BUCHER automation

User Manual



60860482

JX3-BN-ETH

Ethernet

This document has been compiled by Bucher Automation AG with due diligence based on the state of the art as known to them. Any revisions and technical advancements of our products are not automatically made available in a revised document.
Bucher Automation AG shall not be liable for any errors either in form or content, or for any missing updates, as well as for any damage or detriment resulting from such failure.

Bucher Automation AG
Thomas-Alva-Edison-Ring 10
71672 Marbach/Neckar, Germany
T +49 7141 2550-0
info@bucherautomation.com

Technical support
T +49 7141 2550-444
support@bucherautomation.com

Sales
T +49 7141 2550-663
sales@bucherautomation.com

www.bucherautomation.com

Translation of the german original User Manual

Revision	1.20.1
Date of issue	6/4/2024

Table of Contents

1 Introduction 5
1.1 Information on this Document 5
2 Safety 6
2.1 General Information 6
2.2 Purpose 6
2.2.1 Intended use 6
2.2.2 Usage other than intended 6
2.3 Warnings used in this document 7
3 Product description 8
3.1 Design 8
3.2 Features 8
3.3 Status indication 9
3.3.1 Diagnostics capabilities by means of status indication 9
3.4 Nameplate 10
3.5 Scope of Delivery 10
4 Technical Specifications 11
4.1 Dimensions 11
4.2 Mechanical Specifications 11
4.3 Electrical properties 12
4.3.1 System power supply 13
4.4 Environmental Conditions 14
4.5 EMC Values 14
4.5.1 Enclosure 14
4.5.2 Shielded Data and I/O Lines 15
4.5.3 DC Power Supply Inputs and Outputs 16
5 Mechanical Installation 18
5.1 Installing Device on DIN Rail 19
5.2 Removing Device from DIN Rail 20
5.3 Dismounting Enclosure from Backplane Module 21
6 Electrical Connection 22
6.1 Improving EMC Noise Immunity 22
6.2 Interfaces 23
6.2.1 Terminal X10 - Power supply 23
6.2.2 Ports X14, X15 - Ethernet 24
6.3 Commissioning 25
6.3.1 LED states during the boot process 26

7 Identification and Configuration ... 28
7.1 Identification ... 28
7.1.1 Electronic Data Sheet EDS ... 28
7.1.2 Version registers ... 31
7.2 IP configuration ... 32
7.2.1 Delivery status ... 32
7.2.2 Configuration memory ... 33
7.2.3 Configuration file config.ini ... 34
7.2.4 Set IP address of bus node ... 39
7.3 Operating system ... 44
7.3.1 Operating system update of bus node ... 44
7.4 File system ... 45
7.4.1 Features ... 46
8 Programming ... 47
8.1 Abbreviations, Module Register Properties and Formats ... 47
8.2 Addressing I/O Expansion Modules ... 47
8.2.1 Numbering Registers and I/Os ... 49
8.3 Storage options - Overview ... 51
8.3.1 Operating system memory ... 52
8.3.2 File system memory ... 52
8.3.3 Special registers ... 52
8.3.4 Inputs and outputs ... 53
8.4 Ethernet system bus ... 53
8.5 FTP Server ... 53
9 Register overview ... 55
10 Maintenance ... 64
10.1 Repairs ... 64
10.2 Storage and Shipment ... 64
10.3 Return and Disposal ... 64
11 Service ... 66
11.1 Technical support ... 66
12 Spare parts and accessories ... 67
12.1 Spare Parts ... 67
12.2 Accessories ... 67
12.2.1 Ethernet/EtherCAT® cable ... 67

1 Introduction

1.1 Information on this Document

This document forms an integral part of the product and must be read and understood prior to using it. It contains important and safety-related information for the proper use of the product as intended.

Target Groups

This document is intended for specialists with appropriate qualifications.
Only competent and trained personnel are allowed to put this device into operation.
During the whole product life cycle, safe handling and operation of the device must be ensured. In the case of missing or inadequate technical knowledge or knowledge of this document any liability is excluded.

Availability of Information

Make sure this document is kept at the ready in the vicinity of the product throughout its service life.
For information on new revisions of this document, visit the download area on our website. This document is not subject to any updating service.

Start | Bucher Automation - We automate your success.

For further information, refer to the following information products:

– Version updates
  Information about changes to the software products and operating system of your device
– Online help for the JetSym software
  Functions of software products with application examples
– Application-oriented manuals
  Product-independent documentation

2 Safety

2.1 General Information

The product corresponds to the current state of science and technology when placed on the market.
In addition to this user manual, the laws, regulations and directives of the country of operation or the EU apply to the operation of the product. The operator is responsible for compliance with the relevant accident prevention regulations and generally recognized safety rules.

2.2 Purpose

2.2.1 Intended use

The Ethernet bus node JX3-BN-ETH is intended for the extension of existing control systems in machines. This device is used to control machinery, such as conveyors, production machines, and handling machines.

Operate the device only in accordance with the intended conditions of use and within the limits set forth in the technical specifications.
Intended use of the product includes its operation in accordance with this manual.

SELV

The operating voltage of this device is classified as Safety Extra Low Voltage and is, therefore, not subject to the EU Low Voltage Directive. The device may only be operated from a SELV source.

2.2.2 Usage other than intended

This device must not be used in technical systems which to a high degree have to be fail-safe.

2.3 Warnings used in this document

⚠ DANGER



High risk

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING



Medium risk

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

⚠ CAUTION



Low risk

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

NOTICE



Material damage

Indicates a situation which, if not avoided, could result in malfunctions or material damage.

3 Product description

The JX3-BN-ETH Ethernet bus master allows for the setup of remote I/O stations. It features a JX3 bus master node that connects directly to up to 16 JX3 I/O modules. This module enables synchronous communication between controllers and the remote I/O station via Ethernet.

3.1 Design

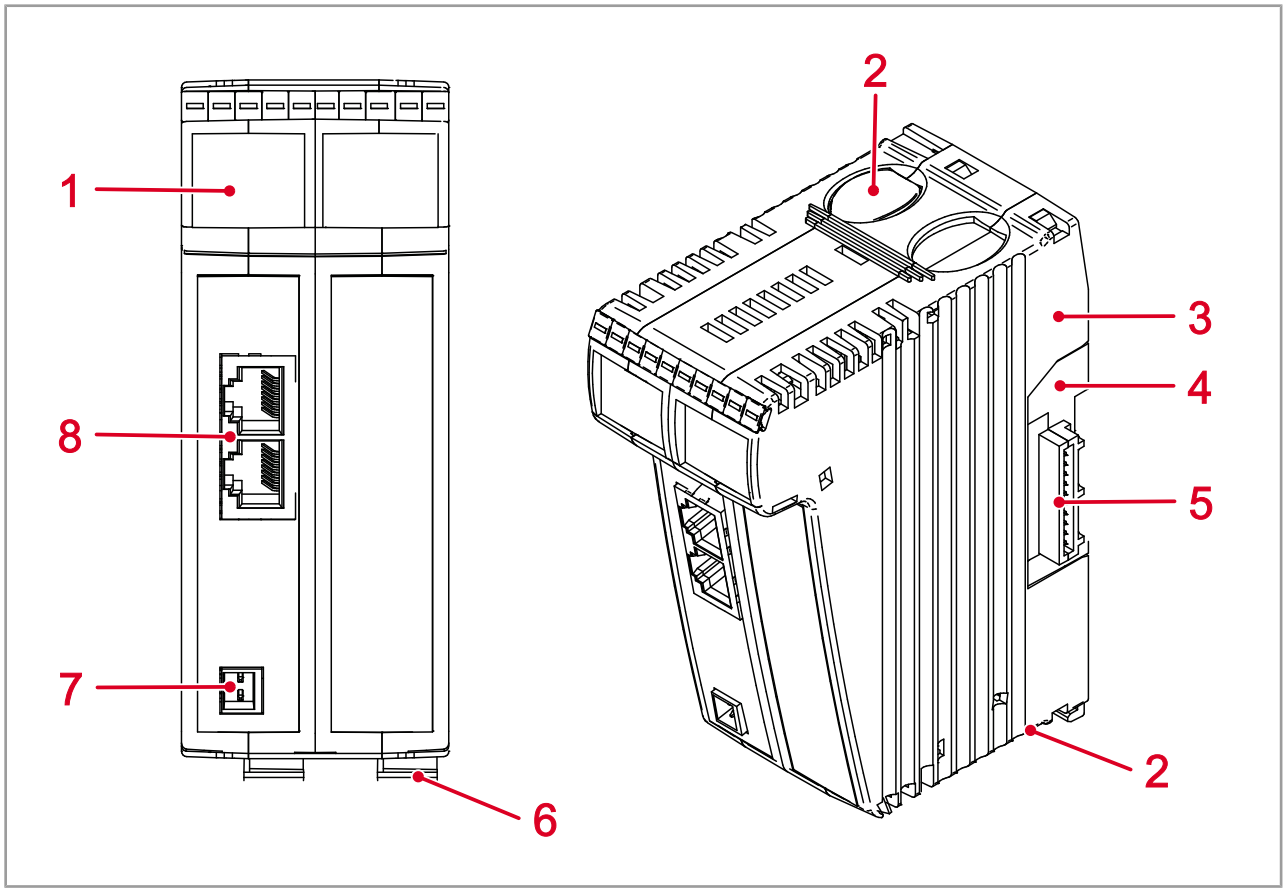


Fig. 1: Device design

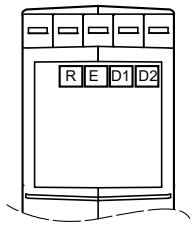
1	Status indication	2	Latch
3	Housing	4	Backplane module
5	X119 connector: Connection for JX3 I/O modules	6	DIN rail release latch
7	Terminal X10: Power supply	8	Ports X14, X15: Ethernet port

3.2 Features

- Ethernet bus node for a maximum of 16 JX3 I/O modules
- Fast I/O processing
- Integrated 2-port switch
- Choice of static or dynamic IP address assignment via GNN (Global Node Number)
- Synchronous Ethernet protocol between controller and JX3-BN-ETH
- Power supply for up to 8 JX3 modules

3.3 Status indication

Status indication LEDs indicate the communication status of the device as well as the status of the power supply.



LED	Description	LED	Description
R	State of operating system	D1	Special states
E	Generic error	D2	State of boot loader

Fig. 2: Status indication

3.3.1 Diagnostics capabilities by means of status indication

Color and status of the LEDs are an excellent source of information for analyzing various states. In the JetSym programming tool, diagnostics can be performed in the Hardware Manager or via the Setup pane by entering the corresponding register number.

LED	Status	Color	Description
R	OFF	---	No power supply or failure
	Blinking at 1 Hz	Green	Module is booting
	Blinking at 4 Hz	Green	Reset or fatal error
	ON	Green	Normal operating condition
E	OFF	---	No error
	Blinking at 1 Hz	Red	There is no valid OS
	Blinking at 4 Hz	Red	Reset or fatal error
	ON	Red	Error; refer to error register
D1	OFF	---	Normal operating condition
	Blinking at 1 Hz	Red	Automatic IP configuration
	Blinking at 4 Hz	Red	Reset or fatal error
D2	OFF	---	Boot loader is not running
	Blinking at 1 Hz	Red	Automatic IP configuration
	Blinking at 4 Hz	Red	Reset or fatal error
	ON	Red	Boot loader is being executed

3.4 Nameplate

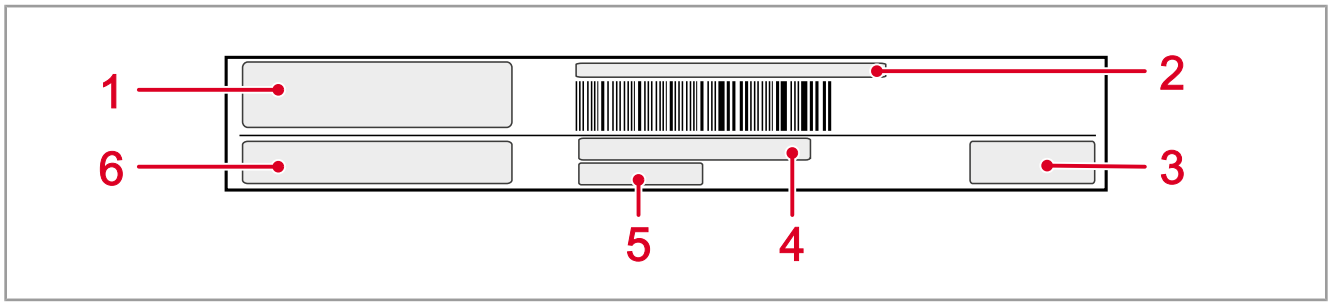


Fig. 3: Sample nameplate

1	Company logo
2	Serial number
3	Certification mark
4	Item number
5	Hardware revision
6	Item name

3.5 Scope of Delivery

Scope of delivery	Item number	Quantity
JX3-BN-ETH	10000645	1
Male connector in spring-cage technology, 2-pin	60870409	1
Terminal labels	60870411	10
Installation manual	60873376	1

4 Technical Specifications

This chapter contains information on both electrical and mechanical data as well as on operating data of the JX3-BN-ETH device.

