



User Manual

JX3-BN-ETH

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Translation of the german original User
Manual

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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 is 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.

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For further information refer to the following information products:

- Version updates
Information about new versions of software products or of the operating system of your controller.
- JetSym software Online Help
Detailed description of software functions with application examples
- Application-oriented manuals
Cross-product documentation

1.2 Typographical conventions

This manual uses different typographical effects to support you in finding and classifying information. Below, there is an example of a step-by-step instruction:

- ✓ This symbol indicates requirements which have to be met before executing the following action.
- ▶ This sign or a numbering at the beginning of a paragraph marks an action instruction that must be executed by the user. Execute the instructions one after the other.
- ⇒ The target after a list of instructions indicates reactions to, or results of these actions.

INFO

In the info box you will find helpful information and practical tips about your product.

2 Safety

2.1 General information

At the time of placing on the market, this product corresponds to the current state of the art and meets the recognized safety rules.

Besides this user manual, laws and regulations in the operator's country are relevant to the operation of the product. The operator is responsible for complying with the directives mentioned below:

- Applicable legislation, rules, and regulations
- Relevant accident prevention regulations
- Accepted safety rules
- EU directives and other country-specific regulations

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 European 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.

Machinery Directive

This device is no safety-related part as per Machinery Directive 2006/42/EC, and must, therefore, not be used for safety-relevant applications. This device is NOT intended for the purpose of personal safety, and must, therefore, not be used to protect persons.

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 potential 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 Ethernet bus node JX3-BN-ETH lets you set up remote I/O stations. It comprises a JX3 bus master to which up to 16 JX3 I/O modules can be directly connected. The bus node enables fast cyclic communication between controllers and the remote I/O station via Ethernet.

3.1 Design

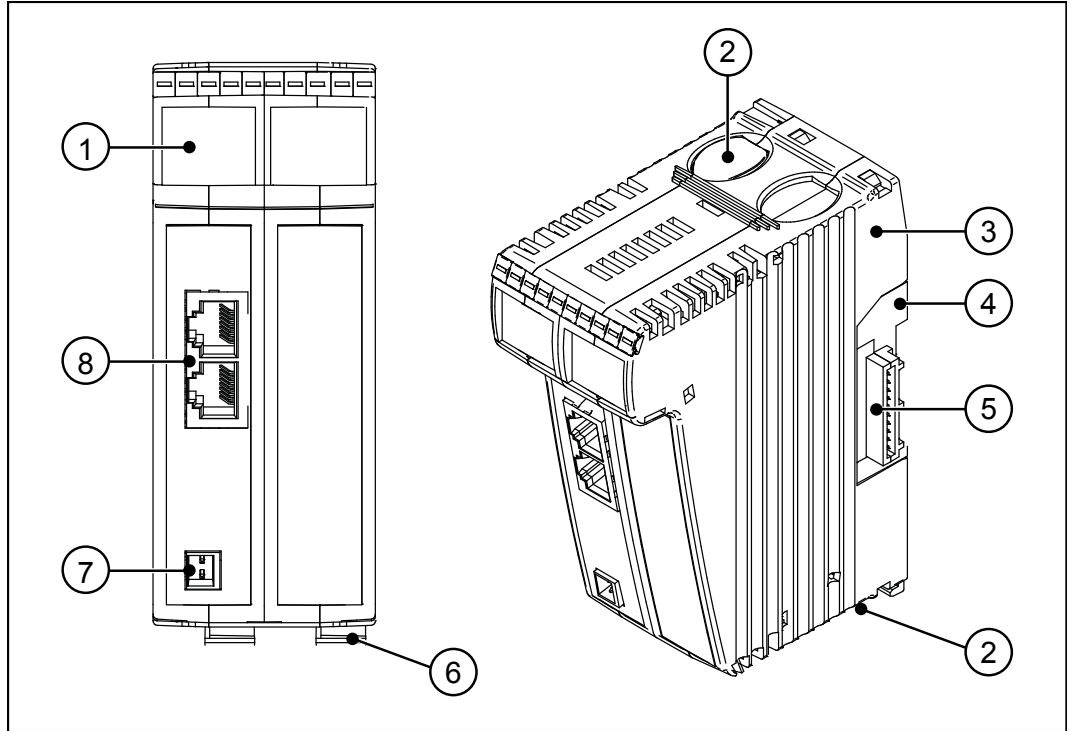


Fig. 1: Device configuration

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

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

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

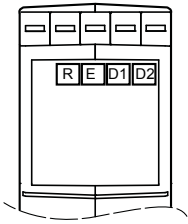


Fig. 2: Status indication

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

3.3.1 Diagnostics capabilities by means of status indication

The color and status of the LEDs provide diagnostic options for various states. In the JetSym application software, diagnostics can be performed in the hardware manager or via the setup window 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

