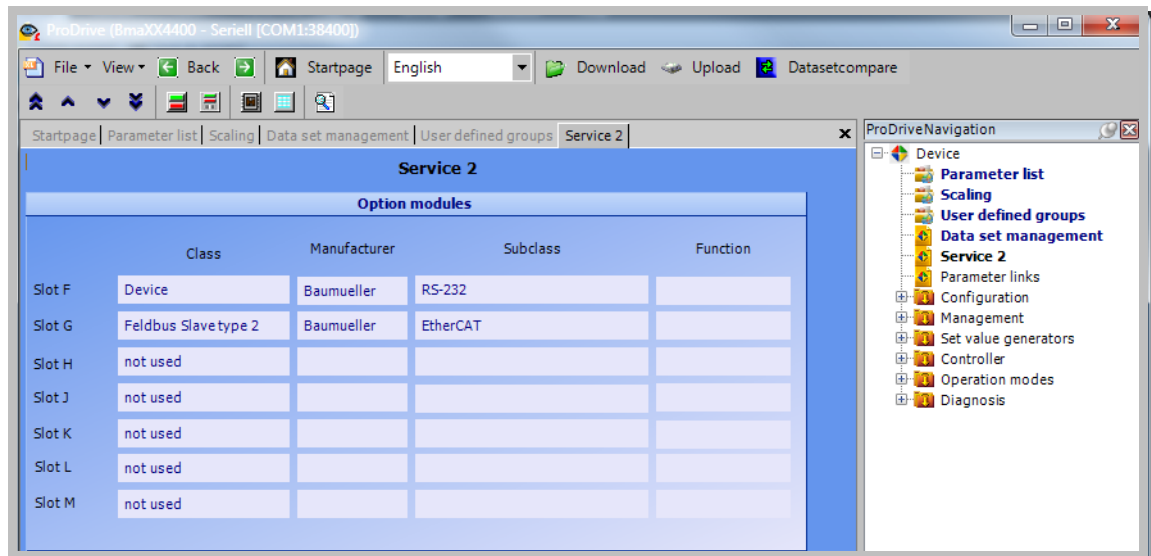
For a guide to operating the EtherCAT slave module for b maXX drive PLC refer to the **EtherCAT Slave for b maXX drive PLC** Instruction handbook, **5.10018**.

The PLC reads the identification of the **EtherCAT slave module** while boot process (set IEC project: variable of data type VERSION_INFO_1_BMSTRUCT on address %MB3.x001024 (x = 2, ..., 7 for plug-in slot/position G, ..., M) and add to the watch window).
The firmware version is shown in the structure elements w_SW1ActualNr and w_SW1ActualStatus).

8.3 Operation

8.2.2 Identification of EtherCAT slave module for b maXX controller

The controller reads the identification of the **EtherCAT slave module** while boot process, automatically.



- 1 Switch on **b maXX BM4000**
- 2 Wait until the system has finished the boot process.
- 3 Remove/delete existing errors/error messages on **b maXX BM4000**.
This errors can be caused by faulty mounting (e.g. cable break) or faulty installation (e.g. no power supply).
Please do not continue before all errors/error messages are removed.

8.3 Operation

8.3.1 EtherCAT slave module for b maXX drive PLC

For a guide to operating the EtherCAT slave module for b maXX drive PLC refer to application handbook [>EtherCAT-Slave for b maXX drive PLC<](#), application handbook [>b maXX drive PLC<](#) and programming handbook [>PROPROG wt II<](#), or refer to ProProg wt III online help system.

8.3.2 EtherCAT slave module for b maXX controller

In this chapter the settings of parameters influencing the EtherCAT slave module are described by using the example of SoE profile (SoE, Sercos profile according IEC 61491 over EtherCAT).

The menu item „setting of synchronization time“ is irrelevant when using the CoE profile (CoE: CANopen over EtherCAT).

8.3.2.1 Parameter

The parameter setting determines the operating behavior of the EtherCAT slave module. Set the parameter values via software ProDrive.

- 1 Start ProDrive
- 2 Select „Navigation“
- 3 Select in project tree „Management“ and then „Drive management“.
- 4 Select the following
 - o „Control via BACI“
 - o „Control via ProDrive“,
 - o „enable BACI write access via service data“,
 - o „enable BACI write access via process data“,

Setting of the communication source

to enable the communication via the EtherCAT slave module.

