

B-Nimis MC-Pro Modular Controller



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Notes on this user manual

This device user manual contains information which is specific to the product and which is valid at the time of printing.

This manual is only complete in conjunction with the product-related hardware and software user manuals required for the individual application.

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Berghof Automation GmbH is certified to DIN EN ISO 9001:2015.

Change log

Version	Date	Description
0.8	09.08.18	First draft
0.9	04.07.19	Addition of graphics. Corrections, change to new layout
1.0	09.07.19	First release

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1. General information

This user manual is intended for use by qualified professionals and contains information on the assembly, installation, start-up and maintenance of the device.

1.1. Notes on the manual

This manual is a component of the product and applies to the following devices:

→ B-Nimis MC-Pro S01


It contains information on the following topics:

- Applications
- Safety
- Mechanical design
- Electrical design
- Connections
- Start-up
- Upkeep and maintenance
- Decommissioning
- Disposal


► keep this user manual always near the product.

1.2. Symbols and visual depictions

The following symbols and visual depictions are used in this handbook:

Symbol	Meaning
→ ...	List entry
► ...	Individual instruction or list of instructions which can be carried out in any order.
1. ... 2. ...	List of instructions which must be carried out in the order given.
	Additional product information

Design of warnings:

 WARNING	
Optional:	Hazard type and source
Other	Short description and consequences
Symbols	► Preventive measures

1.3. Hazard categories and indications

The following indications are used in the case of warning messages so as to ensure your personal safety and avoid any damage to property.

The indications have the following meanings:

DANGER

Serious injury or death

Non-compliance with the safety features will result in death or serious injury.

- ▶ Take preventive measures.

WARNING

Possible serious injury or death

Non-compliance with the safety features may result in death or serious injury.

- ▶ Take preventive measures.
- ▶

CAUTION

Possible minor injuries

Non-compliance with the safety features may result in minor injuries.

- ▶ Take preventive measures.

NOTE

Possible damage to property

Non-compliance with the safety features may result in damage to property.

- ▶ Take preventive measures.

1.4. Qualified personnel

The installation, start-up and maintenance of the device must be carried out by qualified personnel. For the purposes of this documentation and the safety instructions contained therein, “qualified personnel” means trained staff who are familiar with safety concepts in automation engineering and who are authorised to assemble, install, start up, earth and identify devices, systems and electrical circuits in accordance with standards set in safety engineering.

1.5. Duty of care

The user (OEM) must ensure the following:

- ▶ The device must only be used according to regulations.
- ▶ The device must only be used in good working order.
- ▶ The user handbook must always be kept legible and fully available.
- ▶ Only sufficiently qualified and authorised personnel may carry out the assembly, installation, start-up and maintenance of the device.
- ▶ These authorised personnel must receive regular training on all relevant occupational health and safety and environmental protection issues and must be fully familiar with the contents of this user handbook, particularly the sections regarding safety features.
- ▶ Any markings or identification labels and safety and warning signs on the device must not be removed and must be kept legible at all times.
- ▶ The national and international regulations regarding the operating of machinery and facilities where the device is being used must be observed at all times.
- ▶ The user must always be kept abreast of any current relevant information regarding the device and its use or operation.

The user takes direct responsibility for agreeing with the competent authorities the use of safety-related control components, and for compliance with their instructions.

1.6. Intended use

The device is part of a modular automation system for industrial control applications within the medium to high performance range. It extends the communications capabilities to include EtherCAT, Profinet, Modbus and others.

The automation system is designed for use within overvoltage category I (IEC 364 4 443) systems for controlling and regulating machinery and industrial processes in low-voltage installations in accordance with the following general parameters:

- maximum rated supply voltage of 1,000 V AC (50/60 Hz) or 1,500 V DC
- Environment with maximum category 2 pollution (EN 61010-1)
- for use up to a maximum altitude of 2,000 m above msn.
- for indoor use only in areas not exposed to direct UV radiation
- Max. ambient temperature inside and outside the control cabinet in accordance with the technical data (see "Technical data")

Qualified project planning and design, proper transport, storage, installation, use and careful maintenance are essential to the flawless and safe operation of the automation system.

The automation system may only be used within the scope of the data and applications specified in this documentation and associated user manuals.

The automation system must only be used:

- as intended
 - in a technically perfect condition
 - without any unauthorised modifications
 - by qualified users
-
- ▶ Observe the rules of the employer's liability insurance association, the technical inspectorate, and the VDE (Association of German Electrical Engineers) or corresponding country regulations.

The device is intended for installation into a suitable cut-out on industrial machines and systems in indoor areas.

- ▶ When installing the device, check that the seal profiles are undamaged.
- ▶ For operation, refer to the applicable statement of ambient conditions (see "Technical data").

1.7. Transport and storage

The device is susceptible to impacts, heavy vibration, moisture and extreme temperatures.

Transport and storage

- ▶ Protect the device against major mechanical stresses during transport.
- ▶ Always pack the device in its original packaging for transport.
- ▶ For storage, refer to the applicable statement of ambient conditions (see "Technical data").
- ▶ Protect the device against condensation and damp.

Devices with batteries/rechargeable batteries

Lithium metal batteries are hazardous items. The manufacturer's information specifies that they are subject to UN 3091 (must be permanently installed within the device).

The ADR 188 special regulations can be applied for transport.

Operation

- ▶ If the device has been stored or transported in cold weather or under conditions or large fluctuations in temperature, do not start to operate it until it has acclimatised to room temperature for the place it is used.
- ▶ If condensation is present, wait at least 12 hours before starting to operate the device.

1.8. Unpacking

On receipt of the device, a check must be made that it is complete and undamaged.