4.1 Dimensions

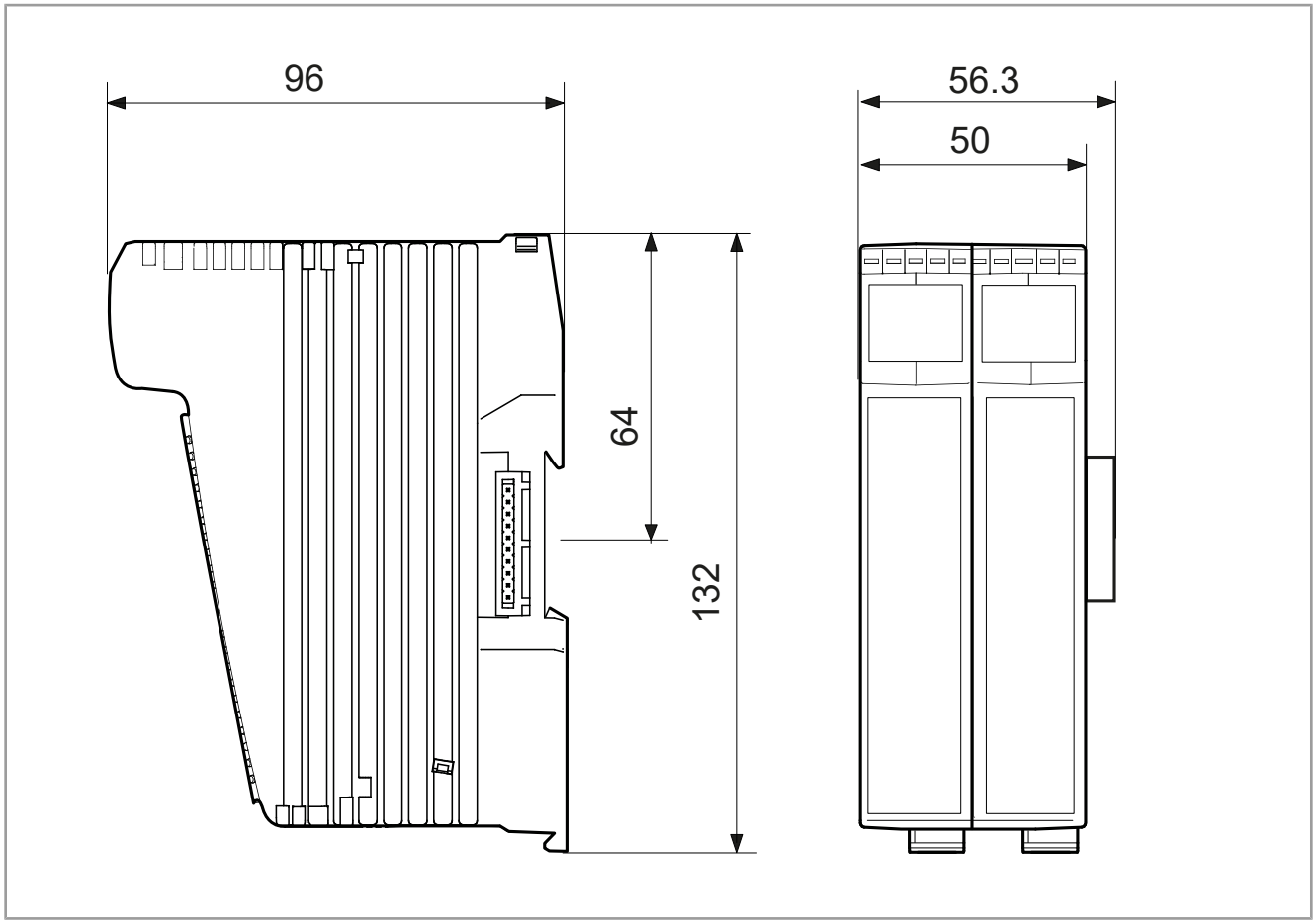


Fig. 4: Dimension in mm

4.2 Mechanical Specifications

Parameter	Description	Standards
Mounting orientation	Vertically mounted on DIN rail	
Weight	250 g	
Enclosure specifications		
Material	Plastic	
Maximum height of fall		
with shipping packaging	1 m	DIN EN 61131-2 DIN EN 60068-2-31
with product packaging	0.3 m	

Parameter	Description	Standards
Vibration resistance		
Frequency sweeps	1 octave/minute, sinusoidal	DIN EN 61131-2 DIN EN 60068-2-6
Constant amplitude	3.5 mm	5 Hz ≤ f ≤ 9 Hz
Constant acceleration	1 g	9 Hz ≤ f ≤ 150 Hz
Number and direction	10 sweeps for all 3 spatial axes	
Shock resistance		
Type of shock	Half-sine wave	DIN EN 61131-2 DIN EN 60068-2-27
Intensity and duration	15 g for 11 ms	
Number and direction	3 shocks in the directions of all 3 spatial axes	
Degree of protection		
Degree of protection	IP20	DIN EN 60529

Tab. 1: Mechanical specifications

4.3 Electrical properties

Power supply (terminal X10)

Category	Description
Supply voltage	DC 24 V
Permissible voltage range	-15 % … +20 %
Reach	Supplies the bus node and up to 8 expansion modules connected to it.
Input current	1.0 A max
Power consumption	24 W max

Tab. 2: Power supply (terminal X10)

Ethernet (Jacks X14, X15)

Category	Description
Terminal type	RJ45 jack
Port count	2
	1 port per terminal
Bit rate	10 Mbit/s, 100 Mbit/s (Cat 5e)
Auto-crossover	Yes

Tab. 3: Ethernet (Jacks X14, X15)

Memory configurations

Category	Description
Flash drive	4 MB

Tab. 4: Memory configurations

Electrical safety

Parameter	Description	Standards
Class of protection	III	DIN EN 61131-2
Dielectric test voltage	Functional ground is internally connected to the device ground	
Protective connection	0	
Overvoltage category	II	

Tab. 5: Electrical safety

4.3.1 System power supply

The bus node supplies the system bus with logic and power supply voltage.

These two types of voltage are for supplying the connected expansion modules.

System bus

Parameter	Description
Bus type	JX3 system bus
Logic voltage	
Supply voltage	DC +5 V
Permissible voltage range	-15 % ... +10 %
Additional voltage	
Supply voltage	DC +24 V
Permissible voltage range	-15 % ... +20 %

Tab. 6: System bus

Connected JX3 IO modules

Parameter	Description
Logic voltage	
Current consumption	I_{5V} = max. 1,200 mA
Power consumption	6 W max.
Additional voltage	
Current consumption	$I_{24\ V}$ = max. 750 mA
Power consumption	18 W max.

Tab. 7: JX3 IO modules on the system bus

4.4 Environmental Conditions

Parameter	Description	Standards
Operating temperature	0 °C … +50 °C	DIN EN 61131-2
Storage temperature	-40 °C … +70 °C	DIN EN 60068-2-1
Humidity	10 % … 95 %, non-condensing	DIN EN 60068-2-2
Max. operating altitude	2,000 m above sea level	DIN EN 61131-2
Corrosion immunity and chemical resistance	No special protection against corrosion. Ambient air must be free from higher concentrations of acids, alkaline solutions, corrosive agents, salts, metal vapors and other corrosive or electroconductive contaminants.	
Degree of pollution – Electronics	Level 2	DIN EN 61131-2
	Usually, the pollution is non-conductive. However, temporary conductivity due to condensation may occur.	

Tab. 8: Environmental conditions

4.5 EMC Values

4.5.1 Enclosure

Emitted Interference

Parameter	Values	Standards
Frequency band	**30 MHz … 230 MHz**	DIN EN 61000-6-3 DIN EN 61131-2 DIN EN 55011
Limit value	30 dB (µV/m) at 10 m distance	
Frequency band	**230 MHz … 1,000 MHz**	
Limit value	37 dB (µV/m) at 10 m distance	
	Class B	

Tab. 9: Emitted interference

Immunity to Interference

Parameter	Values	Standards
Magnetic field with mains frequency		
Frequency	50 Hz	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-8
Magnetic field	30 A/m	
RF field, amplitude-modulated		
Frequency band	80 MHz … 2 GHz	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-3
Test field strength	10 V/m	
	AM 80 % with 1 kHz	
	Criterion A	
ESD		

Parameter	Values	Standards
Discharge through air Test peak voltage	8 kV	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-2
Discharge through air Test peak voltage	4 kV	
	Criterion A	

Tab. 10: Immunity to interference

4.5.2 Shielded Data and I/O Lines

Immunity to interference

Parameter	Values	Standards
RF field, asymmetric, amplitude-modulated		
Frequency band	0.15 MHz … 80 MHz	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-6
Test voltage	3 V	
	AM 80 % with 1 kHz	
Source impedance	150 Ω	
Criterion	A	
Bursts		
Test voltage	1 kV	DIN EN 61000-6-2 DIN EN 61000-6-2 DIN EN 61000-4-4
	tr/tn 5/50 ns	
Repetition frequency	5 kHz	
Criterion	A	
Surge voltages, asymmetric, line-to-ground		
Common-mode coupling	tr/th 1.2/50 µs	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-5
	1 kV	

Tab. 11: Immunity of shielded data lines and I/O lines

Interference Immunity of Functional Earth Connection

Parameter	Values	Standards
RF field, asymmetric, amplitude-modulated		
Frequency band	0.15 MHz … 80 MHz	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-6
Test voltage	3 V	
	AM 80 % with 1 kHz	
Source impedance	150 Ω	
	Criterion A	

Parameter	Values	Standards
Bursts		
Test voltage	1 kV	DIN EN 61000-6-2 DIN EN 61000-6-2 DIN EN 61000-4-4
	tr/tn 5/50 ns	
Repetition frequency	5 kHz	
	Criterion A	

Tab. 12: Interference Immunity of Functional Earth Connection

4.5.3 DC Power Supply Inputs and Outputs

Emitted Interference

Parameter	Values	Standards
Signal and control line connections, DC voltage supply inputs and outputs		
Frequency band	0.15 … 0.5 MHz	DIN EN 61000-6-3
Limit value	40 to 30 dB	
Frequency band	0.5 … 30 MHz	
Limit value	30 dB	
	Class B	

Tab. 13: Emitted interference of the DC power supply inputs and outputs

Immunity to Interference

Parameter	Values	Standards
RF field, asymmetric, amplitude-modulated		
Frequency band	0.15 … 80 MHz	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-6
Test voltage	3 V	
	AM 80 % with 1 kHz	
Source impedance	150 Ω	
	Criterion A	
Bursts		
Test voltage	2 kV	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-4
	tr/tn 5/50 ns	
Repetition frequency	5 kHz	
	Criterion A	
Surge voltages, symmetric, line to line		
Differential-mode coupling	tr/th 1.2/50 µs	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-5
	0.5 kV	

Parameter	Values	Standards
Surge voltages, asymmetric, line to earth		
Common-mode coupling	tr/th 1.2/50 µs	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-5
	1 kV	

Tab. 14: Immunity to interference of the DC power supply inputs and outputs

5 Mechanical Installation

This chapter describes how to install and remove the JX3-BN-ETH.

NOTICE



Damaged devices

Damaged devices may cause considerable physical damage.

- ► Check the device for external damage and faulty connections.
- ► Ensure to install only fully functional devices.

5.1 Installing Device on DIN Rail

NOTICE

Functional impairment caused by unfavorable installation

- ► Install the device only in vertical position on the DIN rail (DIN EN 60715).
- ► Keep a minimum distance of 30 mm to surrounding parts.

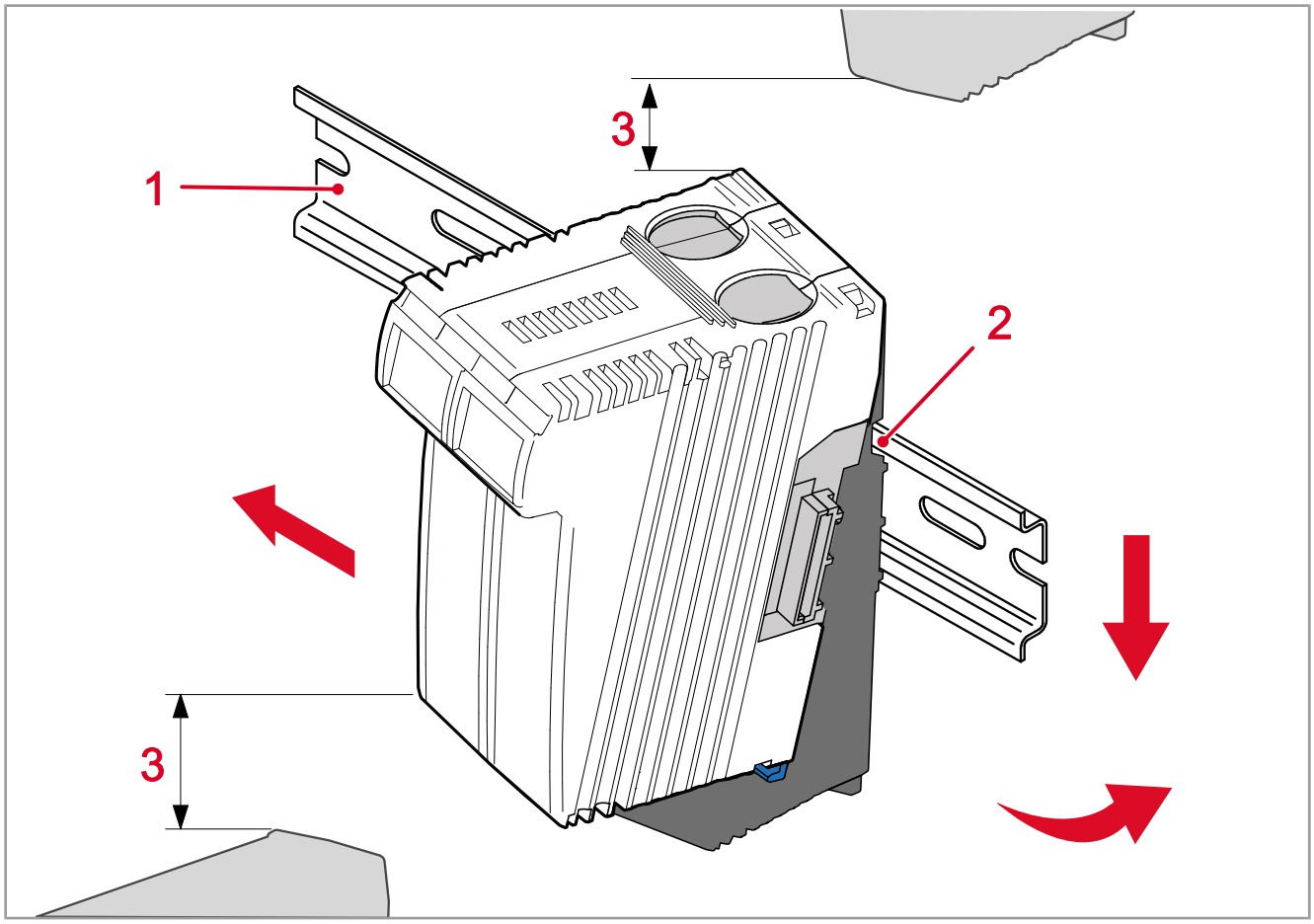


Fig. 5: Installing the device on the DIN rail

1	DIN rail
2	Upper latch
3	Minimum distance to surrounding parts (30 mm min.)

1. Disconnect the system from the power supply.
2. Place the upper latch (2) in an angled position on the DIN rail (1).
3. Snap the lower latch of the device onto the DIN rail.
4. Slide the device on the DIN rail to its intended position.