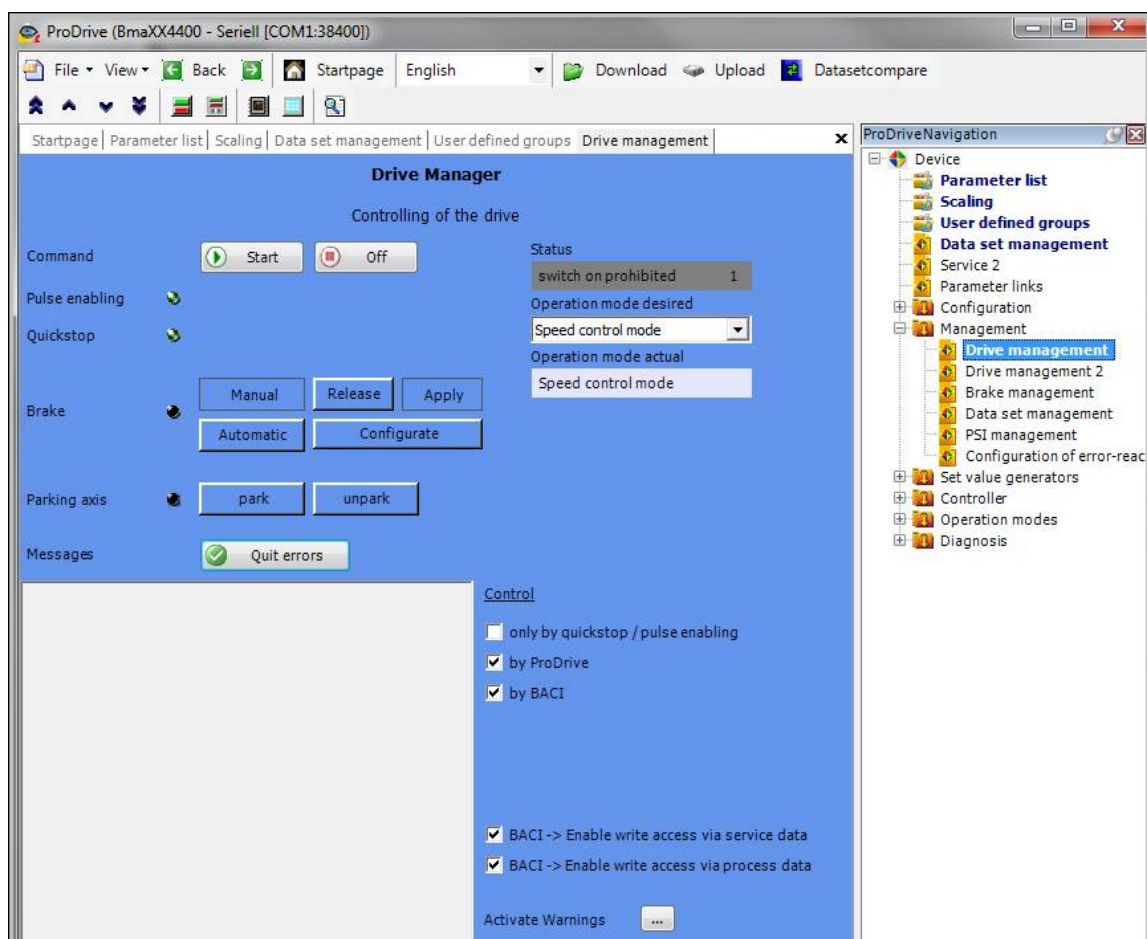


Figure 16: ProDrive set communication source

Setting the synchronization time

The user must set the SYNC-time equal to the EtherCAT cycle time. The controller synchronizes to the setpoint telegram.

- 5 Select „Synchronization“ in ProDrive Navigation
- 6 Set „Use sync signal 1 of BACI“ for source sync signal.