- ▶ Check the packaging for external damage.
- ▶ If the packaging is seriously damaged or if damage to the contents is evident: Do not proceed further with opening the packaging, instead immediately inform the transport company and your supplier.
- ▶ Remove the packaging and keep it safe for subsequent transport.
- ▶ Check the contents for evidence of damage in transport.
- ▶ Check the contents for completeness against the order documentation and keep all the delivery documentation for future reference. The delivery documentation contains important information about the device and is part of the product.
- ▶ If you discover damage in transport, or if the equipment delivered does not match the order: Inform the supplier immediately.

2. Safety

Safety related systems

The use of PLCs in safety-related systems requires specific measures. Wherever a PLC is to be used in a safety-related system, the user must be given comprehensive advice by the PLC manufacturer in addition to information on any available standards or regulations regarding safety installations.

- ▶ Before starting any work on devices, switch off all power feeds, including to peripherals.
- ▶ Keep all ventilation holes unobstructed.

Failure in certain components in an electronic control system may result in uncontrolled and/or unpredictable operational behaviour.

- ▶ All types of failure must be considered at the system level and the associated preventative measures identified.
- ▶ If necessary, request information from your automation system provider.

2.1. Safety instructions

The device may be operated only when it is in good working order. Exposed sharp edges pose an injury risk.

- ▶ If you discover damage to the front glass of the device, do not continue to operate the device. Immediately disconnect it from the power supply.

Working on the device

Do not start work on the device until all necessary safety precautions have been taken. Take precautions to avoid unforeseeable functional events and movements of the system.

- ▶ Bring the system into a safe condition.
- ▶ Switch the system and the device off.
- ▶ Secure the system against being switched on again.
- ▶ Disconnect the device from the system.

The casing of the device must not be opened.

- ▶ If work on the internal parts of the device is necessary, contact the manufacturer (see "Addresses").

3. Product description

The B-Nimis MC-Pro is a CODESYS PLC controller with a broad range of data interfaces. In compliance with IEC 61131-3 the module can be programmed with CODESYS version 3.x.

3.1. Overview

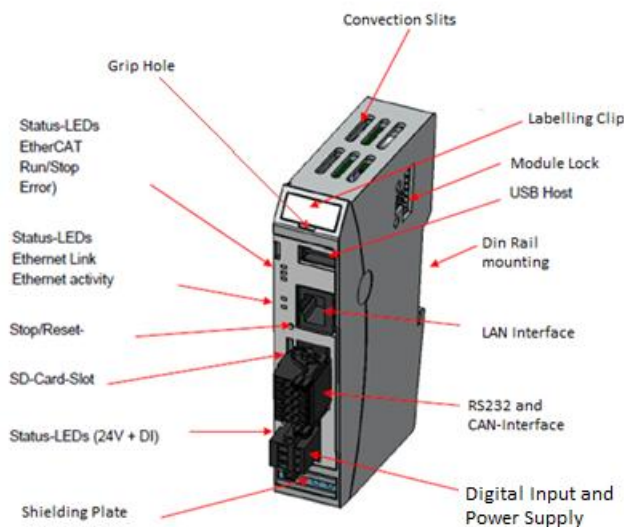


Fig. 1: Overview B-Nimis MC-Pro S01

3.2. Scope of delivery and accessories

Scope of delivery

- Modular-Controller B-Nimis MC-Pro S01
- Connector 3 pin black, order no. 204801900
- Connector 10 pin black, order no 204802100

Accessories

- Plug Set MC-Pro, order no. 201608400
- Shielding connectors:
 - 2 x 8 mm; order no. 204802400
 - 1 x 14 mm; order no. 204802500

3.3. Product features

Installation

The B-Nimis MC-Pro is designed for installation in switching cabinets on a DIN mounting rail in a rough industrial environment. The fanless design and the flash memory make the cost and effort for maintenance minimal.

Processor

The device runs with a 1 GHz i.MX6 SoloX Cortex™-A9 single-core.

Ethernet Interface

1 Ethernet interface with 10/100 Mbit/s

The Ethernet interface is used for standard Ethernet connections. TCP/IP and UDP/IP protocols permit flexible connections to visualisation software, higher-level control units and to the IT infrastructure.

EtherCAT interface

An EtherCAT E-bus interface with a lateral 10 pin connection is available.

USB interface

The USB host interface provides a widely used peripheral interface. For example, it can be used to carry out an application update or data migration simply via a USB stick.



USB sticks with FAT/FAT32 formatting are supported.

If you require support for other USB formats, please contact our Technical Support.

CAN interface

The device has 1 x standard ISO 11898 CAN interface, which can be used up to 1 Mbit/s.

Serial interface

The device has 1 x serial RS-232 port

Digital input

The device provides 1 x digital input on board, which can be used e.g. for CODESYS Event Input

Real Time Clock

A battery-buffered, maintenance free real time clock can be used within the CODESYS application via a software interface.

SD card slot

The B-Nimis MC-Pro provides 1 x SD card slot, e.g. for data copies.

Visualization

CODESYS Target and Web Visualization are included in the scope of supply. An easy to use display is available with the Berghof B-Primis Ethernet Terminals. CODESYS Target- and Web-Visualization are included within the B-Nimis MC-Pro.