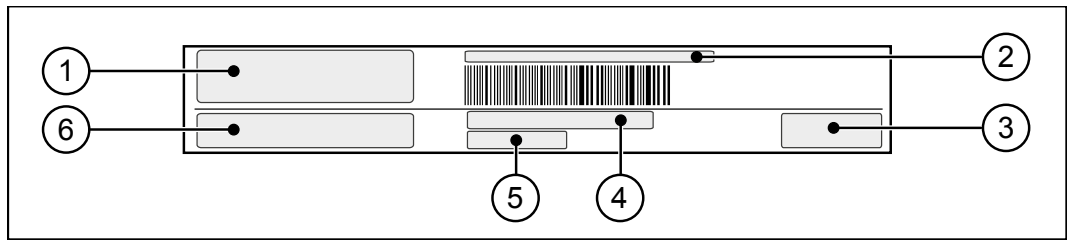


Fig. 3: Sample nameplate

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 electrical and mechanical data, as well as on operating data of the JX3-BN-ETH.

4.1 Dimensions

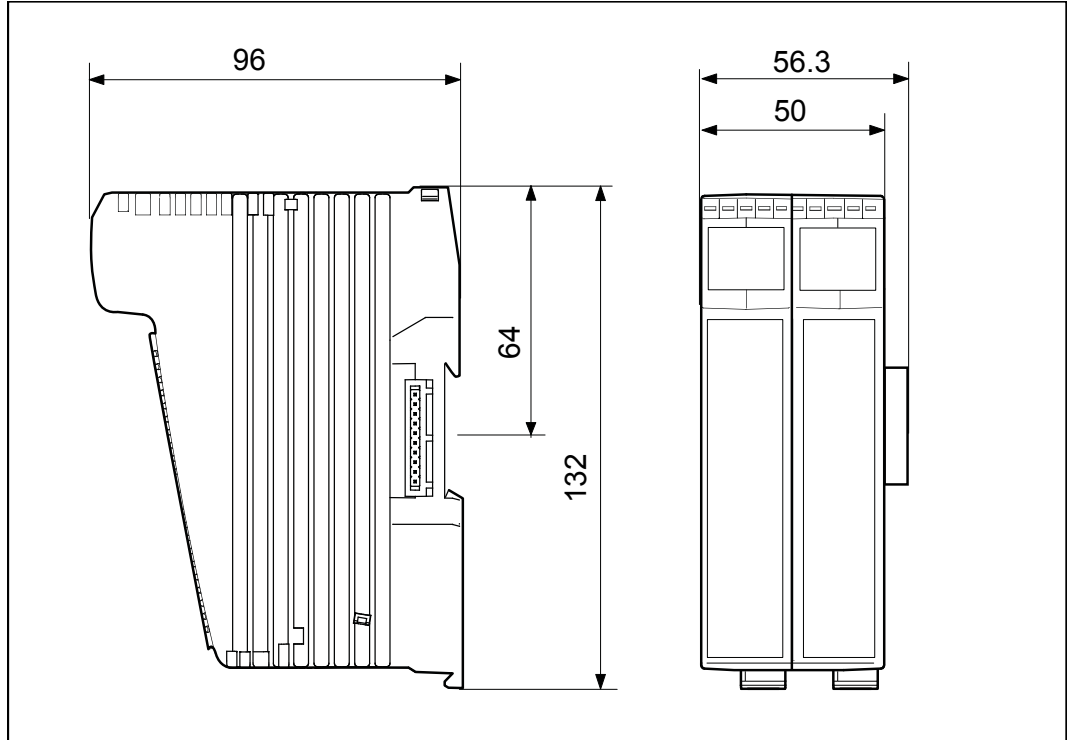


Fig. 4: Dimensions in mm

4.2 Mechanical specifications

Category	Description	Standards
Weight	250 g	
Enclosure specifications		
Material	Plastic	
Maximum height of fall		
Units within packing	1 m	DIN EN 61131-2
Units within product packaging	0.3 m	DIN EN 60068-2-31
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
Intensity and duration	15 g for 11 ms	DIN EN 60068-2-27
Number and direction	3 shocks in the directions of all 3 spatial axes	