5.2 Removing Device from DIN Rail

Applying force to the release latch disengages the device from the DIN rail.

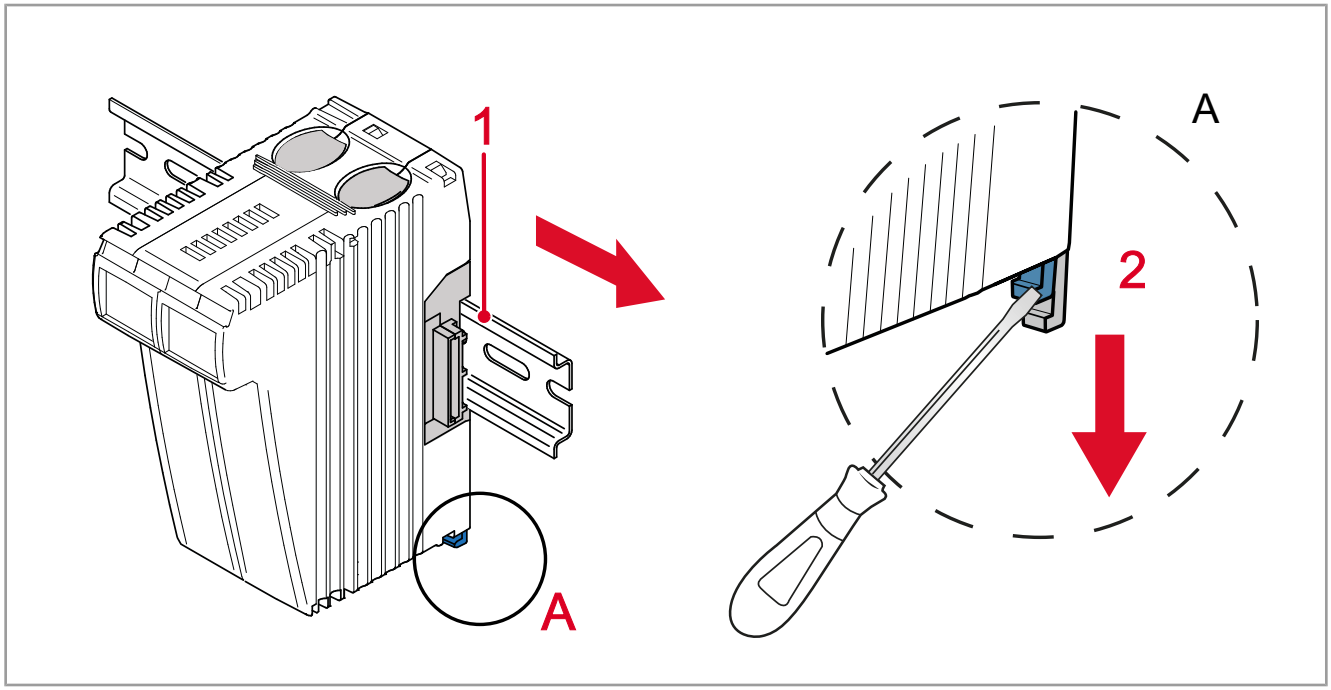


Fig. 6: Removing the device from the DIN rail

1	DIN rail
2	DIN rail release latch
A	Detail view

1. Disconnect the system from the power supply.
2. Pull the device off the overall assembly.
3. Pry the release latch (2) downwards and pull the device off the DIN rail (1).

5.3 Dismounting Enclosure from Backplane Module

Pressing down on the upper and the lower backplane latches of the device allows you to remove the enclosure from the backplane module.

NOTICE



Mechanical damage and reduced EMC noise immunity

If devices are replaced, degree of protection IP20 is not ensured. Touching the EMC clip may lead to mechanical damage to the device and reduced EMC noise immunity.

► Do not touch any electronic components once the enclosure has been removed from the backplane module.

The following information is retained on the backplane module:

– IP address
– Subnet mask
– Gateway
– DNS server

1. Disconnect the system from the power supply.
2. Simultaneously, press and hold the upper and lower latches (1) of the device.
3. With the latches pressed down pull the enclosure away from DIN rail.

6 Electrical Connection

NOTICE



Damages to material or functional impairment

Improper implementation of the wiring harness may cause mechanical stress.

- ► Protect the cables from bending, twisting or chafing.
- ► Install strain reliefs for the connecting cables.

6.1 Improving EMC Noise Immunity

A system's immunity to noise is determined by its weakest component. Key factors are correct connections, lines and proper shielding. Take note of the measures described in this section.

ⓘ Info

Further Information

For further information on the noise immunity of a system, please refer to the Application Note 016 *EMC-Compatible Installation of the Electric Cabinet* available for download on our website.

DIN rail

- Attach the JX3-BN-ETH device to a DIN rail to EN 60715 with the dimensions 35 x 7.5 mm.
- The DIN rail must be electrically conducting and grounded by either of the following two ways:
  - Directly
  - Via rear panel of the electric cabinet

Application Note 016

Follow the instructions given in Application Note 016 *EMC-Compatible Installation of the Electric Cabinet*.

The following instructions are excerpts from Application Note 016:

- Keep signal and power lines **separated from each other** at all times. Bucher Automation AG recommends that there be a minimum distance of 20 cm. Cables and lines should cross each other at an angle of 90°.
- Shield the following cables and lines:
  - Analog lines
  - Data lines
  - Motor cables coming from inverter drives (servo output stage, frequency converter)
  - Lines between components and interference suppressor filter, where the suppressor filter is located not immediately adjacent to the component.
- Place the shield **on both sides**.
- Keep unshielded wire ends of shielded cables as short as possible.
- Span the shield **entirely** across the isolation. For **wide-area grounding**, clamp it down tightly with an extensively earthed strain relief.

6.2 Interfaces

6.2.1 Terminal X10 - Power supply

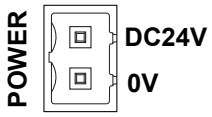
Ports and interfaces

X10 lets you connect the following devices:

– Power supply of the bus node JX3-BN-ETH

– Power supply for connected JX3 expansion modules if they are not supplied by a separate JX3-PS1 power supply module.

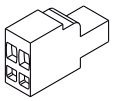
Pinning



Pin	Description
DC24V	Supply voltage
0 V	Reference potential (GND)

2-pin connector, spring-cage technology

The controller comes with a 2-pin spring-clamp connector.



Category	Description	Standards
Connector		
Designation	BU_02_E_BLZF_GE_RM3.5	
Connector technology	Spring-cage connection	
Type	2-pin, 3.5 mm pitch	
Connectible conductors		
Outer diameter of the isolation	2.90 mm max	
AWG	16 … 28	
Clamping range	0.13 … 1.5 mm²	
Stripping length	10 mm	
Specification without wire end ferrules		
Solid conductor	H05(07) V-U	
	0.2 … 1.5 mm²	
Flexible conductor	H05(07) V-K	
	0.2 … 1.5 mm²	
Specification with wire end ferrules		
Wire end ferrule without sleeve	0.2 … 1.5 mm²	DIN 46228/1
Wire end ferrule with sleeve	0.2 … 1.5 mm²	DIN 46228/4
Crimping tool	PZ 4, PZ 6 ROTO, PZ 6/5	DIN 46228

Tab. 15: Connector specification, 2-pin connector, spring-cage technology

6.2.2 Ports X14, X15 - Ethernet

Ports and interfaces

Ports X14 and X15 connect to the following devices:

- Ethernet port connecting to:
  - PC
  - HMI
  - JetMove 2xx
  - any device

Pinning

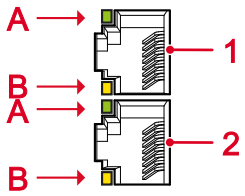


Fig. 7: Ports X14, X15

Position	Socket	LED	Color	Description
1	X14	A	Green	LINK: There is a connection to the network
		B	Yellow	ACT: Data transmission
2	X15	A	Green	LINK: There is a connection to the network
		B	Yellow	ACT: Data transmission

Info

Cables for ports X14, X15

To connect devices to ports X14 and X15, you can order cables separately as accessories [▶ 67].

6.3 Commissioning

Engineering of a JX3station

A JX3 station consists of a bus node or a controller and JX3 expansion modules connected to it.

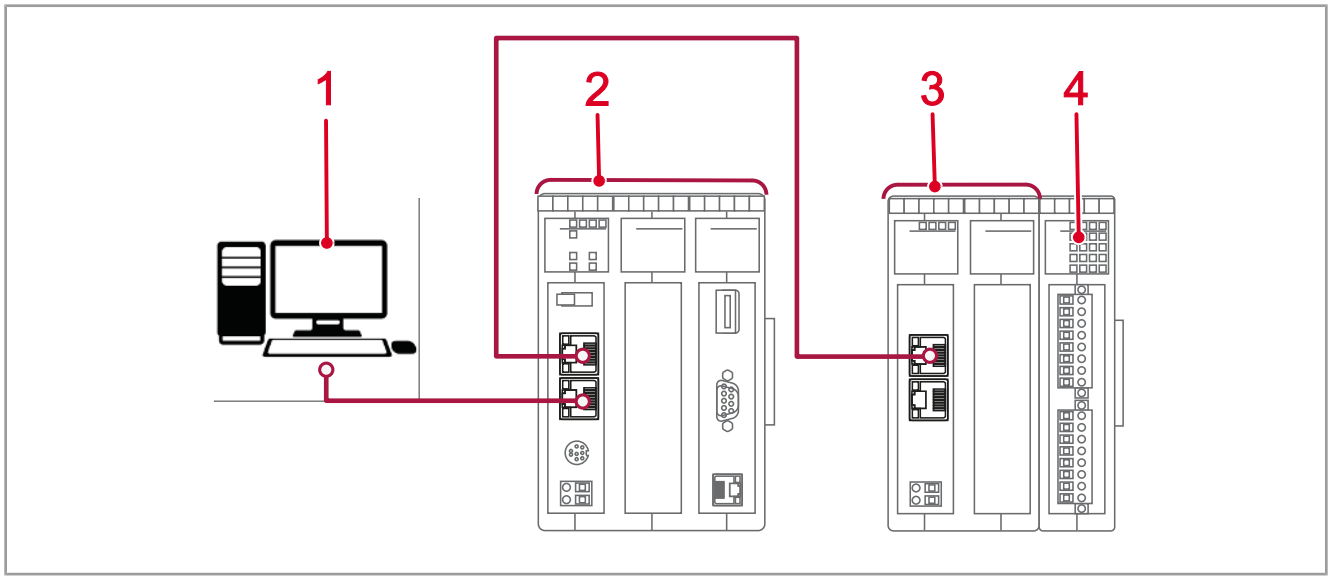
Info

Further Information

For further information, please refer to the JX3 *System* application-oriented manual in the download area of our website.

Configuration

Commissioning the device is based on the following configuration:



Number	Part	Description
1	PC	Programming system
2	Bucher Automation controller	Controller
3	JX3-BN-ETH	Bus node
4	JX3 peripheral module	Peripheral module

Info

Behavior after power-up

The position of switch S11 (mode selector) on the controller must be chosen depending on the application. If the mode selector is in STOP position when the controller is powered up, the application program will not launch.

Commissioning

To commission the JX3-BN-ETH bus node, proceed as follows:

✓ To connect the bus node to a compatible controller, use 2 Ethernet straight-through or crossover cables of the following category:
Cat 5e at 10 MBit/s ... 100 MBit/s or Cat 6 at 1,000 MBit/s

1. Make sure that the power supply of the controller and the bus node is switched off.
2. Set the IP address of the controller and the bus node.
3. Plug the expansion modules into the connector on the right-hand side of the bus node.
4. Connect controller and PC by means of a Ethernet patch cable.
5. Connect controller and bus node by means of the Ethernet patch cable.
6. Energize the controller and the bus node.
   ⇨ Both, the controller and the bus node go through the boot process.
   ⇨ The R LED goes permanently green once the controller and the bus node are ready for operation.
7. Launch the JetSym software tool.

⇨ Now, you can start configuring the bus node.

ⓘ Info

Further information

For further information, please refer to the *Ethernet system bus* application-oriented manual in the download area of our website.

6.3.1 LED states during the boot process

If the following requirements are met, the bus nodes goes through the normal boot process without errors:

– There is a valid OS.

The LED flashing patterns indicate the different stages of the boot process.

LEDs	R	E	D1	D2	State
Phase 1					**Reset**
Color	Green	Red	Red	Red	Reset
Blinking pattern	4 Hz	4 Hz	4 Hz	4 Hz	
Phase 2					**Operating system**
Color	Green	-	-	Red	The bus node initializes the operating system.
Blinking pattern	1 Hz	OFF	OFF	ON	
Phase 3					**Parser**
Color	Green	-	-	-	The OS reads the settings of the DIP switch on the backplane module and checks whether an Ethernet switch exists.
Blinking pattern	1 Hz	OFF	OFF	OFF	

LEDs	R	E	D1	D2	State
Phase 4					**Interfaces and programs**
Color	Green	Red	-	-	The OS is initializing the Ethernet port and the file system.
Blinking pattern	1 Hz	ON	OFF	OFF	
Phase 5					**Application program**
Color	Green	Red	Red	-	The operating system initializes the modules on the JX3 system bus.
Blinking pattern	1 Hz	ON	ON	OFF	
Phase 6					**Operating state**
Color	Green	-	-	-	Normal operating condition
Blinking pattern	ON	OFF	OFF	OFF	

Tab. 16: LED states during the boot process

7 Identification and Configuration

7.1 Identification

This chapter describes how to identify the JX3-BN-ETH device:

– Determining the hardware revision
– Retrieving Electronic Data Sheet (EDS) information. The EDS holds numerous non-volatile production-relevant data.
– Determining the OS version of the device and its software components

7.1.1 Electronic Data Sheet EDS

Each device in a JX3 system features an Electronic Data Sheet EDS. Numerous production-relevant data are permanently stored in the EDS. The EDS data can be read out via files in the file system of the controller or via special registers.

eds.ini file

EDS data can be retrieved via the **eds.ini** file.