Summary of features for B-Nimis MC-Pro S01

- 1 GHz i.MX6 SoloX Cortex™-A9 single-core
- Program memory and data memory (RAM): 256 MB Onboard
- Program memory (Flash): 256 MB Onboard

- 1 x Ethernet 10/100 Base T interface
- 1 x USB Host V2.0
- 1 x CAN interface (galvanic isolated)
- 1 x serial RS-232 interface
- 1 x EtherCAT interface for up to 10 additional MC-I/O extension modules (max. E-bus Load 2 A)
- 1 x Real Time Clock (RTC)
- 1 SD-Card Slot

4. Installation

4.1. Mounting

The B-Nimis MC-Pro modules are intended for mounting rail installation (DIN EN 60715, 35 x 7.5 mm).

1. Push up the module against the mounting rail from below, allowing the metal spring to snap in between mounting rail and mounting area as illustrated.
2. Push the module above against the mounting wall until it snaps in.

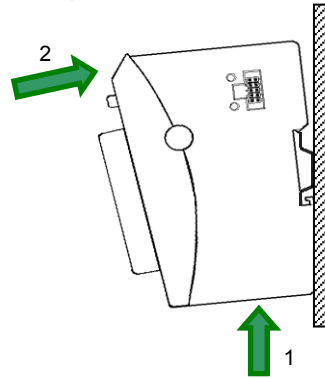


Fig. 2: Mounting the device

NOTICE

There must be at least 100 mm clearance above and below the module.

This guarantees the necessary convection cooling for the B-Nimis MC-Pro. The mounting plate must be metal in order to ensure heat conduction..

To interconnect two modules

After snapping on the first module to the rail, snap on the second module about 1cm away towards the right of the first module. Push the second module along the rail towards the first module until you hear the locking device snap in.

To disconnect two modules

Push down the unlock button (see figure below) of the module that you wish to disconnect from the module to the left of it. Push both modules away from one another until they are about 1 cm apart.

1. Push the module up and against the metal spring located on the lower end of the rail guide.
2. Turn the module away from the rail as shown in the illustration.
3. Pull the module down and remove it.

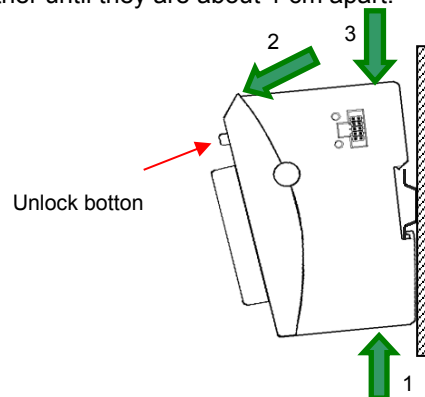


Fig. 3: Uninstalling the device

5. Connection

WARNING

Uncontrolled and unpredictable operational behaviour!

Failure of certain components in electronic control systems may result in uncontrolled and unpredictable operational behaviour.

- ▶ All types of failure and the associated protection systems must be taken into account at system level.
- ▶ Comply with all automation system manufacturer instructions.

5.1. Power supply

The device is powered by an external 24 V DC power supply. It is not designed to be connected to a DC mains supply.

- ▶ Before plugging in the device, ensure that the external power supply meets the required specifications (type K to 61131-2).

External power supply (24 V DC)

Supply voltage	+24 VDC SELV (-15 % / +20 %)
Ripple current proportion	Max. 5 %
	The DC voltage level must not fall below 20.4 V.

Internal power supply

A power supply for the system electronics for an input voltage of 24 V DC (–15% / +20%) is integrated into the device. The power supply has integrated protection against reverse polarity and a limited in-rush current.

Both supply lines and the power supply units must be equipped with an external short-circuit and over-load protection with a tripping current of max. 5 A (depending on the number of I/Os).

Installation

- ▶ All connections and lines must be executed so that no faults are caused by inductive and capacitive interference in the controller.
- ▶ The supply lines must be sufficiently resilient to current and voltage.
- ▶ Shielded lines must be used for communication. The shield must be connected properly to shielding plate of the module.


5.1.1. Connecting the power supply

⚠ CAUTION

Live parts!

- Before starting any work on the device, switch off all power feeds, including peripherals.

Connect the power supply to plug according to the following table.

Power supply plug			
Connector	Pin	Function	
	1	DI	digital input 24 VDC (-20 % / +25 %)
	2	L+	external power supply 24 VDC (-15 % / +20 %)
	3	L-	external power supply GND

The following counterparts have been tested for the SL-SMT 3.5 (Weidmüller) plug-in connector and are approved for use with the device:

→ BLZF 3.5/03/180 (F,LR,LH) SN

5.1.2. Shielding and Earth(ground)

The B-Nimis MC-Pro has to be connected to earth(ground). For this purpose, the metal housing has to be connected to a functional earth. The functional earth serves to dissipate HF currents and is of great importance for the immunity of the module. RF interference is diverted from the electronics board to the metal housing. The metal housing needs a suitable connection with the functional earth.

You have to ensure that

- the connection between DIN rail and switching cabinet conducts well
- the connection between DIN rail and switching cabinet conducts well
- the switching cabinet is safely connected to earth

In special cases you may attach the earth wire straight to the module.