Category	Description	Standards
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	Supply of the bus node and a maximum of 8 connected expansion modules
Input current	1.0 A max.
Power consumption	24 W max.

Tab. 2: Power supply (terminal X10)

Ethernet (sockets X14, X15)

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

Tab. 3: Ethernet (sockets X14, X15)

Memory configurations

Category	Description
Flash disk	4 MB

Tab. 4: Memory configurations

Electrical Safety

Category	Description	Standards
Class of protection	III	DIN EN 61131-2
Dielectric test voltage	Functional ground is connected to chassis ground internally.	
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

Category	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	-24 % ... +20 %

Tab. 6: System bus

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

Tab. 7: Expansion modules connected to the system bus

4.4 Environmental conditions

Category	Description	Standards
Operating temperature	0 ... +50 °C	DIN EN 61131-2
Storage temperature	-40 ... +70 °C	DIN EN 60068-2-1
Air humidity	10 ... 95 % non-condensing	DIN EN 60068-2-2
Max. operating altitude:	2,000 m above sea level	
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	Degree of pollution 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 EMI values

4.5.1 Housing

Emitted interference	Parameter	Values	Standards
	Frequency band	30 ... 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 ... 1,000 MHz	Class B
	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
	Magnetic field	30 A/m	DIN EN 61000-6-2 DIN EN 61000-4-8

Parameter	Values	Standards
RF field, amplitude-modulated		
Frequency band	80 MHz ... 2 GHz	DIN EN 61131-2
Test field strength	10 V/m	DIN EN 61000-6-2
	AM 80 % with 1 kHz	DIN EN 61000-4-3
	Criterion A	
ESD		
Discharge through air Test peak voltage 6 kV	8 kV	DIN EN 61131-2
		DIN EN 61000-6-2
Contact discharge Test peak voltage 6 kV	4 kV	DIN EN 61000-4-2
	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 ... 80 MHz	DIN EN 61131-2
Test voltage	3 V	DIN EN 61000-6-2
	AM 80 % with 1 kHz	DIN EN 61000-4-6
Source impedance	150 Ω	
	Criterion A	
Bursts		
Test voltage	1 kV	DIN EN 61000-6-2
	tr/tn 5/50 ns	DIN EN 61000-6-2
Repetition frequency	5 kHz	DIN EN 61000-4-4
	Criterion A	
Surge voltages, asymmetric, line to earth		
Common-mode interference	tr/th 1.2/50 μs	DIN EN 61131-2
	1 kV	DIN EN 61000-6-2 DIN EN 61000-4-5

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

Interference immunity - Functional earth connection

Parameter	Values	Standards
RF field, asymmetric, amplitude modulated		
Frequency band	0.15 ... 80 MHz	DIN EN 61131-2
Test voltage	3 V	DIN EN 61000-6-2
	AM 80 % with 1 kHz	DIN EN 61000-4-6
Source impedance	150 Ω	
	Criterion A	
Bursts		
Test voltage	1 kV	DIN EN 61000-6-2
	tr/tn 5/50 ns	DIN EN 61000-6-2
Repetition frequency	5 kHz	DIN EN 61000-4-4
	Criterion A	

Tab. 12: Interference immunity - 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 mains inputs and mains 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 tr/tn 5/50 ns	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-4
Repetition frequency	5 kHz Criterion A	
Surge voltages, symmetric, line to cable		
Series-mode interference	tr/th 1.2/50 μs 0.5 kV	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-5
Surge voltages, asymmetric, line to earth		
Common-mode interference	tr/th 1.2/50 μs 1 kV	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-5

Tab. 14: Interference immunity of the DC mains inputs and outputs

5 Mechanical installation

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

5.1 Installing the device on the DIN rail

NOTICE

Functional impairment caused by unfavorable installation

- ▶ Install the device only in vertical position on the DIN rail (DIN EN 60715).
- ▶ Keep the minimum distance to surrounding parts.