Properties

– You can access this file through the bus node's file system.
– For an FTP connection, the user needs administrator rights (user *admin*) or system rights (user *system*).
– The EDS file of the bus node is located in the **System** folder.
– This file is read-only.
– Formatting the flash drive has no effect on the file.

File structure

The EDS file is a text file with its entries grouped into several sections.

Example

This is an example of an EDS file for a JX3-BN-ETH:

```
;Bucher Automation AG Electronic Data Sheet

[IDENTIFICATION]
Version = 0
Code = 315
Name = JX3-BN-ETH
PcbRev = 02
PcbOpt = 01


[PRODUCTION]
Version = 0
SerNum = 20080326011234
Day = 26
```

```
Month = 11
Year = 2019
TestNum = 1
TestRev = 01.18.03.215

[FEATURES]
Version = 0
MAC-Addr = 00:50:CB:00:69:B5
JX3-Bus = 1
```

[IDENTIFICATION] section

The general hardware configuration can be retrieved from the [IDENTIFICATION] section.

Name	Example	Function
Version	0	Version of this section
Code	315	Module code for JX3-BN-ETH
Name	JX3-BN-ETH	Corresponds to the information on the nameplate
PcbRev	002	PCB revision
PcbOpt	01	PCB option

Tab. 17: [IDENTIFICATION] section

[PRODUCTION] section

The serial number and production date can be retrieved from the [PRODUCTION] section.

Name	Example	Function
Version	0	Version of this section
SerNum	20080326011234	Corresponds to the information on the nameplate
Day	26	Production date: Day
Month	03	Production date: Month
Year	2011	Production date: Year
TestNum	1	Internal usage
TestRev	1.18.03.215	Internal usage

Tab. 18: [PRODUCTION] section

[FEATURES] section

In the [FEATURES] section, special properties of the controller are specified. The OS of the controller will ignore properties which have not been entered in the file.

Name	Example	Function
Version	6	Version of this section
MAC-Addr	00:50:CB:FF:FF:FF	MAC address of the Ethernet interface
JX3 bus	1	Bus interface for JX3 modules is available

Tab. 19: [FEATURES] section

EDS registers

Use the EDS registers to retrieve Electronic Data Sheet (EDS) information. These registers contain the exact same information as the EDS file. They are read only (ro).

Register numbers

The basic register number is dependent on the controller. The register number is calculated by adding the number of the module register (MR) to the number of the basic register.

Device	Basic register number	Register numbers
JX3-BN-ETH	100000	100500 ... 100817

Tab. 20: EDS register numbers

Register overview

The following table lists the EDS registers of a bus node, as well as their connection to the entries in the EDS file **/System/eds.ini**. As there is only one register set, select the required module via module registers 500 and 501. The contents of the selected EDS are then displayed in the following registers.

Registers	Section in eds.ini	Name in eds.ini	Description
MR 500	-	-	Functional group 0: Controller 1: JX3 modules
MR 501	-	-	Module number (if MR 500 > 0)
MR 600	IDENTIFICATION	Version	Version of this section
MR 601		Code	Module code
MR 602 … MR 612		Name	Module name or controller name
MR 613		PcbRev	PCB revision
MR 614		PcbOpt	PCB option

Registers	Section in eds.ini	Name in eds.ini	Description
MR 700	PRODUCTION	Version	Version of this section
MR 701 … MR 707		SerNum	Serial number
MR 708		Day	Production date: Day
MR 709		Month	Production date: Month
MR 710		Year	Production date: Year
MR 711		TestNum	Internal usage
MR 712		TestRev	Internal usage

Tab. 21: EDS register summary

EDS file of the JX3 modules

The assignment of module registers 6xx and 7xx corresponds to the assignment on a controller. The module registers 8xx (FEATURES) depend on the module type. For information on these registers refer to the manual of the respective module.

7.1.2 Version registers

The operating system provides several registers which can be used to read out the hardware revision or OS version of the device and its components.
You will need this information when contacting the Bucher Automation AG support hotline in case of a problem.

Hardware revisions

The device has special registers whose contents identify the hardware.

Overview of registers

The hardware revisions can be read out from the following registers:

Register	Description
108020	Hardware revision of the backplane module
108021	Hardware revision of the CPU board
200170	Controller type/Module type

Tab. 22: Register overview of hardware revisions

Operating system versions

The device has special registers that contain unique operating system versions as values.

Format of software version numbers

The JX3-BN-ETH software version is identified by a 4-part number.

1 . 2 . 3 . 4

Fig. 8: Software version numbers

Digits	Description
1	Represents major or main version number
2	Represents minor or secondary version number
3	Represents branch or intermediate version number
4	Represents build version number

Tab. 23: Format of software version numbers

Released version

A released version is identified by both the branch and build values being 0.

Overview of registers

The operating system versions can be read out from the following registers:

Register	Description
200168	Version of the boot loader
200169	Version of the operating system
100002000	Version of the JX3 system bus driver

Tab. 24: Overview of registers

7.2 IP configuration

This section describes the IP configuration for the controller. The following parameters can be set:

– IP address of the bus node
– Subnet mask
– IP address of the default gateway
– IP address of DNS server
– Name of the bus node
– IP port number for the JetSym debugger
– IP basic port number for JetIP communication

7.2.1 Delivery status

Before the bus node JX3-BN-ETH is delivered, various parameters are set to a default value. The user can change these parameters.

ⓘ Info

Important note

A different IP address must be set at each controller and at each bus node within a JX3 station.

Delivery status

Parameter	Value
IP address of the bus node	192.168.1.1
Subnet mask	255.255.255.0
IP address of the default gateway	0.0.0.0
IP address of DNS server	0.0.0.0
Name of the bus node	JX3-BN-ETH
IP port number for the debugger	52000
IP port number for JetIP	50000
DIP switch	DIP switch slider 1 = ON All other DIP switch sliders = OFF
admin user password	admin
system user password	system

Tab. 25: Delivery status

7.2.2 Configuration memory

During boot-up, the bus node reads the initialization parameters of the IP port from the **config.ini** file, it being a physical component of the configuration memory.

The user can access and modify data stored in the configuration memory in the following ways:

– Access via FTP connection to the **config.ini** file in the system directory;

– Access via the configuration registers. Saving the data creates a new configuration file.

ⓘ Info

When does this take effect?

The bus node reads data located in the configuration memory only during the boot process. Changes in the configuration memory require you to reboot the bus node afterwards. Only this way, these changes will take effect.

Default values

Prior to processing any modified data, the bus node performs a plausibility check of the data in the configuration memory.

Where the configuration file provides invalid or no values, the bus node uses the following defaults:

Parameter	Default value
IP address of the bus node	192.168.10.15
Subnet mask	255.255.255.0
IP address of the default gateway	0.0.0.0
IP address of the DNS server	0.0.0.0
Bus node name	JX3-BN-ETH
Suffix type of the name	0
IP port number for JetIP	50000

Tab. 26: Configuration memory default values

Storage location/bus node replacement

The configuration memory is located on the JX3 backplane module. This means that no configuration data is lost if a special function module of the bus node is replaced.

7.2.3 Configuration file config.ini

The **config.ini** file provides access to the configuration memory of the JX3-BN-ETH.

Properties

You can access this file through the JX3-BN-ETH file system.

– For an FTP connection, the user must have administrator or system rights.
– This file is located in the **System** folder.
– You cannot delete the file, but overwrite it.
– Formatting the flash drive leaves the file unchanged.

File structure

The configuration file is a text file and its entries grouped into several sections. Where the configuration file provides no IP configuration parameters, the system falls back on default values.

Example

This is an example of a **config.ini** configuration file:

```
;JX3-BN-ETH System Configuration
;Copyright (c) 2020 by Bucher Automation AG

[IP]
Address = 192.168. 10. 15
SubnetMask = 255.255.255. 0
DefGateway = 192.168. 4. 1
DNSServer = 192.168. 4. 12

[HOSTNAME]
SuffixType = 0
Name = JX3-BN-ETH

[PORTS]
JetIPBase = 50000
JVMDebug = 52000
```

Section [IP]

In the [IP] section, the required IP addresses and subnet mask are specified.

Address

Property	Description	
In the given example	192.168.10.15	
Function	IP address of the JX3-BN-ETH The DIP switch on the backplane module can overwrite the least significant byte.	
Allowed values	> 1.0.0.0	< 223.255.255.255
Illegal values	Network address, broadcast address	
In the event of an illegal value	The JX3-BN-ETH resets all 4 values to their respective defaults.	

Tab. 27: Address

SubnetMask

Property	Description
In the given example	255.255.255.0
Function	Specifies the subnet mask
Allowed values	≥ 128.0.0.0
Illegal values	1 and 0 mixed
In the event of an illegal value	The JX3-BN-ETH resets all 4 values to their respective defaults.

Tab. 28: SubnetMask

DefGateWay

Property	Description	
In the given example	192.168.4.1	
Function	IP address of the gateway to other subnets; JX3-BN-ETH must be able to reach the subnet (Address/SubnetMask), otherwise the JX3-BN-ETH will set this parameter to 0.0.0.0.	
Allowed values	≥ 0.0.0.0	< 223.255.255.255
Illegal values	– Network address – Broadcast address – A value (Address/SubnetMask) the bus node is unable to reach. – The Address value	
In the event of an illegal value	The JX3-BN-ETH sets the value to 0.0.0.0	

Tab. 29: DefGateWay

DNSServer

Property	Description	
In the given example	192.168.4.12	
Function	IP address of the server for the Domain Name System	
Allowed values	≥ 0.0.0.0	< 223.255.255.255
In the event of an illegal value	The JX3-BN-ETH sets the value to 0.0.0.0	

Tab. 30: DNSServer

[HOSTNAME] section

The name of JX3-BN-ETH is stated in the [HOSTNAME] section. The JX3-BN-ETH is able to automatically generate an individual name. This host name is not currently used.

SuffixType

Feature	Description	
In example	0	
Function	Type of the automatically generated suffix appended to the name of the JX3-BN-ETH	
Valid values	0	No suffix
	1	Low byte of the IP address in decimal format
	2	Low byte of the IP address in hexadecimal format
With invalid value	0	

Tab. 31: SuffixType

Name

Feature	Description	
In example	JX3-BN-ETH	
Function	Specifies the name of the JX3-BN-ETH	
Valid values	First character	'A' ... 'Z', 'a' ... 'z'
	Next character	'A' ... 'Z', 'a' ... 'z', '0' ... '9', '-'
With invalid value	JX3-BN-ETH	

Tab. 32: Name

[PORTS] section

In section [PORTS] the IP port numbers of data and debug servers within the JX3-BN-ETH are specified. The IP port numbers must be consistent with, for example, the port numbers set in JetSym.

JetIPBase

Feature	Description
In example	50000
Function	IP port for the operating system update and communication between controllers
Valid values	1024 ... 65535
With invalid value	50000

Tab. 33: JetIPBase

JVMDebug

Feature	Description
In example	52000
Function	IP port for debugger/setup in JetSym
Valid values	1024 ... 65535
With invalid value	52000

Tab. 34: JVMDebug

Change IP configuration via configuration file

The IP configuration can be changed directly via the configuration file **config.ini**.
To do this, carry out the following steps:

1. Use a text editor on the PC to create a configuration file **config.ini** with the desired contents.
2. Open an FTP connection between the PC and JX3-BN-ETH.
3. Log in as a user with administrator or system rights.
   Default:
   User: admin, Password: admin
   User: system; Password: system
4. Browse to directory */System* of the JX3-BN-ETH.
5. Copy the configuration file **config.ini** you created to the JX3-BN-ETH.
6. Close the FTP connection.
7. Reboot the JX3-BN-ETH.

⇨ The new configuration is active.

Alternatively, change the IP configuration via the configuration registers.

Configuration registers

The parameters of the IP configuration can be read out and changed via the configuration registers. The configuration registers include 2 register areas the content of which may differ.

Register numbers

The basic register numbers of the two areas are device dependent. The register number is the result of adding together the module register number (MR) and the basic register number.

Device	Data area	Basic register number	Register numbers
JX3-BN-ETH	Configuration memory	101100	101100 ... 101165
	Parameters used	101200	101200 ... 101265

Tab. 35: Register numbers of configuration registers

Register areas

– Registers R 101100 ... R 101165 contain the data which the bus node has determined from the contents of the configuration file during the boot phase. The user has read-only access to these data.

– Registers R 101200 ... R 101265 contain the data which are actually used to initialize the IP interface. The user has read and write access to these data.

The data of the two register areas may differ for the following reasons:

– The position of the DIP switch influences the actual IP address and thus the value of R 101200.

– Parameters of the IP interface can be changed at runtime. This affects the value of the registers R 101200 ... R 101202.

Overview of registers

Register	Section in config.ini	Name in config.ini	Description
MR 0	IP	Address	IP address of the bus node
MR 1		SubnetMask	Defines the subnet mask
MR 2		DefGateway	IP address of the gateway to other subnets
MR 3		DNSServer	IP address of the server for the domain name system
MR 32	HOSTNAME	SuffixType	Type of the automatically generated suffix to the name of the bus node
MR 33 … MR 51		Name	Defines the name of the bus node
MR 64	PORTS	JetIPBase	IP port number for the operating system update and communication between controllers
MR 65		JVMDebug	IP port number for debugger/setup in JetSym

Tab. 36: Overview of configuration registers

7.2.4 Set IP address of bus node

To communicate with the JX3-BN-ETH via Ethernet, you must set an unambiguous IP address on the bus node.