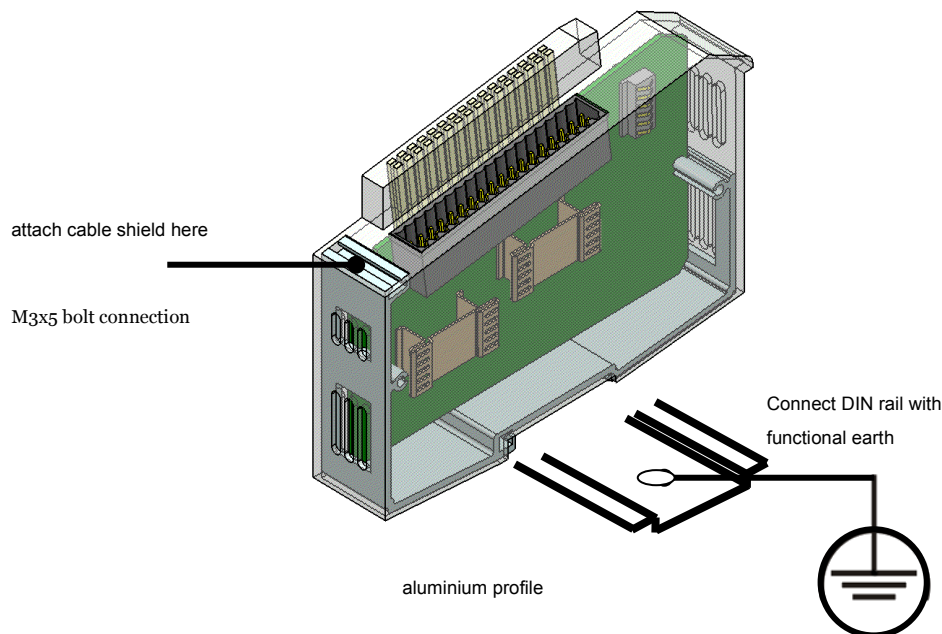


Fig. 4: Shielding and connection to functional earth

NOTE

Earth wires should be short and have a large surface (copper mesh).

For further details see [http://en.wikipedia.org/wiki/Ground_\(electricity\)](http://en.wikipedia.org/wiki/Ground_(electricity)).

5.2. Data connections

5.2.1. Block circuit diagram B-Nimis MC-Pro S01

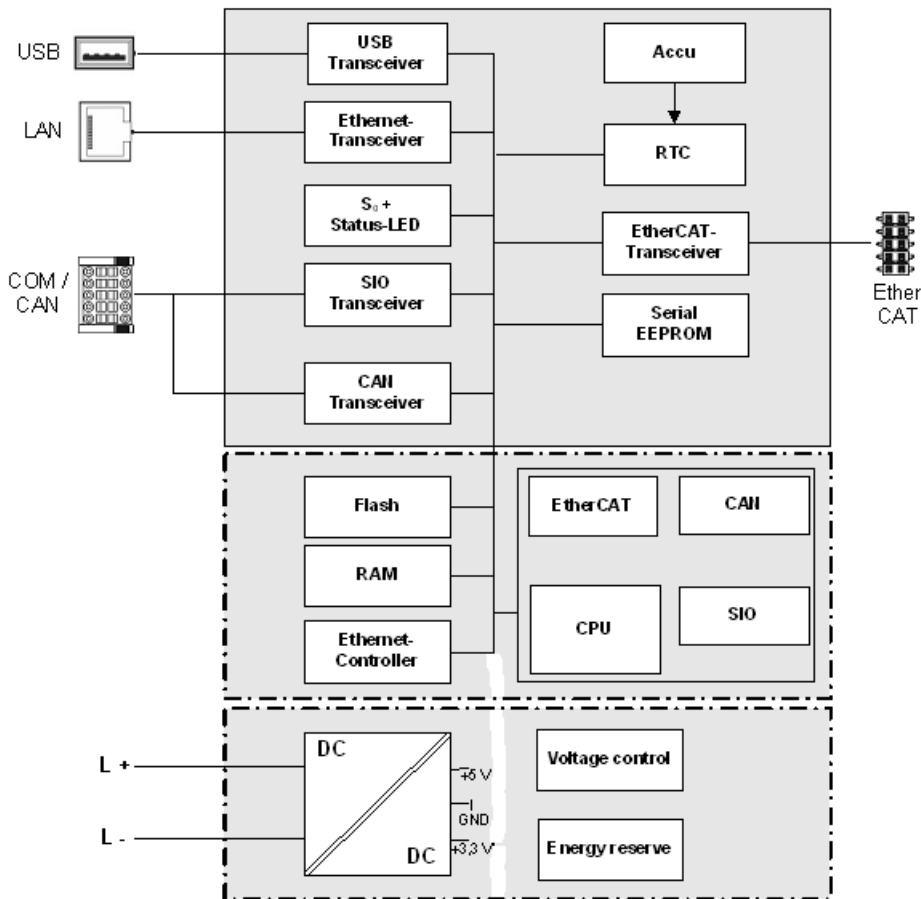


Fig. 5: Block circuit diagram B-Nimis MC-Pro S01

5.2.2. Digital input

The digital input of the controller is available via the supply connector and uses the common ground of the module supply.

NOTE


Damage to the inputs or to the device!

Voltages over ± 32 V can damage the digital input or the device.

- Do not apply voltages above/below of ± 32 V

The digital input is type 1 or 3 (IEC 61131-2) positive switching inputs of type 1 or 3 (IEC 61131-2). The input is designed for nominal input voltages of 24 V. An open input is interpreted as static 0. The reference for the input is the GND of the power supply

Pin assignment


Digital Input and Power Supply			
Connector	Pin	Assignment	
	1	DI	digital input 24 VDC
	2	L+	external power supply 24 VDC (-15 % / +20 %)
	3	L-	external power supply GND

5.2.3. Ethernet interface

The on-board Ethernet adapter has one 10/100-Base-T RJ-45 port for connection to the network.

The status LEDs "SPEED" and "LNK / RCV" provide information about a successful network connection according to IEEE 802.3 clause 25.