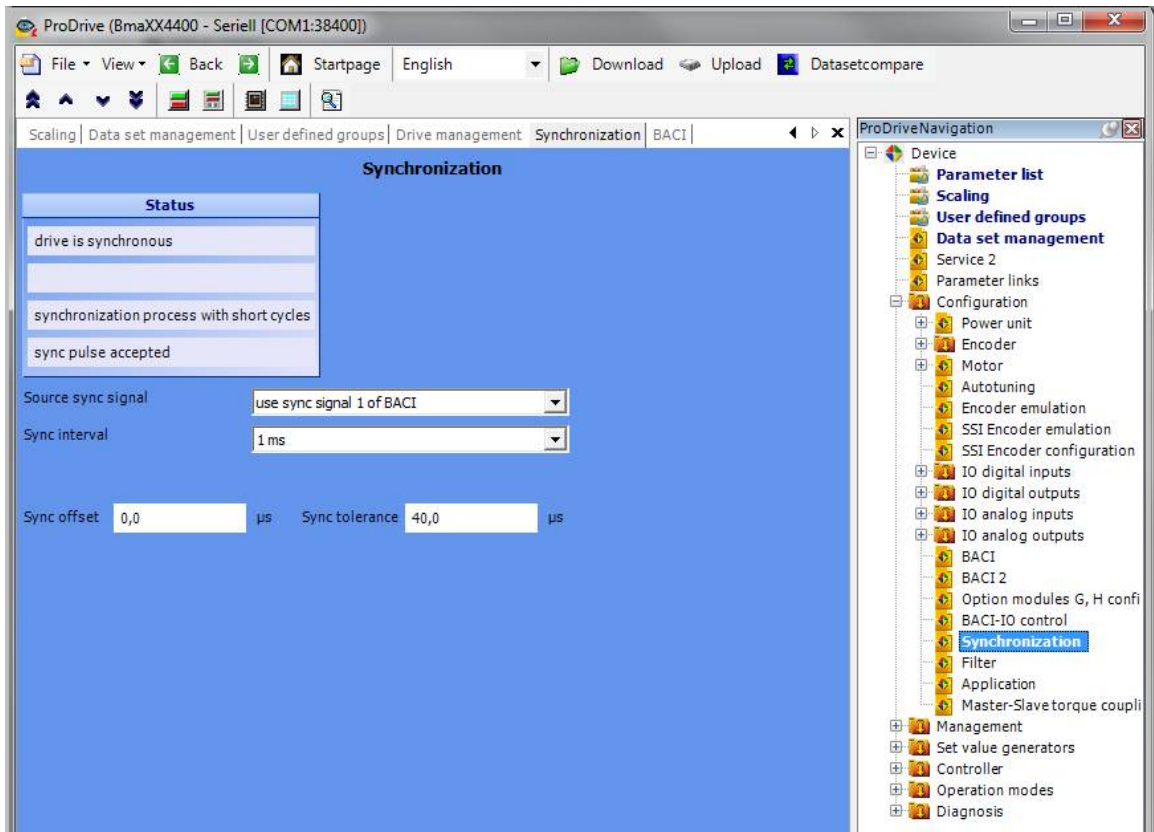


Figure 17: ProDrive settings synchronization



NOTE!

Error parameters of **EtherCAT slave** module see chapter [▶Troubleshooting and fault correction](#) from page 59.

MAINTENANCE

9.1 Safety notes

Basic information

**WARNING!****Risk of injury due to improperly performed maintenance work!**

Improper maintenance can lead to severe personal injury and material damage.

Therefore:

- Before beginning work, make sure that there is enough space for mounting.
- Make sure that the mounting area is kept clean and orderly. Parts and tools that are loosely stacked or lying around are a potential accident source.

9.2 Environmental condition

If the prescribed environmental conditions are adhered to, then the device is maintenance-free. For the prescribed environmental conditions see Instruction handbook **b maXX BM4000**.

The most important prescribed environmental conditions are:

- Dust-free environmental air
- Temperature: Min. 5 °C to max. +55 °C
- Relative humidity: 5% to 85%, no condensation
- Installation altitude: From 1000 m and higher derating

9.3 Inspection intervals - maintenance notes

Refer to Instruction handbook **b maXX 4000**, 5.12008.

9.4 Repairs

In case of device damage, please inform your sales office or:

Baumüller Nürnberg GmbH

Ostendstr. 80 - 90
90482 Nuremberg
Germany

Tel. +49 9 11 54 32 - 0
Fax: +49 9 11 54 32 - 1 30

Mail: mail@baumueller.de
Internet: www.baumueller.de

TROUBLESHOOTING AND FAULT CORRECTION

10.1 Behavior in case of malfunctions

Basic information

**DANGER!****Risk of fatal injury from electrical current!**

Inevitably, when operating this electrical device, certain parts of it are energized with hazardous voltage.

Therefore:

- Pay heed to areas on the device that could be dangerous.

**WARNING!****Risk of injury due to improper fault correction!**

Therefore:

- Only qualified personnel may work on this device!
- Personnel that work with the **b maXX** device must be trained in the safety regulations and the handling of the device, and be familiar with the correct operation of it. In particular, reacting to error indications and conditions requires that the operator must have special knowledge.

10.2 Fault detection using EtherCAT slave for b maXX drive PLC

If an error occurs at the EtherCAT slave module for b maXX drive PLC, the LED H1 flashes. Repeat the steps from the chapters [►Mounting◄](#) from page 41 and [►Commissioning/Operation◄](#) from page 51.

If the error occurs further, the module must send back to Baumüller Nuremberg GmbH for troubleshooting.

10.3 Fault detection using EtherCAT slave for b maXX controller

The fault can be caused by mechanical or electrical malfunctions.

LED H4 The occurrence of an error state of a device **b maXX 4000** is signaled by the lighting up of the red LED H4 on the front side of the housing.

7-segment display Additionally the error code is shown via the 7-segment display on the front side of the housing (not BM4XXX - XXX - XX0XX and BM4XXX - XXX - XX1XX).

By the displayed code the error message can be determined. The displayed error is without exception an LEVEL 2 error (P0201 - P0216).

The display of an error code starts therewith, that „F“ is displayed for 1.5 s. Then the four characters of the error code are displayed. The separate characters are displayed for about 0.8 s, interrupted by a short break. If there are other errors, these are displayed in the same manner. The procedure is repeated as soon as all errors were displayed.