Replace bus node

The IP address is stored to the JX3 backplane module. The following configurations are retained:

– IP address of the bus node
– Subnet mask
– IP address of the default gateway
– IP address of DNS server
– Name of the bus node
– Suffix type of the name
– IP port number for the debugger
– IP port number for JetIP

Configuration options

The IP address can be configured in the following ways:

– Set default IP address
– Configuration via **config.ini** file
– Configuration via **config.ini** file and DIP switches
– Configuration at runtime via special registers

Change IP address

1. Disconnect the JX3-BN-ETH from the power supply.
2. Detach the module housing of the bus node from the backplane module.
3. Set the DIP switches to the desired state.
4. Reinstall the enclosure on the JX3 backplane module.

⇨ After the restart, the bus node JX3-BN-ETH can be reached via the IP address that has been changed before.

Set default IP address

The bus node JX3-BN-ETH has the default IP address 192.168.10.15. The IP address of the bus node can be changed to the default IP address at any time.

ⓘ Info

Important note

A different IP address must be set at each controller and at each bus node within a JX3 station.

DIP switch slider settings

To set the default IP address 192.168.10.15, position the DIP switch sliders (1 … 12 = OFF) as shown below:

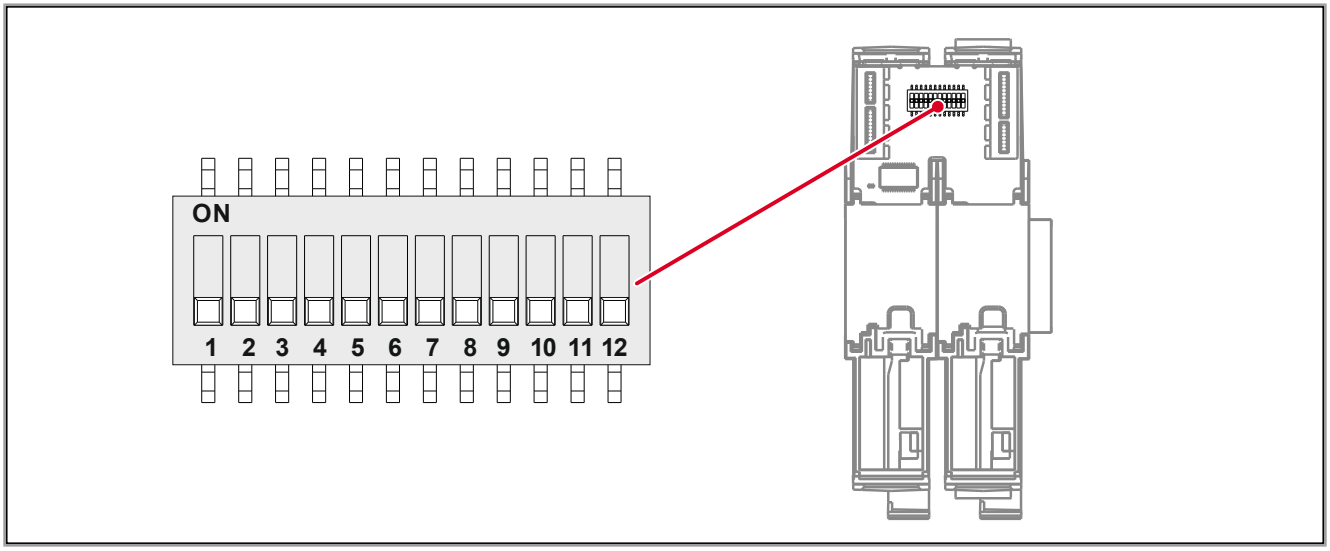


Fig. 9: DIP switch sliders 1 ... 12 OFF

Set IP address via configuration file

Setting the IP address

The IP address can be set via the **config.ini** configuration file.

```
[IP]
Address = aaa.bbb.ccc.ddd
...
```

Element	Description
`Address`	Enter the IP address into this line.
`aaa`	1. byte of IP address
`bbb`	2. byte of IP address
`ccc`	3. byte of IP address
`ddd`	4. byte of IP address

Tab. 37: Elements of the IP address

Setting at DIP switch

The following DIP switch slider settings (1… 8 = ON) cause the JX3-BN-ETH to read out the IP address from the file **config.ini**:

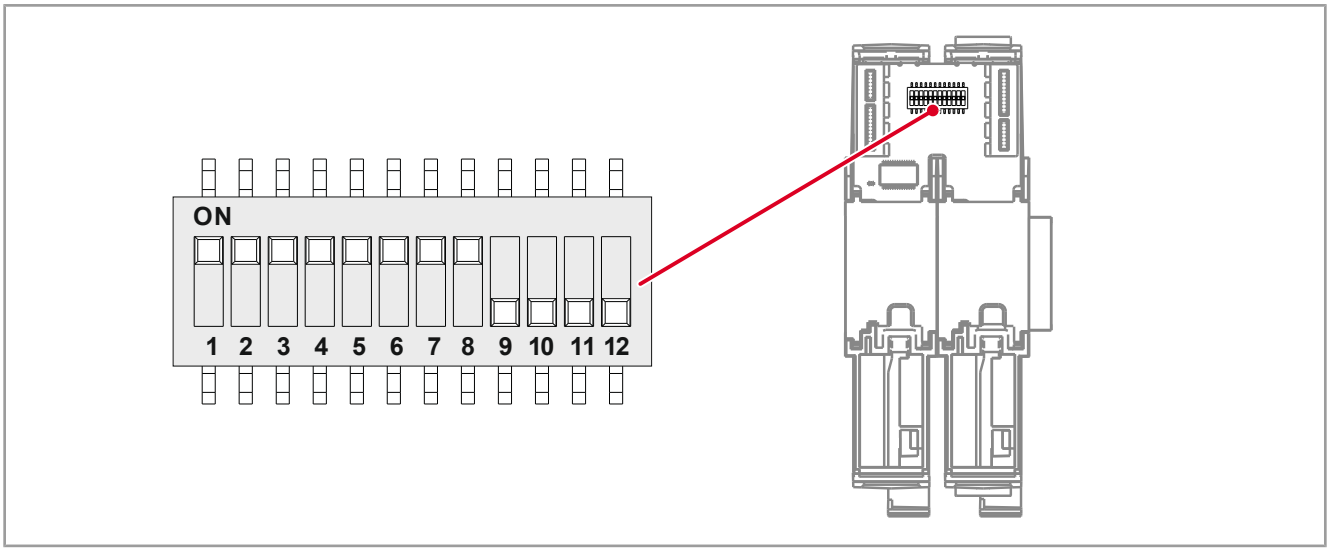


Fig. 10: DIP switch sliders 1 ... 8 ON

Transfer configuration file

1. Establish an FTP connection to the JX3-BN-ETH.
2. Log in as a user with administrator or system rights.
   Default:
   User: *admin*; Password: *admin*
   User: *system*; Password: *system*
3. Open the **System** folder.
4. Copy the **config.ini** file into the **System** folder.
5. Disconnect the FTP connection.
6. Restart the device.

Set IP address via configuration file and DIP switches

You can set the IP address of the bus node JX3-BN-ETH through a combination of the configuration file **config.ini** and the DIP switch sliders positions on the backplane module. Set 3 upper bytes of the IP address via the **config.ini** file and the lower byte via DIP switches 1 ... 8.

Settings via config.ini

► Set the upper 3 bytes of the IP address of the bus node JX3-BN-ETH in the **config.ini** file.

```
[IP]
Address = aaa.bbb.ccc.ddd
...
```

Element	Description
`Address`	Enter the upper 3 bytes of the IP address in this line
`aaa`	First byte of the IP address
`bbb`	Second byte of the IP address
`ccc`	Third byte of the IP address
`1`	Dummy entry, must be 1

Tab. 38: Elements of the IP address

Setting at DIP switch

The following DIP switch settings cause the bus node JX3-BN-ETH to read out the IP address from the **config.ini** file and the DIP switch slider positions:

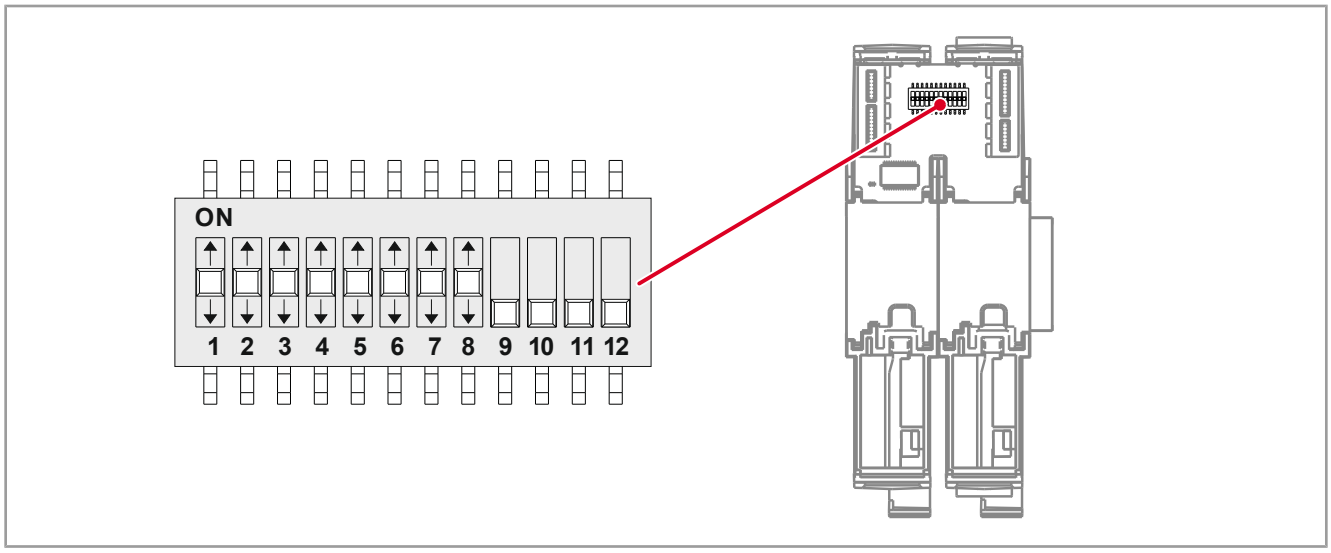


Fig. 11: DIP switch sliders 1 ... 8 in any position

DIP switch									IP address
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9 … 12**	
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Default IP address
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	aaa.bbb.ccc.1
OFF	**ON**	OFF	OFF	OFF	OFF	OFF	OFF	OFF	aaa.bbb.ccc.2
ON	**ON**	OFF	OFF	OFF	OFF	OFF	OFF	OFF	aaa.bbb.ccc.3
...	…	…	…	…	…	…	…	…	…
OFF	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	OFF	aaa.bbb.ccc.254
ON	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	OFF	from config.ini

Transfer configuration file

1. Establish an FTP connection to the JX3-BN-ETH.
2. Log in as a user with administrator or system rights.
   Default:
   User: *admin*; Password: *admin*
   User: *system*; Password: *system*
3. Open the **System** folder.
4. Copy the **config.ini** file into the **System** folder.
5. Disconnect the FTP connection.
6. Restart the device.

Set IP address at runtime

The IP interface is initialized during the boot phase via the settings in the configuration memory. The following settings can be changed via registers. The values are then stored non-retentively:

– IP address
– Subnet mask
– IP address of the default gateway

ⓘ Info

Important note

The settings made during runtime do not overwrite the parameters in the configuration memory. When de-energizing the controller, your settings will be lost.

To change the IP addresses and the subnet mask, proceed as follows:

✓ No communication is active via the IP interface during the setting process. Otherwise, this will lead to data loss.
✓ The validity of the written values is ensured, e.g., by respective programming in the application program. This is important because there is no check if you set the parameters during runtime of the JX3-BN-ETH.

1. Write 104533 with the value 0.0.0.0.
2. Write 104532 with the value 0.0.0.0.
3. Write 104531 with the desired IP address.
4. Write 104532 with the desired subnet mask.
5. Write 104533 with the desired IP address of the default gateway.

⇨ The setting has been completed. Communication is possible again.

7.3 Operating system

We are continuously striving to enhance the operating systems of our products. Enhancing means adding new features, and upgrading existing functions. Current OS files are available for download on our homepage in the downloads area of the respective product.

ⓘ Info

Further information

More information on this subject is available on our website.

Start | Bucher Automation - We automate your success.

7.3.1 Operating system update of bus node

This chapter describes how to perform an operating system update on the JX3-BN-ETH bus node. There are several options to transfer the operating system file to the bus node:

– From within the JetSym programming tool
– Via an FTP connection

Operating system update with programming tool

The JetSym programming tool offers a convenient way of transferring an OS file to the JX3-BN-ETH bus node.

Performing the update

✓ The latest JX3-BN-ETH OS file has been downloaded from the Bucher-Automation homepage.
✓ Controller and JetSym are connected.
✓ The JX3-BN-ETH has been configured in JetSym.
✓ Controller and JX3-BN-ETH are connected.
✓ The JX3-BN-ETH waits in the boot loader for the operating system update or the operating system is running.
✓ The bus node is and remains active.

1. Open the JetSym programming tool.
2. Navigate to the **Hardware** pane.
3. Click on the **Hardware** node and open the shortcut menu e.g. by pressing the right mouse button.
4. Select **Update OS**.
   ⇨ The **OS Update** dialog box opens.
5. Click **Select OS File...**
   ⇨ The file selection dialog opens.
6. Select the corresponding OS file and click **Open**.
   ⇨ The OS file is displayed in the **OS Update** dialog.
7. Click on **Update**.
   ⇨ The OS update is running.

8. Restart the bus node.

⇨ The updated operating system is launched.

Operating system update via FTP

An FTP client lets you transfer an OS file to the JX3-BN-ETH bus node.

Perform update

✓ The latest OS file for the bus node has been downloaded from the Bucher Automation homepage.
✓ An FTP connection to the bus node is active.
✓ The login parameters for a user with administrator or system rights are available.
✓ The operating system of the bus node is running.
✓ The bus node is and remains switched on.