Pin assignment

Ethernet				
Connector	Pin	Assignment	Pin	Assignment
 RJ45	1	TX+	5	75 Ohm
	2	TX-	6	RX-
	3	RX+	7	75 Ohm
	4	75 Ohm	8	75 Ohm

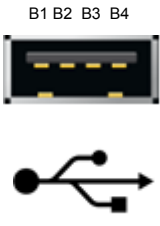
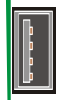
Status-LEDs

LEDs		
LED	Colour	Meaning to IEEE 802.3 clause 25
LED „SPEED“	yellow	On = 100 Mbit/s Off = 10 Mbit/s
LED „LNK/RCV“	green	Link, Data Receive Flashing: connection active; data transfer in progress Off: no connection established

5.2.4. USB interface

Devices with a USB interface can be connected to the USB host port (Rev. 2.0). Suitable USB device classes are: USB stick, keyboard or USB-Serial adapter

Pin assignment

	USB		
	Connector	Pin	Assignment
		B1	VCC
		B2	D-
		B3	D+
		B4	GND

NOTE

Damage to USB stick and malfunction due to data loss!

Removing a USB stick while it is still in use and data are being transferred can render the USB stick unusable. Open files which can no longer be accessed because the USB stick has been removed can block the device.

- Therefore ensure that all operations are complete before removing the USB stick.

NOTE

Damage to property and malfunctions due to data loss!

The USB interface is protected against overloading (> 0.5 A). In the event of a short circuit during operation, the control unit may trigger a reset of the system.

Substantial property damage and damage to the USB device may result.

- Before using a USB device, check carefully its power consumption..

NOTE

Failures and malfunctions will occur if direct connections are made to signal earth!

- Use only USB devices that have no direct connection between signal earth and the housing.

USB sticks can be plugged and removed during operation. The inserted USB stick is automatically recognized and integrated in the Linux directory /media/usbX. When unplugging the USB stick, the directory /media/usbX is removed from the directory.

For the USB stick either the first partition or, if there is no partition, the entire memory is mounted.

The X in usbX stands for a number from 1 (the first USB device) to 8 (the last / maximum USB device).



The USB interface plug is designed to withstand 1,000 plugging and unplugging cycles.


5.2.5. CAN and RS232 serial interface

The CAN interface conforms to the ISO 11898 standard and can be operated up to the maximum baud rate of 1 Mbit/s. The lowest baud rate which can be set is 50 kBit/s. The port is galvanically isolated

CAN interface	
Standard	ISO 11898
Maximum Baud rate	1 MBit/s
Lowest adjustable Baud rate	50 kBit/s

RS232 interface	
Maximum Baud rate	115 kBit/s

Pin assignment

RS232			CAN	
Assignment	Pin	Connector	Pin	Assignment
RxD	1	 Weidmüller B2L 3,5/10/180LH SN BK BX SO 1338740000	6	CAN-H
TxD	2		7	CAN-L
Ground	3		8	CAN Ground
Shield	4		9	CAN-H
Shield	5		10	CAN-L

5.2.6. EtherCAT extension modules

The B-Nimis MC-Pro PLC controller can be extended with a system of modular EtherCAT modules. These MC-I/O modules, which are connected side-to-side, are designed to offer a wide range of process signals.

NOTE

The number of direct connectable EtherCAT MC-I/O modules is limited!

The B-Nimis MC-Pro provides a current of up to 2 A for the logic supply of the EtherCAT expansion modules. Therefore, the maximum number of possible extension modules is limited to 10.

LED Signals

The EtherCAT status LEDs indicate the status of the EtherCAT ASIC.

EtherCAT

State	LED, flash code	Meaning
Init	red, continuous light	Initialization, no data exchange
Pre-Op	red/green, 1:1	Preoperational status, no data exchange
Safe-Op	red/green, 3:1	Operational status, full data exchange
Op	green, continuous light	Operational status, full data exchange

6. Operation

6.1. Switching on and off

NOTE

Damage or malfunction!

- ▶ Do not insert, connect, undo or touch any connections whilst the device is in operation.
- ▶ Before starting any work on the device, switch off all power feeds, including those to any connected peripherals (sensors and programmable devices etc. with independent power supplies).

NOTE

Damage to property!

- ▶ Before connecting the power supply, ensure that all cabling and the polarity of all the connections are correct..

Switching on

The device does not have an on/off switch. The device starts automatically when the system is switched on or the power is connected.

Switching off

The device is switched off when the system is switched off or the power supply is disconnected.

6.2. Initial Setup of the device

6.2.1. Web Terminal Configuration

NOTE

Damage to property!

- Before connecting the power supply, ensure that all cabling and the polarity of all the connections are correct.

The device must be connected to the network with the correct settings before it can be used.

At delivery the IP-address and network mask are set to:

IP-Adresse: 169.254.255.XX

XX corresponds to the last two numbers of the device serial number.

Exception: 00 becomes 100.

Network mask: 255.255.255.0

This setting can be used for initial setup of the device in the IP network.

1. Supply the device with power (24 V).
After the start the current IP address and network mask of the device are shown at the top right of the display.
2. Connect the device to a programming computer using a network cable (X4) and network switch.
3. Open a web browser on the programming computer.
4. Enter the IP address of the device into the web browser.

The login screen will appear



User Login:

Name:

Password:

Abb. 1: Login window

5. Use the following user name and password to log into the device:

Name: admin

Password: admin

The web configuration page will be displayed.