Example: Error 125 and 91 are generated:

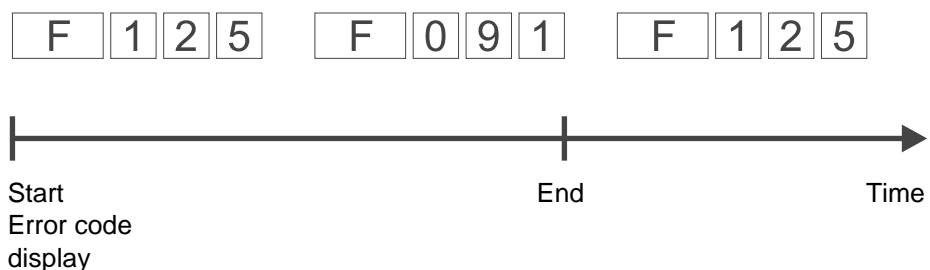


Figure 18: Error messages 7-segment display

Operating software ProDrive

Furthermore the error message is shown in the operating software:

- Start the operating program ProDrive (from FW 3.07), if it isn't running yet.



NOTE!

The controller software version and the operating software version must be compatible to use ProDrive with all functions.

Display the „error message“ in ProDrive:

- Open navigation with click on + in front of „Management“

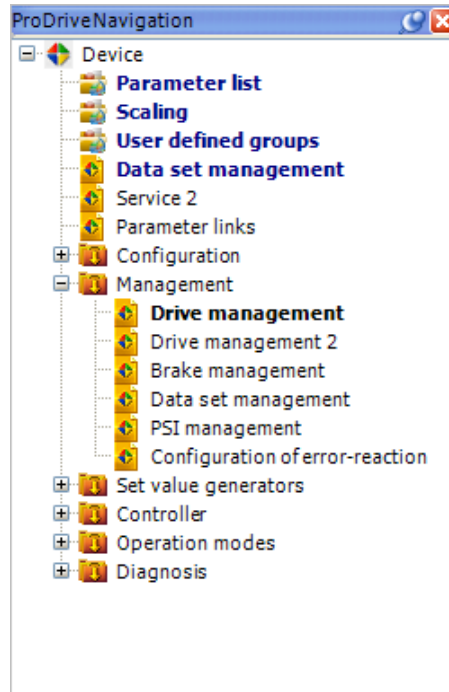


Figure 19: Project navigation in ProDrive

10.3 Fault detection using EtherCAT slave for b maXX controller

- ▶ Select „Drive management“

The window „Drive manager“ opens, see below with an exemplary (error) message. Before the communication between controller and PC/laptop is started, the messages in this list have been arranged in numerical order. The newly occurring messages are added to the end of the list, when communication is active.