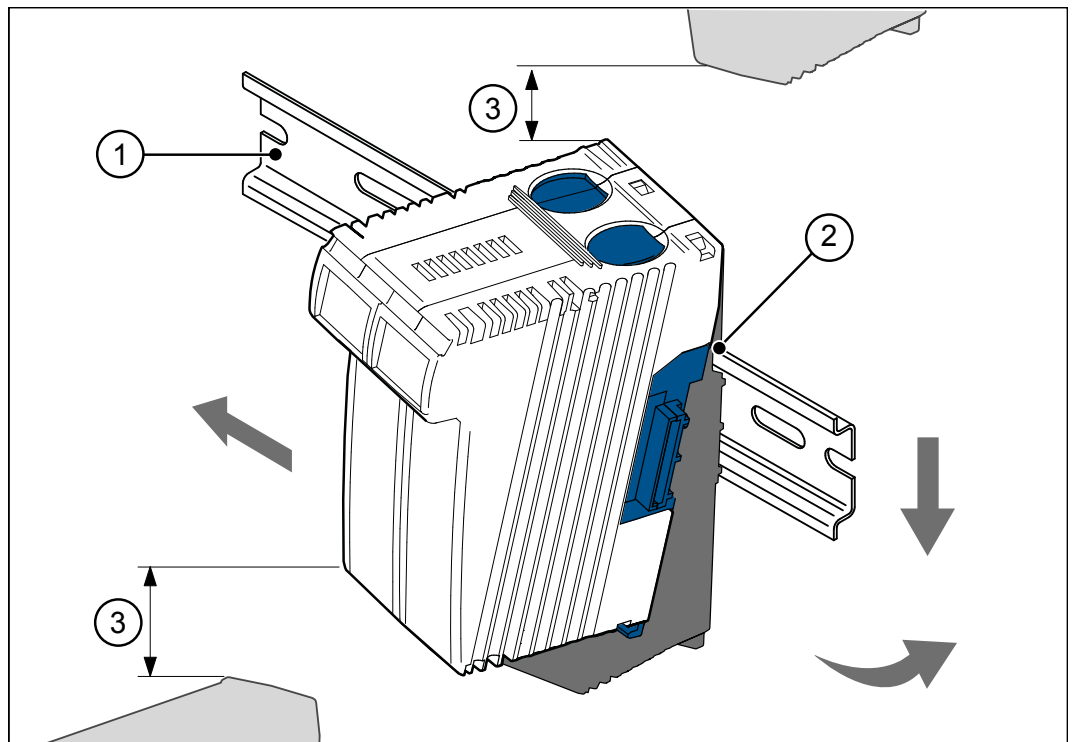


Fig. 5: Installing the device on the DIN rail

1	DIN rail	2	Upper latch
3	Minimum distance to surrounding parts = 30 mm		

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

5.2 Removing the device from the DIN rail

The release latch lets you remove the device from the DIN rail.