Configuration

[Network](#)
[Real-Time-Clock](#)
[Display](#)
[FTP-Server](#)
[Users](#)

System

[Info](#)
[Update](#)
[Reboot](#)
[Format Filesys](#)

PLC-Manager

[Control](#)
[Application Info](#)
[Application Files](#)
[Font Files](#)

Fig. 2: Web interface configuration menu

6. Click on the "Network" link.

The network configuration page is displayed

Network Configuration

COMMON

Hostname:

Default Gateway:

DNS Server 1:

DNS Server 2:

ETH0

Mode:

IP Address:

NetMask:

ETH1

Mode:

Fig. 3: Network configuration menu

7. Check the network settings and if desired make changes in the respective text boxes.
 Configuration DC211x: ETH0 = X4, ETH1 = X5
8. Save the settings by clicking on "Save".
9. Additional settings can also be viewed and/or modified on the web configuration page (for example "system time", display resolution, TargetVisu).
10. In order to load all the modified settings, reboot the device:
 Disconnect the device temporarily from the power supply.
 – or –
 Click on "Reboot" in the web interface and then confirm it on the next screen by clicking on "Reboot Module".

The device is now configured and ready for use

6.3. Operation

6.3.1. Status indicators

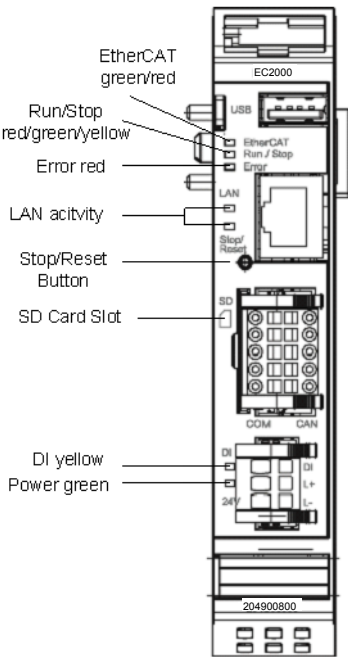


Fig. 6: Status indicators

Power LED

4 operating status LED indicate the current status of the voltage supply, module mode and error messages.

LED		State
1	Power (green)	ON = correct voltage supply to the module electronics

RUN/STOP push button

	Action	effect
during boot phase	activation	start plc in service mode
CODESYS	Short push	Change between RUN and STOP mode of PLC
	Long push	STOP the PLC using RESET cold

RUN/STOP ERROR – LED indication

2 LEDs are available to signalize the system state (RUN/STOP in two colours: red/green/(yellow); ERROR in red only).

:

System state	LED RUN/STOP	LED ERROR
PPP configuration mode active	yellow	off
USB packet update running	yellow flashing	off
System error	off	red
PLC state		
RUN	green	off
STOP	red	off
Error stop	red	red
Reset button	red flashing	off
ProfiNET state		
Identification of device	yellow flashing	red flashing

Basic procedure for error stop:

1. Log in to the device via a web browser.
2. Determine the cause of the fault (Diagnostics > PLC Log/System Log).
3. Correct the fault.
4. Restart the device (press “Reset” on the device).

The device is now ready for use.

Ethernet states

See chapter 5.3.3. Ethernet Interface

6.3.2. Real Time Clock

Setting/ Reading the date and time

The time can be set and read via the web configuration page or via the CODESYS V3 library.

Changing the battery

The battery is not designed to be changed by the user; the manufacturer should be contacted in order to change the battery.



For the battery the regulations according to UN 3091 -PI 970 Section II Button Cell apply.

6.3.3. SD-Card

WARNUNG

Serious injury as a result of uncontrolled and unpredictable operational behaviour!

Inserting or removing the SD card can lead to malfunctions in the device. Faults in electronic control systems may result in uncontrolled and unpredictable behavior of the plc controller.

- ▶ Only insert or remove the SD card when the device is switched off.

Inserting a SD card

1. Switch the device off.
2. Insert the SD card into the SD card slot.
3. Switch the device on again.

The card is now ready for use(read, write and copy).

Path: /media/sd



Max. possible storage capacity: 32 GB.

The life cycle of the gold-plated contacts is up to 10,000 plugging and unplugging cycles.

The SD card drive has a push-in/push-out insertion and ejection mechanism.

To avoid malfunctions, do not withdraw the SD card by pulling it.

6.3.4. Reset/Stop push button

The Reset/Stop button is located on the front of the device below the status LEDs. To prevent unintentional operation, the stop/reset button can only be operated with a thin pointed object (pen, screw-driver).

CODESYS Stop – Start – Reset

By briefly pressing the button, a running CODESYS application is stopped. The Run / Stop LED changes from green to red. A short press will start the CODESYS application. The Run / Stop LED changes from red to green. If the button is pressed and held for more than 5 seconds, a "Reset warm" is triggered. After the time has elapsed, the Run/Stop LED flashes quickly and the button can be released. The controller is now in reset state.

Service mode

To enter service mode, the controller must be switched off. The button is then held down and the controller is switched on again. The button must be kept pressed until the Run/Stop LED flashes yellow every two seconds.

6.4. Troubleshooting

6.4.1. No network connection

- ▶ Check the cabling / switch.
- ▶ Check whether an IP address has been duplicated.
- ▶ Check the network settings on the PC: The subnet and the subnet mask settings must be the same as those for the controller.
- ▶ Check the firewall / anti-virus programs on the PC.
- ▶ Check the Lifeguard settings.

6.4.1 CODESYS application is in Error Stop

1. Log in to the device via a web browser.
2. Determine the cause of the fault (Diagnostics > PLC Log/System Log).
3. Correct the fault.
4. Restart the device (press "Reset" on the device).

The device is now ready for use.

6.4.2. IP-Address of B-Nimis MC-Pro is unknown

If the IP address of the device is not known, the device can be reconfigured via a USB update.