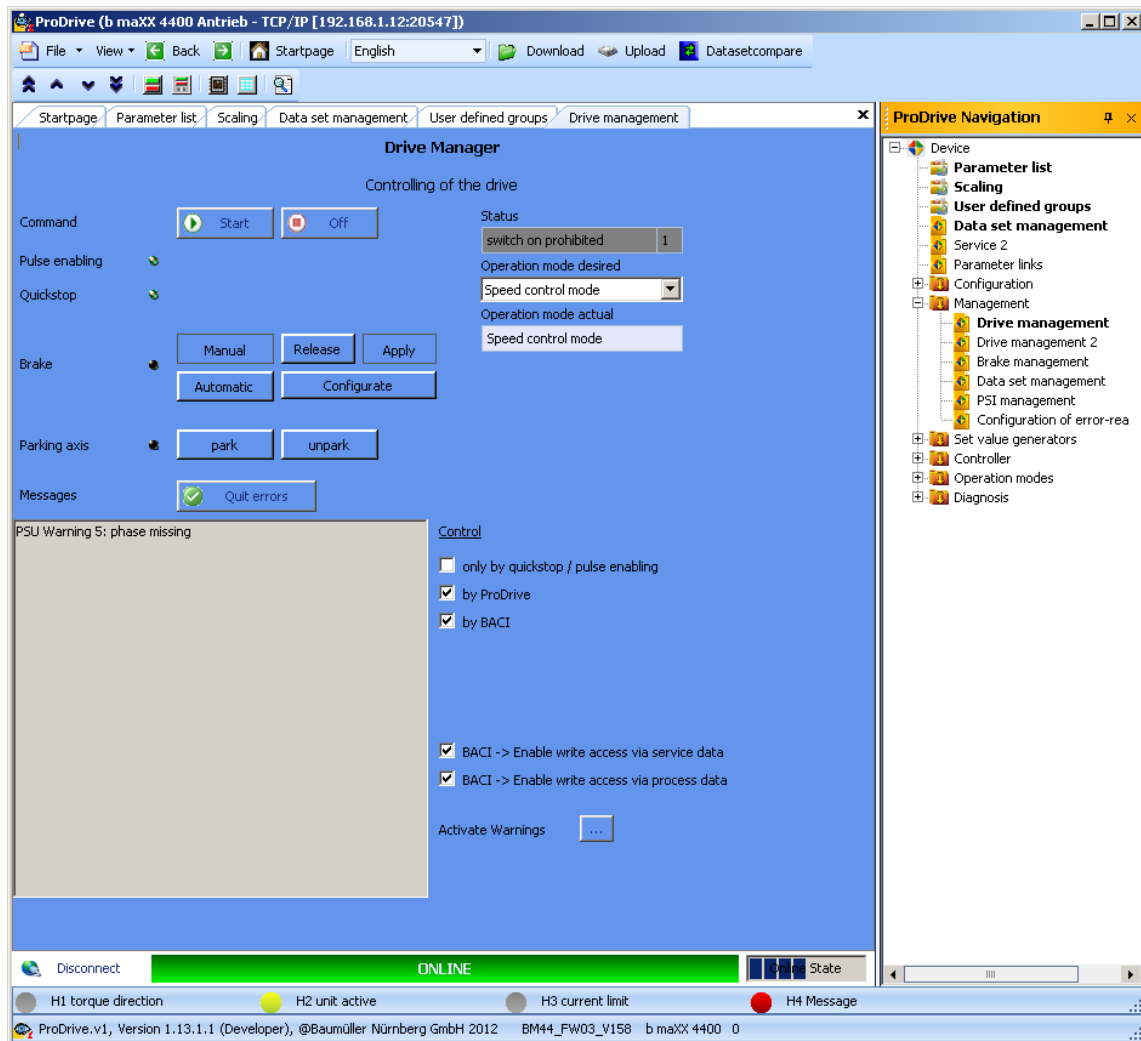


Figure 20: Drive manager ProDrive



NOTE

If you are not able to start the motor, although the red LED H4 isn't lighting up and although the LED H2 is lighting up green, check the parameterization of the **b maXX 4000** with the parameter list in ProDrive.

Error possibilities are e. g.: torque limit = 0 has been set or notch position is not correct (also see parameter manual **b maXX 4000**).

If no LEDs are lighting up on the front side of the device, check the 24V supply.

10.4 Error handling

The error messages in the system are built up hierarchically

An error message can result from a beneath in the hierarchic arranged error message. This is why the message 'Error' (level 1) can base on an error, which e. g. has appeared in „ModuleError“ (level 2)., because there is a failure in „Function module1“ (level 3, e. g. Sincos-encoder module).

Error memory

From firmware V03.11 onwards an internal error memory exists to read out errors by a higher-level open-loop control. All occurrent errors which lead to an error response of the drive are saved chronologically in this error memory.

A read access to the error memory is done element by element with an index parameter (P0258) and a value parameter (P0259).

The error memory will be deleted completely at error acknowledgment (Bit 7 = 1 in control word).

For a further description see parameter P0257 in the Parameter Manual.

Error display

If an error appears, the according definite error message is displayed within a short time in ProDrive in the menu „device manager‘ and on the 7-segment display.



NOTE!

The device is provided with predefined error reactions. You are able to set the error reaction of the device in 'Depending on settings' in the column 'Reaction' marked error messages. An exception here are errors, which have to have an immediate pulse inhibit as a consequence. These can not be changed due to safety reasons.

10.4.1 Error reset

If the red error LED is lighting up, there is at least one error.

There are several methods to reset errors:

- Via ProDrive (from FW 3.07):
Button “Quit errors” (either in the dialog box “Device manager” or on the page “Device manager”).
That means, that you inform the device, that you have noted the error, that you have removed it or that you want to pass over it. Due to error reset all error messages are reset. An individual error reset is not possible. The button Quit errors causes a resetting of the error, in case the cause for the error message exists no longer.