1. Open an FTP connection to the bus node.
2. Log in with administrator or system rights.
3. In the file system, open the **OS** folder.
4. Transfer the operating system file **Update.ini** to the directory.
5. Restart the bus node.

⇨ The imported operating system is started.

7.4 File system

This chapter describes the file system of the JX3-BN-ETH bus node. The file system allows access to the files on the internal flash disk.

NOTICE



Malfunctions caused by missing or damaged system files

Careless working with system files can result in malfunctions of the device.

► Do not delete or move any system files.

Division

The file system distinguishes between the following files:

– System directories/files used by the operating system
– Files used by the user

System directories

System directories cannot be deleted. They are still available after formatting.

Directory	Description
/System	– System configuration – System information

Tab. 39: System directories

ⓘ Info

Further information

For more information on this subject refer to the application-oriented manual *File System* available for download from our homepage.

7.4.1 Features

The following properties apply to the internal flash disk:

– Open a maximum of 8 files at the same time.
– Separate directory names with a slash "/" and not with a backslash "\".
– Date, time and file size are not available for all system files.

Flash disk - Properties

Size

The following disk space is available to the user:

– 4 MB

Features

The internal flash disk drive has got the following properties:

– Up to 7 directory levels and 1 file level are allowed.
– Differentiation between upper and lower case.
– Directory and file names with a length of up to 63 characters are possible.
– All characters except "/" and ".." are permitted for directory and file names.
– User/access administration for a maximum number of 31 locks and 33 users.

8 Programming

8.1 Abbreviations, Module Register Properties and Formats

Abbreviations

The abbreviations used in this document are listed in the table below:

Abbreviation	Description
R 100	Register 100
MR 150	Module register 150

Tab. 40: Abbreviations

Module Register Properties

Each module register is characterized by certain properties. Most properties are identical for many module registers. In the following description, module register properties are mentioned only if a property deviates from the default properties listed below.

Property	Standard design
Access	Read/write
Value after reset	0 or undefined (e.g. revision/version number)
Takes effect	Immediately
Write access	Always
Data type	Integer

Tab. 41: Module register properties

Numerical formats

The numerical formats used in this document are listed in the table below:

Notation	Format of numerical values
100	Decimal
0x100	Hexadecimal
0b100	Binary

Tab. 42: Numerical formats

8.2 Addressing I/O Expansion Modules

The JX3 I/O module connects to sensors and actuators. The data are either sent directly to the controller via the JX3 system bus or, if the JX3 modules are located remotely, via Ethernet bus nodes or EtherCAT® bus nodes.

Each JX3 I/O module provides 10,000 module registers.

These module registers are mapped to registers in the controller. The only way of writing and reading process, configuration and diagnostic data to and from an expansion module is via controller registers. Controller registers can be accessed in the application program of the controller, in a setup pane of JetSym or via a visualization application.

The number of a controller register or I/O being mapped to a module register depends on the following parameters:

- Controller model
- Type of connection between controller and expansion module
  - Local direct connection
  - Remote connection via Ethernet
  - Remote connection via EtherCAT®
- Position and number of expansion modules in the system
  The number of expansion modules that can be connected to a controller depends on the model of the expansion module. After max. 8 expansion modules, a power supply module must be inserted.

Example system overview

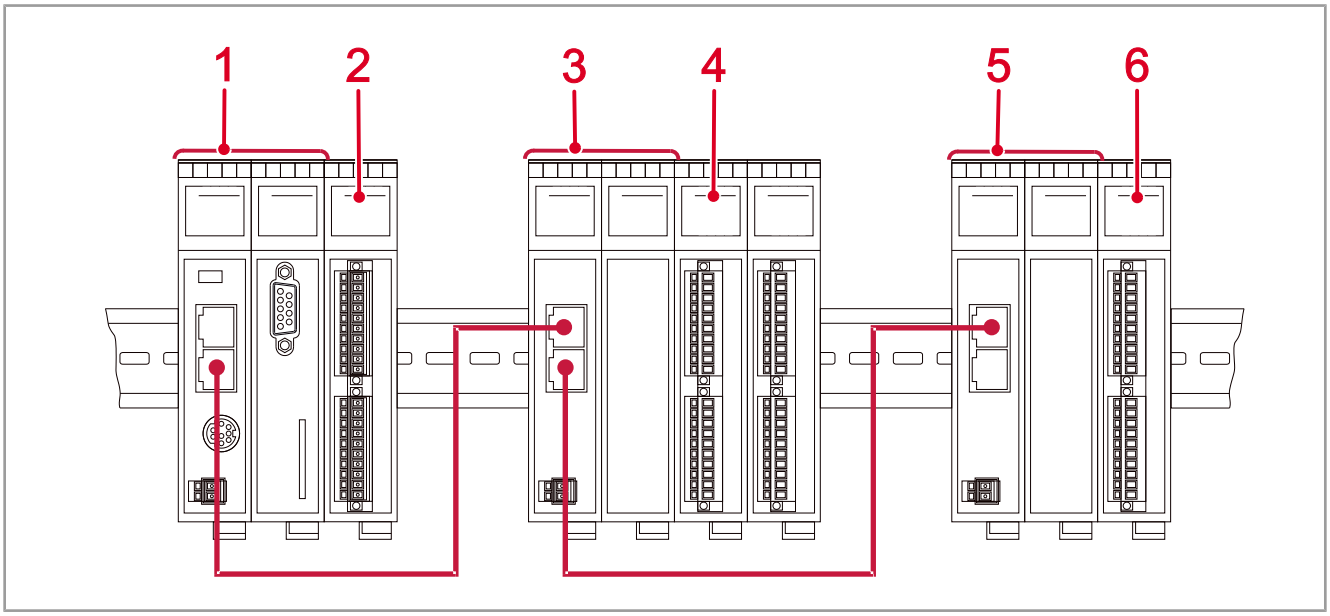


Fig. 12: Example system overview of a controller communicating with various bus nodes and expansion modules

1	Controller	2	JX3 I/O module
3	JX3-BN-ETH	4	JX3 I/O module
5	JX3-BN-ETH	6	JX3 I/O module

ⓘ Info

Number of connectible expansion modules

You can calculate the exact amount of connectible expansion modules by means of the system bus configurator, JX3-sysbus_configurator_xxx_e, which is available for download on our website.

ⓘ Info

Further Information

For further information, please refer to the JX3 *System* application-oriented manual in the download area of our website.

8.2.1 Numbering Registers and I/Os

Module registers – definition

Module registers are the data interface of the JX3 module. Use module registers to read process, configuration and diagnostics data from the JX3 module, or write such data to the JX3 module.

– The module register number within a module is unique.
– This unique register number lets you access a specific module register within the system.

Registers - Definition

There are several ways to access registers directly and indirectly:

– From an application program
– From the Setup pane of JetSym
– From a visualization application

The register number within the system is unique.

ⓘ Info

Further Information

For further information, please refer to the JX3 *System* application-oriented manual in the download area of our website.

Expansion modules connected with a controller

Our products offer a host of features accessible to the user via registers. Each register is addressed by a unique number – the register number. Each digital input and output has a unique I/O number.

Register numbering system

Register numbers consist of a prefix, the module position in the system and the module register number. If the expansion modules are connected with the controller via JX3 system bus, the prefix is 100. In this case, the module register number is always a four-digit number.

100XXZZZZ

Fig. 13: Example: Register numbers

Digits	Description	Value range
100	Prefix	
XX	Position of the module in the system	02 … 17
ZZZZ	Module register number	0000 … 9999

I/O numbering system

I/O numbers provide direct access to the inputs or outputs of the module. These I/O numbers consist of a five-digit prefix, the module position in the system and the I/O number of the module. The I/O numbers always start with the constant prefix **10000**.

10000XXZZ

Fig. 14: Example: I/O numbers

Digits	Description	Value range
10000	Prefix	
XX	Position of the module in the system	02 … 17
ZZ	Module-specific I/O number	01 … 16

Expansion modules connected to an Ethernet bus node

The Ethernet bus node and the controller communicate via Ethernet system bus. When addressing expansion modules via Ethernet bus node, the Global Node Number (GNN) becomes part of the register number.

System overview

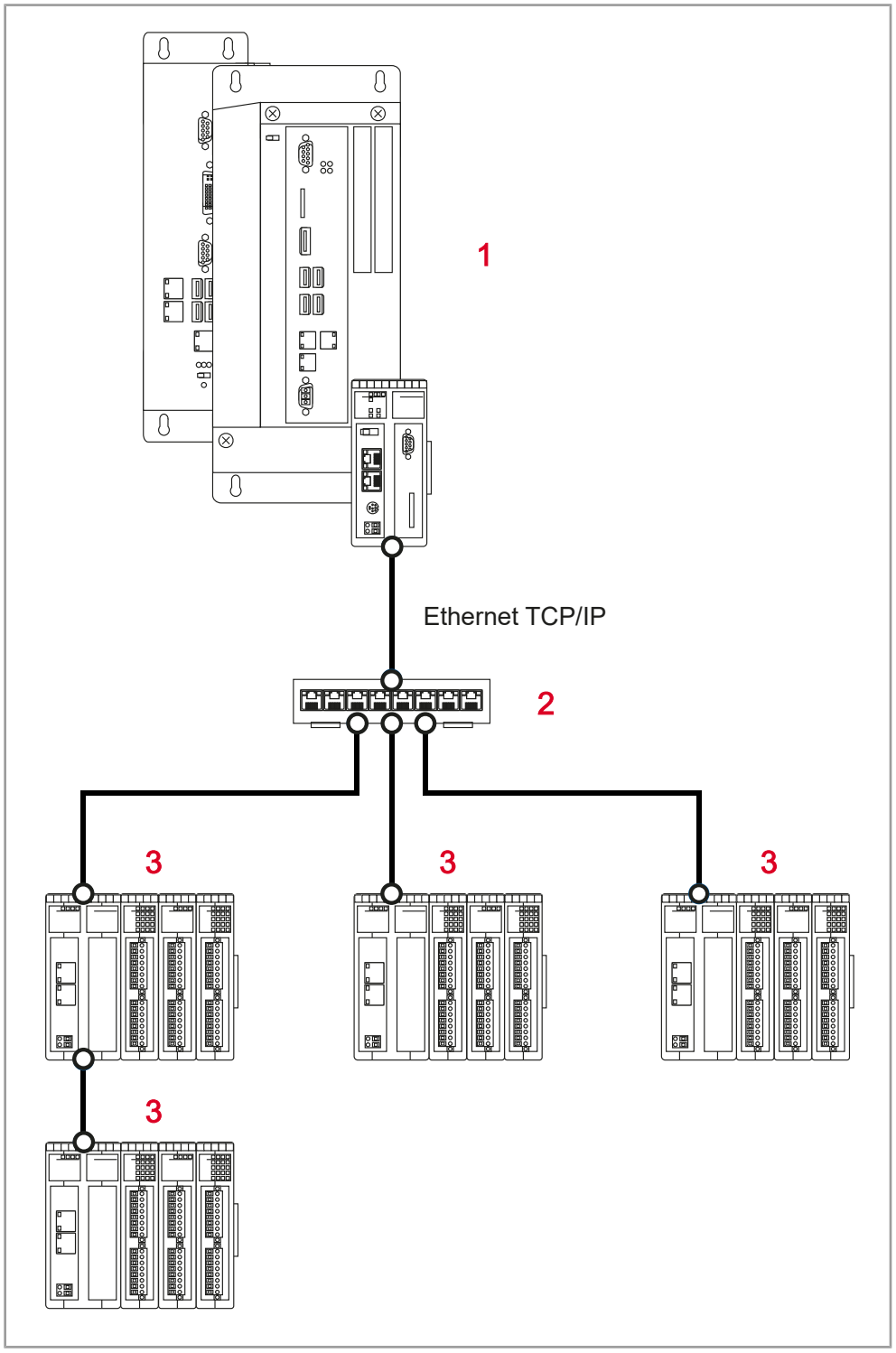


Fig. 15: System overview

1	Controller
2	Ethernet switch
3	Up to 64 Ethernet bus nodes per controller and up to 16 JX3-IO modules per Ethernet bus node

Definition of global node number

The Global Node Number (GNN) is used to identify Bucher Automation devices (e.g. controllers, bus nodes) within an Ethernet network:

– Within one network, each Bucher Automation device must have a unique GNN.
– The JetSym Hardware Manager automatically assigns the GNN during configuration.
– The value range of the GNN within a project is 000 ... 199.
– The GNN of the controller is always 000.

Register numbering system

Register numbers consist of a prefix, the GNN, the module position within the system and the module-specific register number.

1NNNXXZZZZ

Fig. 16: Example: Register numbers

Digits	Description	Value range
1	Prefix	
NNN	Bus node ID, GNN	001 … 199
XX	Position of the module within the station	02 … 17
ZZZZ	Module register number	0000 … 9999

I/O numbering system

I/O numbers provide direct access to the inputs or outputs of the module. The I/O numbers consist of prefix 1, the GNN, prefix 2, the module position in the system and the module-specific I/O number.

1NNN01XXZZ

Fig. 17: Example: I/O numbers

Digits	Description	Value range
1	Prefix 1	
NNN	Bus node ID, GNN	001 … 199
01	Prefix 2	
XX	Position of the module within the station	02 … 17
ZZ	Module-specific I/O number	01 … 16

ⓘ Info

Further information

For further information, please refer to the *Ethernet system bus* application-oriented manual in the download area of our website.

8.3 Storage options - Overview

The JX3-BN-ETH bus node features a data memory. This memory is located directly in the CPU or in separate memory or I/O modules.

There is, for example, volatile and non-volatile memory:

– Volatile memory loses its content at switching off.
– Non-volatile memory keeps its content even when the power supply is off.

8.3.1 Operating system memory

The OS is stored to a non-volatile flash memory in the CPU. It boots immediately after the device was switched on.

Features

– Internal flash memory for storing OS data
– Internal volatile RAM for storing OS data

Access

– The user is not allowed to directly access the OS memory.
– The operating system can be changed via an update.

8.3.2 File system memory

The file system memory is for storing data and program files.