1. Restart the device while holding down the function button S1 until the run / stop LED flashes yellow every 2 seconds. The device is now started in service mode.
2. In service mode the device can be accessed via the factory default IP address
IP-address: 169.254.255.XX
Net mask: 255.255.255.0
X corresponds to the last 2 numbers of the device serial number. Exception: 00 becomes 100.
3. Change settings as needed.
4. Restart the device.

Device is now configured and ready for operation.

7. Maintenance and service

Repairs and corrective maintenance may be carried out only by the manufacturer or authorised customer service centres.

WARNING

Uncontrolled and unpredictable operational behaviour!

Failures or malfunctions may result in uncontrolled and unpredictable operational behaviour.

- ▶ Do not insert, connect, undo or touch any connections whilst the device is in operation.
- ▶ Before starting any work on the device, switch off all power feeds, including those to any connected peripherals (sensors and programmable devices etc. with independent power supplies).

If the device is used correctly it should not require any maintenance.

- ▶ Make sure all the ventilation holes are kept free of obstructions.
- ▶ Do not open the device. If maintenance is necessary, please contact customer service.

8. Uninstallation

1. Disconnect the device and its peripherals from the power supply.
2. Unplug all plug connectors and cables.

NOTE

Damage to the device!

If uninstallation is performed carelessly the device can be damaged.

Push down the unlock button (see figure below) of the module that you wish to disconnect from the module to the left of it. Push both modules away from one another until they are about 1 cm apart.

1. Push the module up and against the metal spring located on the lower end of the rail guide.
2. Turn the module away from the rail as shown in the illustration.
3. Pull the module down and remove it.

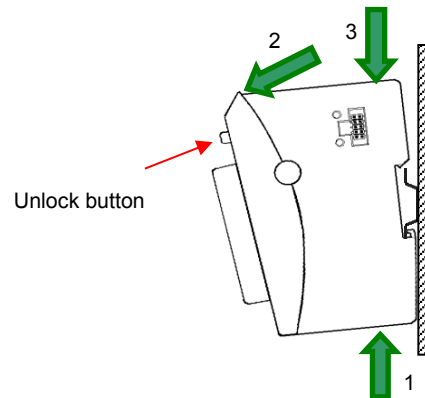


Fig. 7: Uninstalling the device

9. Disposal

The device contains the following components which need to be disposed of separately:

- Metals
- Electronic components
- Battery

The respective national regulations for disposal of electrical devices in B2B trade are applicable.

The following options are available for disposal of the device:

Disposal by the manufacturer

Unless agreed otherwise, devices can be sent back for disposal.

Disposal in accordance with regional regulations

- ▶ Dismantle the device and disassemble it completely into its component parts.
- ▶ Send the metal parts for metal recycling.
- ▶ Sort the electronic parts (circuit boards, drives etc.).
- ▶ Dispose of the electronic scrap in accordance with the national laws and regulations.
- ▶ Check that the battery is fully discharged.
- ▶ Dispose of the battery in accordance with the national laws and regulations, via an authorised collection point.

10. Technical data

B-Nimis MC-Pro S01	
Module data	
Device name	B-Nimis MC-Pro S01
Order no.	204900800
Programming	CODESYS V3.x
Installation	DIN rail NS 35/7,5 EN 60715
I/O Extension	right-sided EtherCAT expansion modules MC I/O series
CPU	
CPU	i.MX6 SoloX 1 GHz
Program memory (Flash)	256 MB Onboard
Program memory and data memory (RAM)	256 MB Onboard
Retain memory	not available for B-Nimis MC-Pro S01 (use CODESYS Persistenz Manager)
Dimensions and weights	
Dimensions (WxHxD [mm])	25 x 124 x 90
Gewicht	approx. 150 g
Operating conditions	
Ambient temperature	0 °C to 50 °C; 55 °C as standalone specification (if installation instructions are observed)
Relative air humidity	5% ... 95% non condensing
Transportation and storage	
Ambient temperature	-25 °C bis +70 °C
Relative air humidity	5% ... 95% non condensing
Shock resistance	
Vibration	Sinus-shaped (EN 60068-2-6) test: Fc 10 ... 150 Hz, 10 m/s²
Shock	15 G (approximately 150 m/s²), 11 ms duration, semi-sinus (EN 60068-2-27) test: Ea
EMC, protection rating	
Emitted interference	EN 61131-2; EN 61000-6-4, industrial sector
Immunity to interference	EN 61131-2; EN 61000-6-2, industrial sector
Protection class	III
Insulation strength	SELV (U _e < 30 V) according to EN 61131-2

B-Nimis MC-Pro S01	
Protection type	IP20
Power supply (24 V DC power)	
Supply voltage	+24 V DC (–15 % / +20 %) SELV max. ripple component 5%
Power consumption	typ. 0,15 A, max. 0,3 A at +24 VDC, adapt fuse protection depending on number of connected expansion modules, max. 2.5A
Protection against reverse polarity	yes
separated potentials	no
power fail filter time	10 ms at < 20,4 VDC (with max. external E-Bus Load of 5 V / 2 A) Power Fail Level < 19,2 VDC
Ethernet interface	
Number / type of interface	1x 10/100 Base T
Connection system	1x RJ45
EtherCAT interface	
Number / type of interface	1x EtherCAT E-Bus, 10-pin.
Connection system	Row connector to the right side
USB interface	
Number / type of interface	1x Host USB Rev. 2.0
plugging/unplugging cycles	max. 1.000
CAN interface	
Number / type of interface	1x CAN
Isolation	yes (galvanic)
Baud rate	ISO 11898 max. 1 Mbit/s
Termination	external
Serial interfaces	
Number / type of interface	1x RS232; 3 wire
Isolation	no
Baud rate	max. 115 kBits/s
Additional functions	
Real Time Clock	yes, with battery backup (maintenance free)
SD-Card	1 x SD card slot
Digitaler Eingang	24 V, 1 ms
Battery	