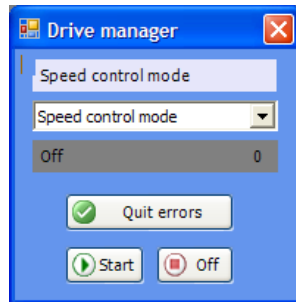
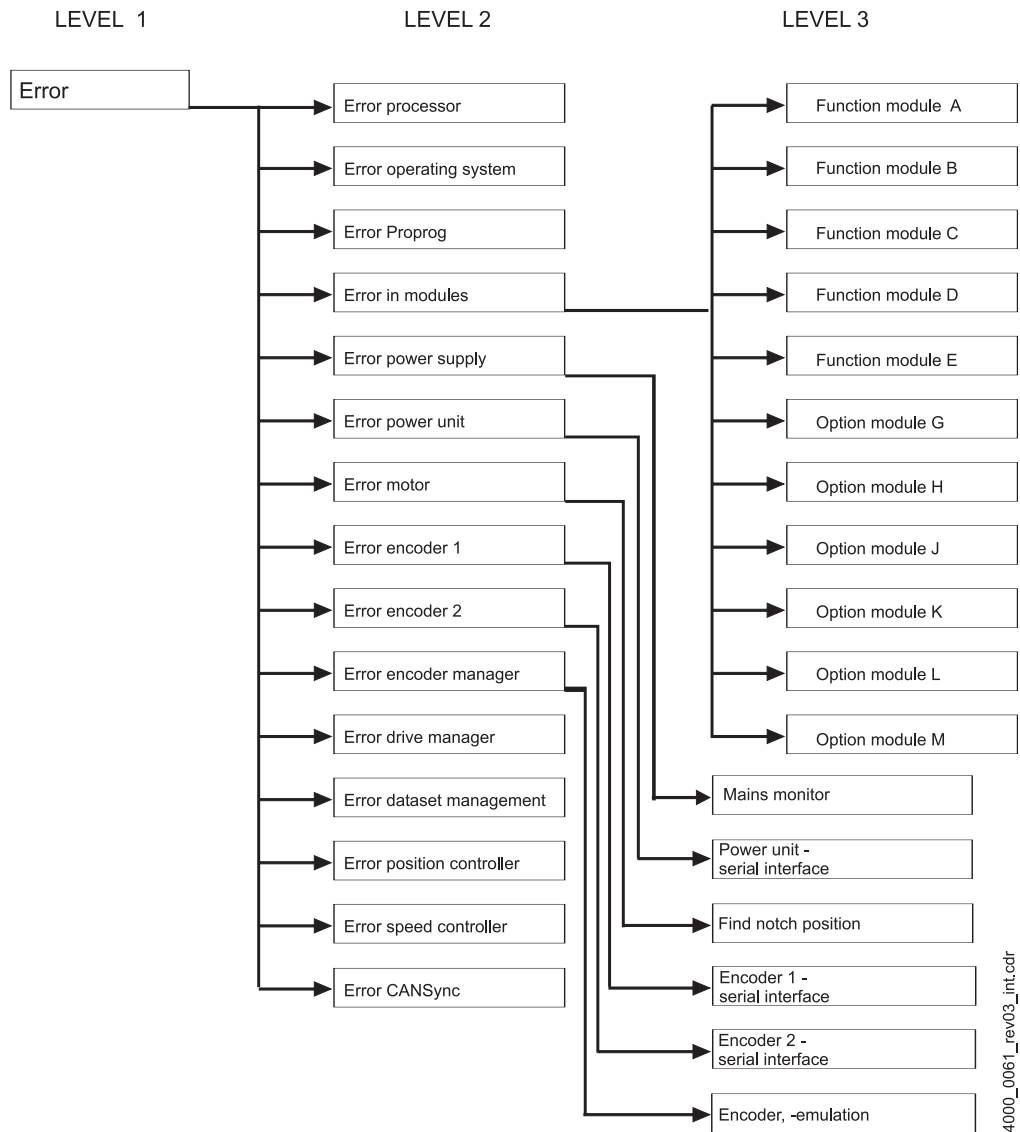


Figure 21: ProDrive Drive manager

- Via writing access to control word (P0300):
Here a rising edge must be generated in bit 7 (generated by the control system or by operating software via input to parameter list).
Note: The drive control must be active (see parameter P1001 Communication source) for the selected communication source.
- Via a digital input:
A digital input of a DIO module can be selected via parameter P0575 digital input for error acknowledgement can be selected for error reset. A rising edge on this input resets the error messages.
- Via the pulse enable input:
Precondition is, that the drive is only controlled via the hardware inputs (that means that the motor guide is neither set via the operating software nor via another communication source). Furthermore the option “Quit error via pulse enable” in parameter P1002 Options device manager must be active. With the first rising edge of pulse enable the errors then are reset. But the drive still does not start. Therefore you then need a second rising edge for the enable.

Additional data according the subject resetting of error messages is available in the 'parameter manual'.

10.4.2 Error messages



4000_0061_rev03_init.cdr

Figure 22: Survey error list

1st level	1st level errors are only interesting for the access to errors via parameters, to be used without ProDrive, e. g. at Field bus communication. This errors are not shown in ProDrive/ 7-segment display. Bit mapping see description of the parameter P0200 in the parameter manual.
2nd level	Order of the error messages see survey (▶Figure 22◀ on page 65).
3rd level	2nd level error messages are displayed on the 7-segment display in ProDrive.



NOTE!

3rd level errors are only displayed in ProDrive separated by a decimal point from the corresponding 2nd level error.

e.g.:

Motor error 102: Group error find notch position **(2nd level)**

Find notch position error 102.64: Drive moved more than 4 times delta angle. **(3rd level)**

In the column 'Reaction' the reaction of the system to the error is shown:

- „IS“ = pulse inhibit;
- „adjustable“ = the error reaction can be set via ProDrive (Window „Drive management“, toolbar button „Error reaction“).
- „no reaction“ means, the drive is continuing to work and the red error LED is blinking.