Properties

– Non-volatile
– Slow access: Milliseconds up to seconds
– Limited number of write/erase cycles: Approx. 1 million
– Size of internal flash disk: 4 MB

Types of access

– By the operating system
– By JetSym
– Via FTP connection
– By the email client
– Via a browser (via the HTTP server)
– Via file commands from the application program and through the AutoCopy function

8.3.3 Special registers

Special registers let you control OS functions and retrieve status information.

Properties

– Global variables with dedicated addresses (%VL)
– When the operating system is launched, special registers are initialized using their default values
– Register numbers: 100000 ... 999999

Memory access

– By JetSym
– By the email client
– From other controllers

8.3.4 Inputs and outputs

Inputs and outputs are 1-bit variables. This means they can either have the value TRUE or FALSE. Inputs and outputs are addressed in immediate read/write cycles.

Properties of virtual inputs/outputs

– Global variables assigned to permanent addresses (%IX, %QX)
– Quantity: 16000
– I/O numbers: 20001 ... 36000

Properties of digital inputs/outputs

– Global variables assigned to permanent addresses (%IX, %QX)
– Located on modules connected to the JX3 system bus
– I/O numbers on the JX3 system bus: 100000201 ... 100001716
– I/O numbers of remote devices connected to a JX3-BN-ETH: 1nnn010201 ... 1nnn011716 (nnn = GNN)

Memory access

– By JetSym
– By the email client
– From HMIs
– From within the application program

8.4 Ethernet system bus

Bucher Automation AG controllers and modules offer a wide range of functions that can be accessed by the user via registers.

The Bucher Automation Ethernet system bus enables data exchange between controllers and bus nodes via standard Internet using publisher/subscriber mechanisms.

ⓘ Info

Further information

For further information, please refer to the *Ethernet system bus* application-oriented manual in the download area of our website.

8.5 FTP Server

The FTP server allows access to directories and files of the flash disk integrated into the JX3-BN-ETH using an FTP client.

FTP clients

Besides the command line FTP client that comes with many PC operating systems, graphical FTP tools can also be used.

Number of possible connections

The FTP server of the JX3-BN-ETH is able to manage up to 4 open FTP connections simultaneously.

Any other FTP client that tries to connect to the FTP server will not receive a response to its request to establish a connection.

Login

To access the file system via FTP, the FTP client must log in as follows when communication is established:

– Under **Server name**, enter the IP address of the device.
– Under **User name**, enter the user name, e.g. *admin*.
– Under **Password**, enter the password, e.g. *admin*.

Delivery status

The product comes with a pre-set user account:

– NAME = admin
– PW = admin

ⓘ Info

Further information

For more information on this subject refer to the application-oriented manual *File System* available for download from our homepage.

9 Register overview

This register overview gives a condensed summary of the registers of the JX3-BN-ETH device as applies to the operating system version .

Module code

Each module has a
unique module code for identification purposes (see module register
100601 *Module code*).

– Module code JX3-BN-ETH: 315

General overview - Registers

Register range	Description
100000 ... 100999	Electronic Data Sheet (EDS)
101000 … 101999	Configuration
102000 … 102999	Real-time clock
104000 ... 104999	Ethernet
108000 ... 108999	CPU/backplane
200000 ... 209999	General system registers

I/Os - General overview

I/O numbers	Description
10000mm01 ... 10000mm16	JX3 modul (mm: 01 ... 16)

Electronic Data Sheet (EDS)

Register range	Description
100500	EDS Access 0 = CPU (or JX3-BN-ETH), 1 = JX3 modules
100501	Module number 2 ... 17 *If register 100500 = 1*

Register range	Description
100600 ... 100614	**Identification**
100600	Internal version number
100601	Module ID
100602 ... 100612	Module name (register string)
100613	PCB revision
100614	PCB options
100700 ... 100712	**Production**
100700	Internal version number
100701 ... 100707	Serial number (register string)
100708	Day
100709	Month
100710	Year
100711	TestNum.
100712	TestRev.
100800 ... 100809	**I/O module properties** *If register 100500 = 1 and register 100501= 2 … 17*
100800	Internal version number
100801	Diagnostic configuration
100802	Digital inputs
100803	Digital inputs, inverted
100804	Digital outputs
100805	Digital outputs, inverted
100806	Cyclic inputs
100807	Cyclic outputs
100808	Features
100809	Diagnostics mask
100800 ... 100817	**Properties** - JX3-BN-ETH *If register 100500 = 0*
100800	Internal version number
100801	MAC address (Jetter)
100802	MAC address (device)
100803	Serial port

Register range	Description
100804	Slider
100805	STX
100806	Non-volatile registers
100807	JX3 bus
100808	CAN-bus
100809	SD memory card
100810	Motion Control
100811	Intelligent slave modules
100812	HTTP / e-mail
100813	Modbus/TCP
100815	LED for SD memory card
100816	User-defined LEDs
100817	RTC

Configuration

Register	Description
From file /system/ config.ini	
101100	IP address
101101	Subnet mask
101102	Default gateway
101103	DNS server
101132	Host name suffix type
101133 ... 101151	Host name (register string)
101164	Port number - JetIP
Used by the system	
101200	IP address
101201	Subnet mask
101202	Default gateway
101203	DNS server
101232	Host name suffix type
101233 ... 101251	Host name (register string)
101264	Port number - JetIP

Ethernet

Register	Description
ARP	
104200	Sent requests
104201	Received requests
104202	Sent responses
104203	Received responses
104204	Dynamic entries
104205	Static entries
104206	Obsolete entries
IP	
104500	Sent packets
104501	Sent bytes
104502	Received packets
104503	Received bytes
104504	Invalid packets
104505	Discarded received packets
104506	Checksum error of the received data
104507	Discarded transmit packets
104508	Sent fragments
104509	Received fragments
104531	Current IP address (rw)
104532	Current subnet mask (rw)
104533	Current default gateway (rw)
TCP	
104800	Sent packets
104801	Sent bytes
104802	Received packets
104803	Received bytes
104804	Invalid packets
104805	Discarded received packets
104806	Checksum error
104807	Connections
104808	Disconnections
104809	Discarded connections
104810	Repeated transmit packets

Register	Description
UDP	
104900	Sent packets
104901	Sent bytes
104902	Received packets
104903	Received bytes
104904	Invalid packets
104905	Discarded received packets
104906	Checksum error

LEDs

Register	Description
108002	**All LEDs ON/OFF (bit-coded)**
Bit 0	"R" LED
Bit 1	"E" LED
Bit 2	LED D1
Bit 3	LED D2
108003	"R" LED
108004	"E" LED
108005	LED D1
108006	LED D2
Values	
0	OFF
1	Flashing slowly
2	Flashing fast
3	ON

CPU/backplane module

Register	Description
108010	DIP switch - all sliders
108011	DIP switch - address
108012	DIP switch - mode
108020	Backplane revision
108021	CPU revision
108099	Clear EEPROM (0x12345678)
108100 ... 108227	EEPROM registers on backplane

General system registers

Register	Description
200000	OS version (major * 100 + minor)
200168	Boot loader version (IP format)
200169	OS version (IP format)
200170	Controller type (340/350)
201000	Runtime register in milliseconds (rw)
201001	Runtime register in seconds (rw)
201002	Runtime register in register 201003
201003	10 ms units for register 201002 (rw)
201004	Runtime register in milliseconds (ro)
202930	**Web status (bit-coded)**
Bit 0 = 1	FTP server available
Bit 1 =1	HTTP server available
202936	**Control register - File system**
0xc4697a4b	Formatting the flash disk
202980	Error history: Number of entries
202981	Error history: Index
202982	Error history: Entry

JX3 system bus registers

Register	Description
100002000	JX3 system bus revision
100002008	**Error (bit-coded)**
Bit 3	Errors
100002011	Module number in case of error
100002013	Number of detected JX3 modules
100002015	Index to module array
100002016	Module array
100002111	Register number in case of error
100002764	Timeout for register access [ms]
100003mm0 ... 100003mm9	Registers on I/O modules (compatibility mode) mm: Module number - 2 (00 ... 15)
100004000 ... 100004367	Inputs/outputs mapped to registers

Register	Description
100mm0000 … 100mm9999	Registers on I/O modules (direct access) mm: Module number 02 ... 17

32 combined inputs

Register	Description			
System bus JX3: Register + 100000000 / Network: + 1GNN910000				
Example	Register number 100004002 lets you access inputs 1 ... 8 and 9 ... 16 of the JX3 modules at positions 2 and 3.			
4000	101 ... 108	109 ... 116	201 ... 208	209 ... 216
4001	109 ... 116	201 ... 208	209 ... 216	301 ... 308
4002	201 ... 208	209 ... 216	301 ... 308	309 ... 316
4003	209 ... 216	301 ... 308	309 ... 316	401 ... 408
4004	301 ... 308	309 ... 316	401 ... 408	409 ... 416
4005	309 ... 316	401 ... 408	409 ... 416	501 ... 508
4006	401 ... 408	409 ... 416	501 ... 508	509 ... 516
4007	409 ... 416	501 ... 508	509 ... 516	601 ... 608
4008	501 ... 508	509 ... 516	601 ... 608	609 ... 616
4009	509 ... 516	601 ... 608	609 ... 616	701 ... 708
4010	601 ... 608	609 ... 616	701 ... 708	709 ... 716
4011	609 ... 616	701 ... 708	709 ... 716	801 ... 808
4012	701 ... 708	709 ... 716	801 ... 808	809 ... 816
4013	709 ... 716	801 ... 808	809 ... 816	901 ... 908
4014	801 ... 808	809 ... 816	901 ... 908	909 ... 916
4015	809 ... 816	901 ... 908	909 ... 916	1001 ... 1008
4016	901 ... 908	909 ... 916	1001 ... 1008	1009 ... 1016
4017	909 ... 916	1001 ... 1008	1009 ... 1016	1101 ... 1108
4018	1001 ... 1008	1009 ... 1016	1101 ... 1108	1109 ... 1116
4019	1009 ... 1016	1101 ... 1108	1109 ... 1116	1201 ... 1208
4020	1101 ... 1108	1109 ... 1116	1201 ... 1208	1209 ... 1216
4021	1109 ... 1116	1201 ... 1208	1209 ... 1216	1301 ... 1308
4022	1201 ... 1208	1209 ... 1216	1301 ... 1308	1309 ... 1316
4023	1209 ... 1216	1301 ... 1308	1309 ... 1316	1401 ... 1408
4024	1301 ... 1308	1309 ... 1316	1401 ... 1408	1409 ... 1416
4025	1309 ... 1316	1401 ... 1408	1409 ... 1416	1501 ... 1508
4026	1401 ... 1408	1409 ... 1416	1501 ... 1508	1509 ... 1516
4027	1409 ... 1416	1501 ... 1508	1509 ... 1516	1601 ... 1608
4028	1501 ... 1508	1509 ... 1516	1601 ... 1608	1609 ... 1616
4029	1509 ... 1516	1601 ... 1608	1609 ... 1616	1701 ... 1708
4030	1601 ... 1608	1609 ... 1616	1701 ... 1708	1709 ... 1716
4031	1609 ... 1616	1701 ... 1708	1709 ... 1716	1801 ... 1808
4032	1701 ... 1708	1709 ... 1716	1801 ... 1808	1809 ... 1816
4033	1709 ... 1716	1801 ... 1808	1809 ... 1816	1901 ... 1908
4034	1801 ... 1808	1809 ... 1816	1901 ... 1908	1909 ... 1916
4035	1809 ... 1816	1901 ... 1908	1909 ... 1916	2001 ... 2008
4036	1901 ... 1908	1909 ... 1916	2001 ... 2008	2009 ... 2016

Register	Description			
4037	1909 ... 1916	2001 ... 2008	2009 ... 2016	2101 ... 2108
4038	2001 ... 2008	2009 ... 2016	2101 ... 2108	2109 ... 2116
4039	2009 ... 2016	2101 ... 2108	2109 ... 2116	2201 ... 2208
4040	2101 ... 2108	2109 ... 2116	2201 ... 2208	2209 ... 2216
4041	2109 ... 2116	2201 ... 2208	2209 ... 2216	2301 ... 2308
4042	2201 ... 2208	2209 ... 2216	2301 ... 2308	2309 ... 2316
4043	2209 ... 2216	2301 ... 2308	2309 ... 2316	2401 ... 2408
4044	2301 ... 2308	2309 ... 2316	2401 ... 2408	2409 ... 2416

16 combined inputs

Register	Description	
System bus JX3: Register + 100000000 / Network: + 1GNN910000		
Example	Register number 100004062 lets you access inputs 1 ... 8 and 9 ... 16 of the JX3 module at position 2.	
4060	101 … 108	109 … 116
4061	109 … 116	201 … 208
4062	201 … 208	209 … 216
4063	209 … 216	301 … 308
4064	301 … 308	309 … 316
4065	309 … 316	401 … 408
4066	401 … 408	409 … 416
4067	409 … 416	501 … 508
4068	501 … 508	509 … 516
4069	509 … 516	601 … 608
4070	601 … 608	609 … 616
4071	609 … 616	701 … 708
4072	701 … 708	709 … 716
4073	709 … 716	801 … 808
4074	801 … 808	809 … 816
4075	809 … 816	901 … 908
4076	901 … 908	909 … 916
4077	909 … 916	1001 … 1008
4078	1001 … 1008	1009 … 1016
4079	1009 … 1016	1101 … 1108
4080	1101 … 1108	1109 … 1116
4081	1109 … 1116	1201 … 1208
4082	1201 … 1208	1209 … 1216
4083	1209 … 1216	1301 … 1308
4084	1301 … 1308	1309 … 1316
4085	1309 … 1316	1401 … 1408
4086	1401 … 1408	1409 … 1416
4087	1409 … 1416	1501 … 1508
4088	1501 … 1508	1509 … 1516
4089	1509 … 1516	1601 … 1608
4090	1601 … 1608	1609 … 1616
4091	1609 … 1616	1701 … 1708
4092	1701 … 1708	1709 … 1716
4093	1709 … 1716	1801 … 1808
4094	1801 … 1808	1809 … 1816
4095	1809 … 1816	1901 … 1908
4096	1901 … 1908	1909 … 1916
4097	1909 … 1916	2001 … 2008
4098	2001 … 2008	2009 … 2016
4099	2009 … 2016	2101 … 2108
4100	2101 … 2108	2109 … 2116
4101	2109 … 2116	2201 … 2208
4102	2201 … 2208	2209 … 2216
4103	2209 … 2216	2301 … 2308
4104	2301 … 2308	2309 … 2316
4105	2309 … 2316	2401 … 2408
4106	2401 … 2408	2409 … 2416