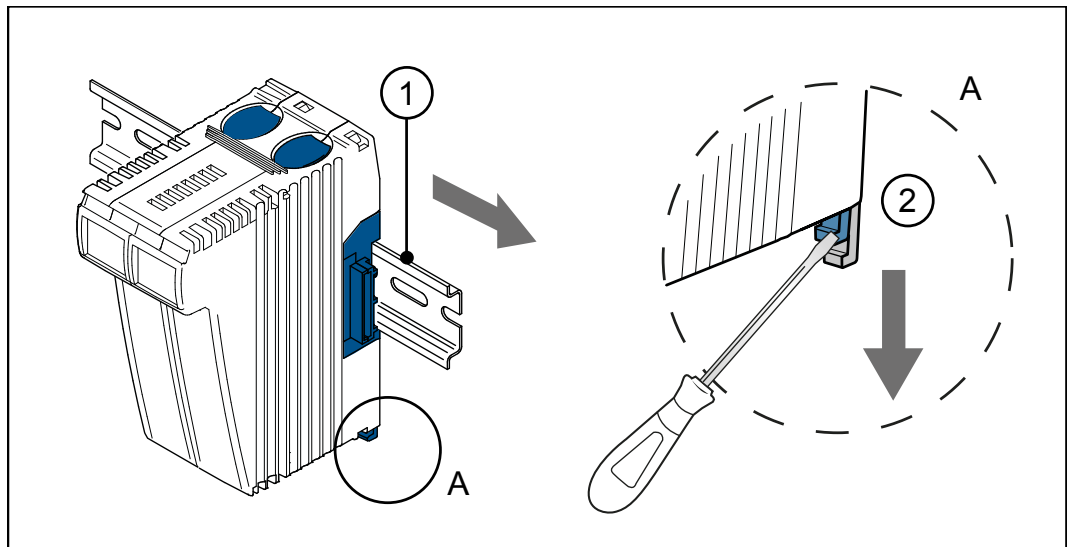


Fig. 6: Removing the device from the DIN rail

1	DIN rail	2	DIN rail release latch
A	Detail view		

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

5.3 Dismounting the enclosure from the backplane module

The upper and lower backplane tab on the module let you pull off the enclosure from the backplane module.

NOTICE

Mechanical damage and limited immunity to interferences

When replacing devices, degree of protection IP20 is not guaranteed. If you touch the EMC clip, you may damage this clip. A damaged clip may result in lower 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

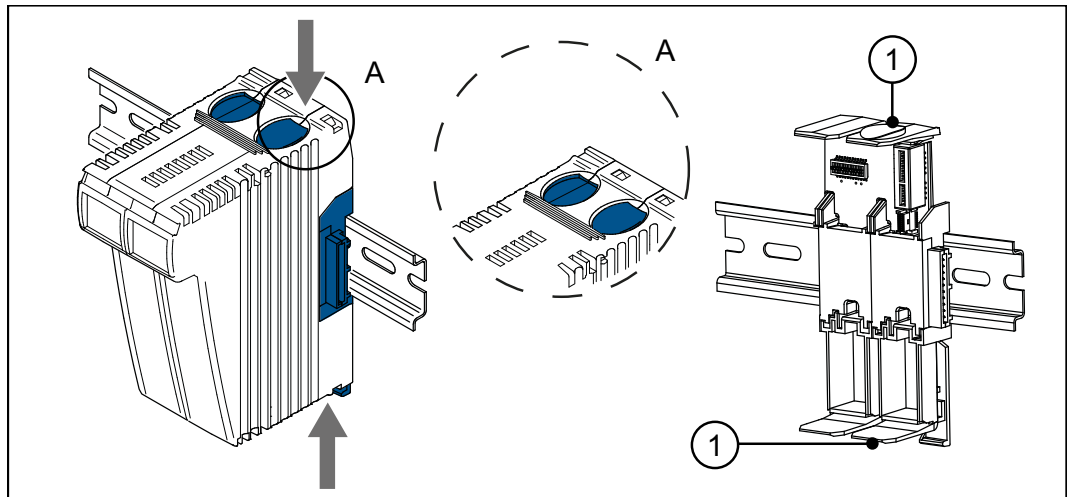


Fig. 7: Dismounting the enclosure from the backplane module

1	DIN rail latch	A	Detail view
---	----------------	---	-------------

1. Disconnect the system from the power supply.
2. Press the upper and lower latches (1) on the device simultaneously.
3. Keep the latches pressed and pull off the enclosure.

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 the noise immunity

The noise immunity of a system is determined by its weakest component. Correct connections, lines and shielding are key factors. Follow the procedures described in this chapter.

INFO

Further information

You can find further information on the immunity of a plant in the Application Note 016 *EMC-Compatible Installation of Electric Cabinets* on our [homepage](#).

DIN rail

- Mount the JX3-BN-ETH on a DIN rail to DIN EN 60715 with the dimensions 35 x 7.5 mm.
- The DIN rail must be electrically conducting and grounded by either of the 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:

- **Separate** signal and power lines **physically**. Jetter AG recommends a distance greater than 20 cm. Cables and lines should cross each other at an angle of 90°.
- Shield the following lines:
 - Analog lines
 - Data lines
 - Motor cables of inverter drives (servo amplifiers, frequency converters)
 - Lines between components and interference suppression filter if the filter is not placed directly on the component.
- Connect the shield **on both sides**.
- Keep unshielded wire ends of shielded cables as short as possible.
- Pull back the **entire perimeter** of the shield behind the insulation. Then clamp it **with the greatest possible surface area** under a grounded strain relief.