Error messages 3rd level

P0245
P0246

Error in option module G Error in option module H (depending on slot/position)

Error code	Meaning	Reaction
4096	Wrong parameter No. at set value parameter 1	adjustable
4097	Wrong parameter No. at set value parameter 2	adjustable
4098	Wrong parameter No. at set value parameter 3	adjustable
4099	Wrong parameter No. at set value parameter 4	adjustable
4100	Wrong parameter No. at set value parameter 5	adjustable
4101	Wrong parameter No. at set value parameter 6	adjustable
4102	Wrong parameter No. at set value parameter 7	adjustable
4103	Wrong parameter No. at set value parameter 8	adjustable
4104	Wrong parameter No. at set value parameter 9	adjustable
4105	Wrong parameter No. at set value parameter 10	adjustable
4106	Wrong parameter No. at set value parameter 11	adjustable
4107	Wrong parameter No. at set value parameter 12	adjustable
4108	Wrong parameter No. at set value parameter 13	adjustable
4109	Wrong parameter No. at set value parameter 14	adjustable
4110	Wrong parameter No. at set value parameter 15	adjustable
4111	Wrong parameter No. at set value parameter 16	adjustable
4112	Wrong parameter No. at actual value parameter 1	adjustable
4113	Wrong parameter No. at actual value parameter 2	adjustable
4114	Wrong parameter No. at actual value parameter 3	adjustable
4115	Wrong parameter No. at actual value parameter 4	adjustable
4116	Wrong parameter No. at actual value parameter 5	adjustable
4117	Wrong parameter No. at actual value parameter 6	adjustable
4118	Wrong parameter No. at actual value parameter 7	adjustable
4119	Wrong parameter No. at actual value parameter 8	adjustable
4120	Wrong parameter No. at actual value parameter 9	adjustable
4121	Wrong parameter No. at actual value parameter 10	adjustable
4122	Wrong parameter No. at actual value parameter 11	adjustable
4123	Wrong parameter No. at actual value parameter 12	adjustable
4124	Wrong parameter No. at actual value parameter 13	adjustable
4125	Wrong parameter No. at actual value parameter 14	adjustable
4126	Wrong parameter No. at actual value parameter 15	adjustable
4127	Wrong parameter No. at actual value parameter 16	adjustable
4128	Invalid value at set value parameter No. 1	adjustable
4129	Invalid value at set value parameter No. 2	adjustable
4130	Invalid value at set value parameter No. 3	adjustable
4131	Invalid value at set value parameter No. 4	adjustable
4132	Invalid value at set value parameter No. 5	adjustable
4133	Invalid value at set value parameter No. 6	adjustable
4134	Invalid value at set value parameter No. 7	adjustable
4135	Invalid value at set value parameter No. 8	adjustable
4136	Invalid value at set value parameter No. 9	adjustable

10.4 Error handling

Error code	Meaning	Reaction
4137	Invalid value at set value parameter No. 10	adjustable
4138	Invalid value at set value parameter No. 11	adjustable
4139	Invalid value at set value parameter No. 12	adjustable
4140	Invalid value at set value parameter No. 13	adjustable
4141	Invalid value at set value parameter No. 14	adjustable
4142	Invalid value at set value parameter No. 15	adjustable
4143	Invalid value at set value parameter No. 16	adjustable
4144	Invalid value for set value period	adjustable
4145	Invalid value for actual value period	adjustable
4146	Incorrect value for cycle offset set values	adjustable
4147	Incorrect value for cycle offset actual values	adjustable
4148	BACI timeout at cyclic data	adjustable
4149	BACI timeout at service data	adjustable
4150	Check results in faulty checksum	adjustable
4151	Ramp-up timeout when waiting for the slave type or when waiting for the resetting of config pending flag	adjustable
4152	Invalid data transfer structure type	adjustable
4153	Internal error: Incorrect BACI status	adjustable
4154	Access conflicts with slave at cyclic communication	adjustable
4155	Error cyclic communication: Parameter value wrong	adjustable
4156	Error cyclic communication: Alive counter conflict	adjustable
4157	Cmd interface: Channel number wrong (0 or > 6)	adjustable
4158	Cmd interface: Selected channel not available	adjustable
4159	Cmd interface: Internal error - wrong pointer	adjustable
4160	Cmd interface: Internal error - wrong state	adjustable
4161	Cmd interface: Wrong package No.	adjustable
4162	Cmd interface: Wrong command No.	adjustable
4163	Cmd interface: Wrong state at package handling	adjustable
4164	Cmd interface: Timeout at command processing	adjustable
4165	Cmd interface: Wrong package length	adjustable
4166	Cmd interface: Descriptor not available	adjustable
4167	Cmd interface: Wrong package type	adjustable
4168	Cmd interface: Checksum error	adjustable
4169	Module identification: PCI error at reading	adjustable
4170	Module identification: PCI error at writing	adjustable
4171	Module identification: General error at reading	adjustable
4172	Module identification: General error at writing	adjustable
4173	Internal error	adjustable
4174	Configuration cyclic services: Parameters are not cyclic writable	adjustable
4175	Configuration cyclic services: Invalid parameter No.	adjustable
4176	Wrong option module error code	adjustable
4177 to 8192	reserved	



ACCESSORIES AND SPARE PARTS

Accessories/spare parts for devices of the **b maXX** series are listed in this appendix. Product management is happy to handle any queries and suggestions on accessory parts.