8 combined inputs

Register	Description
System bus JX3: Register + 100000000 / Network: + 1GNN910000	
Example	Register number 100004122 lets you access inputs 1 ... 8 of the JX3 module at position 2.
4120	101 ... 108
4121	109 ... 116
4122	201 ... 208
4123	209 ... 216
4124	301 ... 308
4125	309 ... 316
4126	401 ... 408
4127	409 ... 416
4128	501 ... 508
4129	509 ... 516
4130	601 ... 608
4131	609 ... 616
4132	701 ... 708
4133	709 ... 716
4134	801 ... 808
4135	809 ... 816
4136	901 ... 908
4137	909 ... 916
4138	1001 ... 1008
4139	1009 ... 1016
4140	1101 ... 1108
4141	1109 ... 1116
4142	1201 ... 1208
4143	1209 ... 1216
4144	1301 ... 1308
4145	1309 ... 1316
4146	1401 ... 1408
4147	1409 ... 1416
4148	1501 ... 1508
4149	1509 ... 1516
4150	1601 ... 1608
4151	1609 ... 1616
4152	1701 ... 1708
4153	1709 ... 1716
4154	1801 ... 1808
4155	1809 ... 1816
4156	1901 ... 1908
4157	1909 ... 1916
4158	2001 ... 2008
4159	2009 ... 2016
4160	2101 ... 2108
4161	2109 ... 2116
4162	2201 ... 2208
4163	2209 ... 2216
4164	2301 ... 2308
4165	2309 ... 2316
4166	2401 ... 2408
4167	2409 ... 2416

32 combined outputs

Register	Description			
System bus JX3: Register + 100000000 / Network: + 1GNN910000				
Example	Register number 100004202 lets you access outputs 1 ... 8 and 9 ... 16 of the JX3 modules at positions 2 and 3.			
4200	101 ... 108	109 ... 116	201 ... 208	209 ... 216
4201	109 ... 116	201 ... 208	209 ... 216	301 ... 308
4202	201 ... 208	209 ... 216	301 ... 308	309 ... 316
4203	209 ... 216	301 ... 308	309 ... 316	401 ... 408
4204	301 ... 308	309 ... 316	401 ... 408	409 ... 416
4205	309 ... 316	401 ... 408	409 ... 416	501 ... 508

Register	Description			
4206	401 ... 408	409 ... 416	501 ... 508	509 ... 516
4207	409 ... 416	501 ... 508	509 ... 516	601 ... 608
4208	501 ... 508	509 ... 516	601 ... 608	609 ... 616
4209	509 ... 516	601 ... 608	609 ... 616	701 ... 708
4210	601 ... 608	609 ... 616	701 ... 708	709 ... 716
4211	609 ... 616	701 ... 708	709 ... 716	801 ... 808
4212	701 ... 708	709 ... 716	801 ... 808	809 ... 816
4213	709 ... 716	801 ... 808	809 ... 816	901 ... 908
4214	801 ... 808	809 ... 816	901 ... 908	909 ... 916
4215	809 ... 816	901 ... 908	909 ... 916	1001 ... 1008
4216	901 ... 908	909 ... 916	1001 ... 1008	1009 ... 1016
4217	909 ... 916	1001 ... 1008	1009 ... 1016	1101 ... 1108
4218	1001 ... 1008	1009 ... 1016	1101 ... 1108	1109 ... 1116
4219	1009 ... 1016	1101 ... 1108	1109 ... 1116	1201 ... 1208
4220	1101 ... 1108	1109 ... 1116	1201 ... 1208	1209 ... 1216
4221	1109 ... 1116	1201 ... 1208	1209 ... 1216	1301 ... 1308
4222	1201 ... 1208	1209 ... 1216	1301 ... 1308	1309 ... 1316
4223	1209 ... 1216	1301 ... 1308	1309 ... 1316	1401 ... 1408
4224	1301 ... 1308	1309 ... 1316	1401 ... 1408	1409 ... 1416
4225	1309 ... 1316	1401 ... 1408	1409 ... 1416	1501 ... 1508
4226	1401 ... 1408	1409 ... 1416	1501 ... 1508	1509 ... 1516
4227	1409 ... 1416	1501 ... 1508	1509 ... 1516	1601 ... 1608
4228	1501 ... 1508	1509 ... 1516	1601 ... 1608	1609 ... 1616
4229	1509 ... 1516	1601 ... 1608	1609 ... 1616	1701 ... 1708
4230	1601 ... 1608	1609 ... 1616	1701 ... 1708	1709 ... 1716
4231	1609 ... 1616	1701 ... 1708	1709 ... 1716	1801 ... 1808
4232	1701 ... 1708	1709 ... 1716	1801 ... 1808	1809 ... 1816
4233	1709 ... 1716	1801 ... 1808	1809 ... 1816	1901 ... 1908
4234	1801 ... 1808	1809 ... 1816	1901 ... 1908	1909 ... 1916
4235	1809 ... 1816	1901 ... 1908	1909 ... 1916	2001 ... 2008
4236	1901 ... 1908	1909 ... 1916	2001 ... 2008	2009 ... 2016
4237	1909 ... 1916	2001 ... 2008	2009 ... 2016	2101 ... 2108
4238	2001 ... 2008	2009 ... 2016	2101 ... 2108	2109 ... 2116
4239	2009 ... 2016	2101 ... 2108	2109 ... 2116	2201 ... 2208
4240	2101 ... 2108	2109 ... 2116	2201 ... 2208	2209 ... 2216
4241	2109 ... 2116	2201 ... 2208	2209 ... 2216	2301 ... 2308
4242	2201 ... 2208	2209 ... 2216	2301 ... 2308	2309 ... 2316
4243	2209 ... 2216	2301 ... 2308	2309 ... 2316	2401 ... 2408
4244	2301 ... 2308	2309 ... 2316	2401 ... 2408	2409 ... 2416

16 combined outputs

Register	Description
System bus JX3: Register + 100000000 / Network: + 1GNN910000	

Register	Description	
Example	Register number 100004262 lets you access outputs 1 ... 8 and 9 ... 16 of the JX3 module at position 2.	
4260	101 ... 108	109 ... 116
4261	109 ... 116	201 ... 208
4262	201 ... 208	209 ... 216
4263	209 ... 216	301 ... 308
4264	301 ... 308	309 ... 316
4265	309 ... 316	401 ... 408
4266	401 ... 408	409 ... 416
4267	409 ... 416	501 ... 508
4268	501 ... 508	509 ... 516
4269	509 ... 516	601 ... 608
4270	601 ... 608	609 ... 616
4263	209 ... 216	301 ... 308
4271	609 ... 616	701 ... 708
4272	701 ... 708	709 ... 716
4273	709 ... 716	801 ... 808
4274	801 ... 808	809 ... 816
4275	809 ... 816	901 ... 908
4276	901 ... 908	909 ... 916
4277	909 ... 916	1001 ... 1008
4278	1001 ... 1008	1009 ... 1016
4279	1009 ... 1016	1101 ... 1108
4280	1101 ... 1108	1109 ... 1116
4281	1109 ... 1116	1201 ... 1208
4282	1201 ... 1208	1209 ... 1216
4283	1209 ... 1216	1301 ... 1308
4284	1301 ... 1308	1309 ... 1316
4285	1309 ... 1316	1401 ... 1408
4286	1401 ... 1408	1409 ... 1416
4287	1409 ... 1416	1501 ... 1508
4288	1501 ... 1508	1509 ... 1516
4289	1509 ... 1516	1601 ... 1608
4290	1601 ... 1608	1609 ... 1616
4291	1609 ... 1616	1701 ... 1708
4292	1701 ... 1708	1709 ... 1716
4293	1709 ... 1716	1801 ... 1808
4294	1801 ... 1808	1809 ... 1816
4295	1809 ... 1816	1901 ... 1908
4296	1901 ... 1908	1909 ... 1916
4297	1909 ... 1916	2001 ... 2008
4298	2001 ... 2008	2009 ... 2016
4299	2009 ... 2016	2101 ... 2108
4300	2101 ... 2108	2109 ... 2116
4301	2109 ... 2116	2201 ... 2208
4302	2201 ... 2208	2209 ... 2216
4303	2209 ... 2216	2301 ... 2308
4304	2301 ... 2308	2309 ... 2316
4305	2309 ... 2316	2401 ... 2408
4306	2401 ... 2408	2409 ... 2416

8 combined outputs

Register	Description
System bus JX3: Register + 100000000 / Network: + 1GNN910000	
Example	Register number 100004322 lets you access outputs 1 ... 8 of the JX3 module at position 2.
4320	101 ... 108
4321	109 ... 116
4322	201 ... 208
4323	209 ... 216
4324	301 ... 308
4325	309 ... 316
4326	401 ... 408
4327	409 ... 416
4328	501 ... 508
4329	509 ... 516
4330	601 ... 608
4331	609 ... 616
4332	701 ... 708

Regis-ter	Description
4333	709 ... 716
4334	801 ... 808
4335	809 ... 816
4336	901 ... 908
4337	909 ... 916
4338	1001 ... 1008
4339	1009 ... 1016
4340	1101 ... 1108
4341	1109 ... 1116
4342	1201 ... 1208
4343	1209 ... 1216
4344	1301 ... 1308
4345	1309 ... 1316
4346	1401 ... 1408
4347	1409 ... 1416
4348	1501 … 1508
4349	1509 ... 1516
4350	1601 … 1608
4351	1609 ... 1616
4352	1701 ... 1708
4353	1709 … 1716
4354	1801 … 1808
4355	1809 … 1816
4356	1901 … 1908
4357	1909 … 1916
4358	2001 … 2008
4359	2009 … 2016
4360	2101 … 2108
4361	2109 ... 2116
4362	2201 … 2208
4363	2209 … 2216
4364	2301 … 2308
4365	2309 … 2316
4366	2401 … 2408
4367	2409 … 2416

10 Maintenance

This device is maintenance free. Therefore, for the operation of the device, no inspection or maintenance is required.

10.1 Repairs

Defective components could cause dangerous malfunctions and could compromise safety.
Only the manufacturer is allowed to repair the device.
It is forbidden to open the device.

Modifications to the device

Modifications and alterations to the device and its functions are not allowed. In the case of modifications to the device, any liability is excluded.

The original parts are specifically designed for the device. Parts and equipment from other manufacturers must, therefore, not be used.

Any liability for any damages resulting from the use of non-original parts and equipment is excluded.

10.2 Storage and Shipment

Storage

When storing the device observe the environmental conditions given in chapter “Technical specifications”.

Shipment and packaging

The device contains electrostatically sensitive components which can be damaged if not handled properly. Damages to the device may impair its reliability.

To protect the device from impact or shock, it must be shipped in its original packaging, or in an appropriate protective ESD packaging.
In case of damaged packaging inspect the device for any visible damage, and inform your freight forwarder and the Bucher Automation AG of the damage caused during shipment. If the device is damaged or has been dropped, it is strictly forbidden to use it.

10.3 Return and Disposal

Disposal options

Return your Bucher Automation AG product to us for proper disposal. Visit our website for detailed information and to download the required Returns form.

Meaning of WEEE icon



Fig. 18: WEEE icon – crossed out trash can

The product is waste electronic equipment and must be disposed of by a certified waste management facility. Do not dispose of the product with normal household waste. Applicable local environmental directives and regulations must be complied with.

Batteries

Prior to disposing of waste electronics, remove any batteries where this is possible in a safe and non-destructive way. Dispose of batteries properly.

Personal data

It is the responsibility of the customers to delete any personal data stored on waste electric and electronic equipment prior to disposal.

11 Service

11.1 Technical support

In case of questions, suggestions, or issues, please contact our experts from Technical Support. You may reach out by phone or through the contact form on our homepage:

Technical Support | Bucher Automation - We automate your success.

Or email us:

support@bucherautomation.com

Please supply the following information when contacting Technical Support:

– Hardware revision and serial number
  The hardware revision and serial number is printed on the nameplate of the product.
– OS version
  To determine the operating system version, use the functions of the development environment.

12 Spare parts and accessories

NOTICE



Inadequate accessories might cause damage to the product

Parts and equipment from other manufacturers might impede the function of the device and cause damage to the product.

► Only use accessories recommended by Bucher Automation AG.

12.1 Spare Parts

Component	Item number
Terminal labels	60870411
Male connector in spring-cage technology, 2-pin	60870409

Tab. 43: Spare parts

12.2 Accessories

ⓘ Info

Ordering Accessories

The accessories are not part of the scope of delivery.

Suitable accessories can be obtained from Bucher Automation AG.

Component	Item number
Screwdriver	60871712
End clamp for DIN rail	60863970

Tab. 44: Accessories

12.2.1 Ethernet/EtherCAT® cable

Component	Item number
Patch cable 1:1, 1 m, gray, Hirose, Cat 5e, shielded	60537500
Patch cable 1:1, 2 m, gray, Hirose, Cat 5e, shielded	60854512
Patch cable 1:1, 5 m, gray, Hirose, Cat 5e, shielded	60854514
Patch cable 1:1, 10 m, gray, Hirose, Cat 5e, shielded	60854515
Patch cable cross-over, 1 m, gray, Hirose, Cat 5e, shielded	60854078
Patch cable cross-over, 3 m blue Hirose, Cat 5e, shielded	60851216
Patch cable cross-over, 5 m, gray, Hirose, Cat 5e, shielded	60854079

Bucher Automation AG
Thomas-Alva-Edison-Ring 10
71672 Marbach/Neckar, Germany
T +49 7141 2550-0
info@bucherautomation.com

www.bucherautomation.com