B-Nimis MC-Pro S01	
Typ	Panasonic VL1220 or similar (Lithium-Metal-cell, Lithium < 1 g)
Lifetime	10 years (depending on operating temperature)
Included Licenses	B-Nimis MC-Pro S01 Target Visualization and VNC-Server Web Visualization (Web Server, HTML5) EtherCAT-Master CANopen Master

10.1. Nameplate

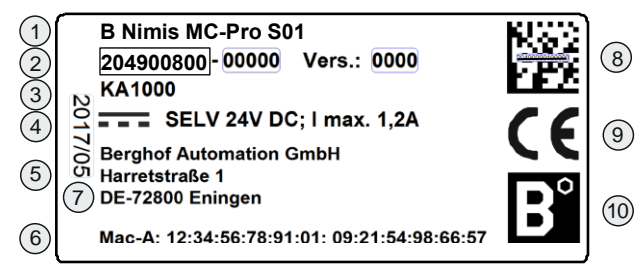


Fig. 8: Nameplate

Item	Designation	Item	Designation
1	Device Name	6	Customer no.
2	Identification no. (Article no., serial no. and version/as-delivered condition)	7	Supply voltage und maximum current consumption
3	Date of manufacture (year/week)	8	QR code (Identification no.)
4	Manufacturer's address	9	CE mark
5	Mac addresses	10	Manufacturer's mark (trademark)

10.2. Identification

Product: Modular-Controller, B-Nimis MC-Pro S01

The characteristics of the device can be decoded from the identification key.

Identification Scheme

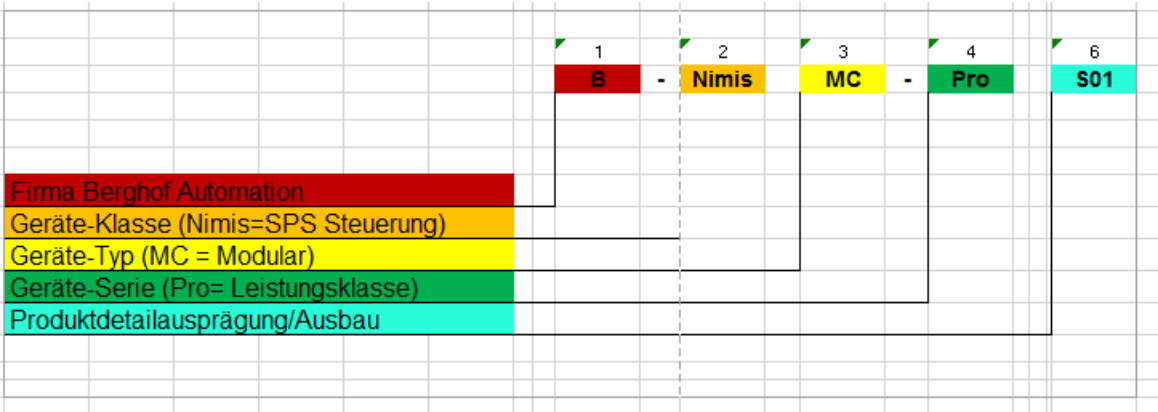


Fig. 9: Identification Scheme

11. Standards and certificates

11.1. Standards

Applicable directives

- EMC directive 2014/30/EU
- RoHS directive 2011/65/EU (including derivation 2015/863)

Applicable standards

- Programmable Logic Controllers, part 1: General information
EN 61131-1
- Programmable Logic Controllers, part 2: Equipment requirements and tests EN 61131-2
- Industrial Control Equipment 17. Edition / 1999-01-28, UL 508
- Technical documentation for assessing electrical and electronic equipment in respect of restriction of hazardous substances
EN 50581:2012

11.2. Declaration of conformity

The declarations of conformity can be found on our website

<https://www.berghof-automation.com>

and are available for downloading in respect of each product.

Example of a path:

Products → Controllers / PLC → Display PLC → Capacitive → Product

Downloads:

- > Technical Data
- > Manual
- > Pin Assignment
- > Declaration of Conformity
- > Brochure

Fig. 10: Download menu of Berghof Homepage

12. Customer services / addresses

Repairs and corrective maintenance may be carried out only by the manufacturer or authorised customer service centres.

12.1. Customer service

Berghof Automation GmbH
Harretstr. 1
72800 Eningen
Germany
T +49.7121.894-183
F +49.7121.894-100
e-mail: support-controls@berghof.com
<https://www.berghof-automation.com>

12.2. Addresses

CAN in Automation; international manufacturer and user organisation for CAN users in automation:

CAN in Automation e.V. (CiA)
Am Weichselgarten 26
91058 Erlangen
headquarters@can-cia.de
www.can-cia.de

EtherCAT Technology Group
ETG Headquarters
Ostendstraße 196
90482 Nuremberg
info@ethercat.org
www.ethercat.org

Beuth Verlag GmbH, 10772 Berlin
VDE-Verlag GmbH, 10625 Berlin
URL: www.iec.ch

13. Appendix

13.1. Information on copyright and software licence

The firmware of the devices contains der free software. Parts of this software are available under the following OpenSource licences, amongst others:

- GNU General Public License (GPL)
- GNU Lesser General Public License (LGPL)
- Mozilla Public License (MPL)
- FreeType License (FTL)

The source code of the free software may be requested from Berghof Customer Service within three years of delivery of the device, at cost price.

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