11.1 Cables

- Available Ethernet connecting cables:
type: patch cable, STP

Type	Length [m]	Part No.
K-ETH-33-0-0,5	0,5	325160
K-ETH-33-0-01	1	325161
K-ETH-33-0-02	2	325162
K-ETH-33-0-03	3	325163
K-ETH-33-0-04	4	325317
K-ETH-33-0-05	5	325164
K-ETH-33-0-10	10	325165

Additional lengths upon request

12

DISPOSAL



NOTE!

Baumüller products are not subject to the scope of application of the EU's Waste Electrical and Electronic Equipment Directive (WEEE, 2002/96/EC). Hence, Baumüller is not obligated to bear any costs for taking back and disposing of old devices.

12.1 Safety notes



DANGER!

Risk of fatal injury from electrical current!

Stored electric charge.

Discharge time of the system = discharge time of the device with the longest DC link discharge time in the DC link connection.

Refer to Instruction handbook **b maXX BM4000**, Electrical data.

Therefore:

- Do not touch before taking into account the discharge time of the capacitors and electrically live parts.
- Heed corresponding notes on the equipment.
- If additional capacitors are connected to the DC link, the DC link discharge can take a much longer time. In this case, the necessary waiting period must be determined or a measurement made as to whether the equipment is de-energized. This discharge time must be posted, together with an IEC 60417-5036 (2002-10) warning symbol, on a clearly visible location of the control cabinet.



NOTICE!

Avoid polluting the environment as a result of improper disposal.

Therefore:

- Only dispose in compliance with the health and safety regulations.
- Take heed of any special local regulations. If you are unable to directly ensure safe disposal yourself, commission a suitable disposal contractor.
- In the event of a fire, hazardous substances could possibly be generated or released.
- Do not expose electronic components to high temperatures.
- Beryllium oxide is used as inner insulation, for example for various power semiconductors. The beryllium dust that is generated upon opening is injurious to the health.

Do not open electronic components.

- Dispose of capacitors, semiconductor modules and electronic scrap as special waste.



WARNING!

Danger as a result of faulty deinstallation!

The deinstallation and disposal requires qualified personnel with adequate experience.

Therefore:

- Only allow deinstallation and disposal to be performed by qualified personnel.

12.2 Disposal facilities/authorities

Ensure that the disposal is handled in compliance with the disposal policies of your company, as well as with all national regulations of the responsible disposal facilities and authorities. In case of doubt, consult the bureau of commerce or environmental protection authority responsible for your company.



APPENDIX A - DECLARATION OF CONFORMITY

EC - Declaration of Conformity

Doc.-No.: 5.13012.00
Date: 25.04.2013

according to EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC

The Manufacturer: Baumüller Nürnberg GmbH
 Ostendstraße 80-90
 90482 Nürnberg, Deutschland

declares, that the product:

Designation: EtherCAT slave module for b maXX 4000 standard controller
 Type: BM4-O-ECT-xx
 Manufactured since: 03.05.2013

is developed, designed and manufactured in accordance with the EMC Directive 2004/108/EC and the Low Voltage Directive 2006/95/EC.

Applied harmonized standards:

Standard	Title
DIN EN 62061:2010-05	Safety of Machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
DIN EN 61800-5-1:2008-04	Adjustable speed electrical power drive Part 5-1: Safety requirements - Electrical, thermal and energy
DIN EN 61800-5-2:2008-04	Adjustable speed electrical power drive Part 5-2: Safety requirements - Functional
DIN EN 61800-3:2005-07	Adjustable speed electrical power drive Part 3: EMC requirements and specific test methods

The mentioned devices cannot be operated without a BM4000 standard controller.

The products must be installed correctly and all notes and safety notes of the referring instruction handbooks BM4000 and BM4-O-ECT-xx option module must be complied with, to guarantee the compliance to the guidelines.

The compliance to the guidelines was verified with a typical configuration of a BM4000 standard controller.

Nuremberg / 25.04.2013
 Location / Date

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



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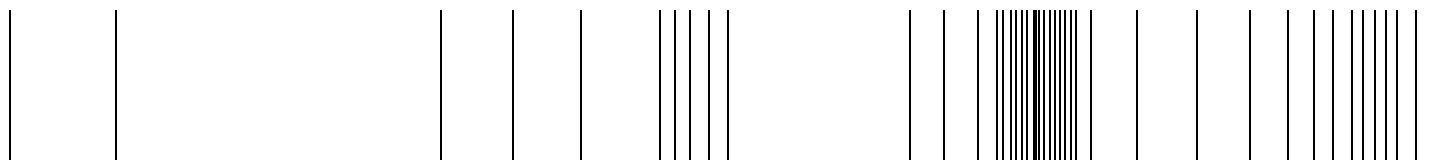
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Warning notes 6



Overview of Revisions

Version	Status	Changes
5.06003.05	22.04.2013	First issue
5.06003.06	20.06.2013	Error correction
5.06003.07	08.11.2013	Example: Setting IP address
5.06003.08	12.08.2014	Change Flashing pattern Pro-Operational, Safe-Operational

be in motion



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