6.2 Ports and interfaces

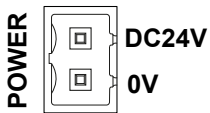
6.2.1 Terminal X10 - Power supply

**Ports and inter-
faces**

Terminal X10 lets you connect the following interface signals:

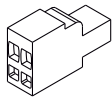
- Power supply of the JX3-BN-ETH bus node
- Power supply for connected JX3 peripheral modules if these are not supplied by a JX3-PS1 power supply module.

Pin assignment



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

2-pin connector, spring-cage technology



Category	Description	Standards
Connector		
Designation	BU_02_E_BLZF_GE_RM3.5	
Connector technology	Spring-cage connection	
Type	2-pin, contact spacing 3.5 m	
Connectible conductors		
Outer diameter of the isolation	2.90 mm max.	
AWG	16 ... 28	
Terminal range	0.13 ... 1.5 mm ²	
Stripping length	10 mm	
Specification without wire end ferrules		
Single conductor	H05(07) V-U	
	0.2 ... 1.5 mm ²	
Flexible conductor	H05(07) V-K	
	0.2 ... 1.5 mm ²	
Specification with wire end ferrules		
Wire end ferrule without sleeve	0.2 ... 1.5 mm ²	DIN 46228/1
Wire end ferrule with sleeve	0.2 ... 1.5 mm ²	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

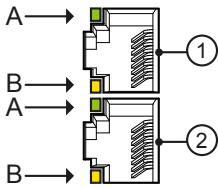
6.2.2 Ports X14, X15 - Ethernet

**Ports and inter-
faces**

Jacks X14 and X15 let you connect the following interface signals:

- Ethernet port for connection of:
 - PC
 - HMI
 - JetMove 2xx
 - Any device

Pin assignment



Position	Socket	LED	Color	Description
1	X14	A	Green	LINK: Connection to the network exists
		B	Yellow	ACT: Data transfer
2	X15	A	Green	LINK: Connection to the network exists
		B	Yellow	ACT: Data transfer

INFO

Cables for ports X14, X15

To connect devices to ports X14 and X15, you can order cables separately as [accessories](#) [▶ 63].

See also

- Ethernet/EtherCAT® cable [▶ 63]

6.3 Commissioning

Engineering a JX3 station

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

INFO

Further information

You will find further information on this topic in chapter *Engineering of a JX3 Station* in the application-oriented manual *JX3 system* in the Download area of our [homepage](#).

Configuration

Commissioning is based on the following configuration:

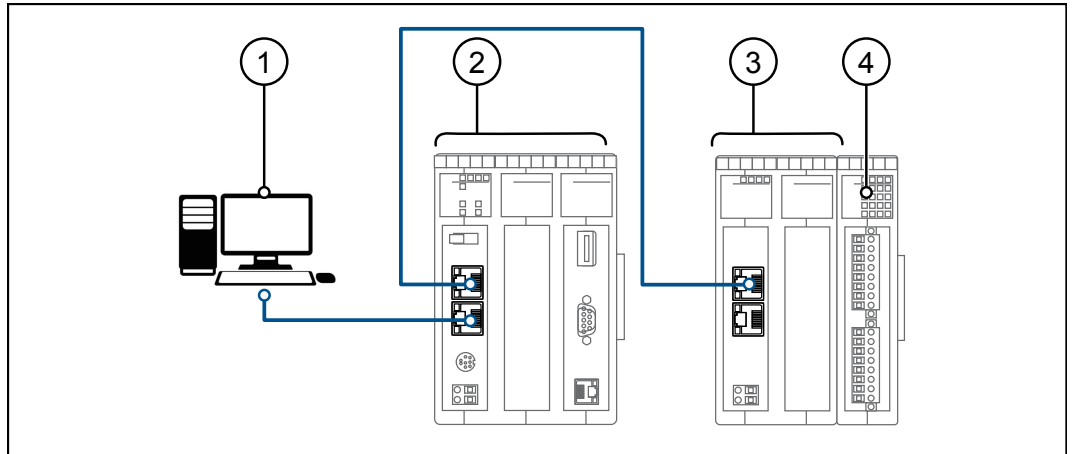


Fig. 8: Configuration

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

INFO

Behavior after power-up

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

Commissioning

Carry out the following steps for commissioning the JX3-BN-ETH:

- ✓ To connect the bus node to a compatible controller, use 2 Ethernet patch cables 1:1, or crossover, of the following category:
Cat 5e at 10 ... 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. On the right side of the bus node snap the expansion modules into it.
- 4. Connect controller and PC by means of the 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 LED R lits green once the controller and the bus node are ready for operation.
7. Launch the JetSym software.
 - ⇒ Now, you can start configuring the bus node.

i INFO	Further information Further information on this topic can be found in the Application-oriented Manual <i>Jetter Ethernet System Bus</i> that can be downloaded from our homepage .
---------------	--

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 back-plane module and checks whether an Ethernet switch exists.
Blinking pattern	1 Hz	OFF	OFF	OFF	
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 Programming

7.1 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. 17: Abbreviations

Module register properties

Each module register is characterized by certain properties. For many module registers most properties are identical. For example, their value after reset is 0. In the following description, module register properties are mentioned only if a property deviates from the default properties listed below.

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

Tab. 18: 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. 19: Numerical formats

JetSym sample programs

The notation for sample programs used in this document is listed in the table below:

Notation	Format of numerical values
Var, When, Task	Keyword
BitClear();	Commands
100 0x100 0b100	Constant numerical values
// This is a comment	Comment
// ...	Further program processing

Tab. 20: JetSym sample programs

7.2 Addressing of I/O expansion modules

JX3 I/O modules let you connect sensors and actuators. The data is either routed directly to the controller via JX3 system bus or, if the JX3 I/O modules are distributed, via Ethernet bus nodes or via EtherCAT® bus nodes.

Each JX3 I/O module has 10.000 module registers.

These module registers are mapped to registers in the controller. Only controller registers let you read and write process, configuration, and diagnostic data of an expansion module. Controller registers can be accessed in the application program of the controller, in a setup pane of JetSym or via user interface.

The number of a controller register or an I/O to which a module register is mapped is influenced by 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 amount of expansion modules in the system

The number of expansion modules that can be connected to a controller depends on the type of expansion modules. After 8 expansion modules max., a power supply module must be inserted.

Example - System overview

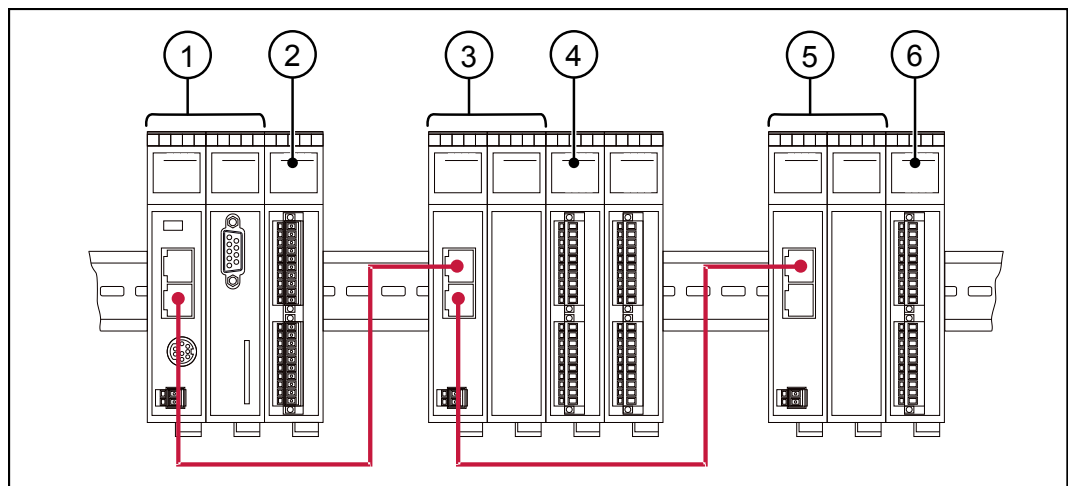


Fig. 9: Exemplary system overview of a controller with several bus nodes and expansion modules

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

i INFO

Number of connectable expansion modules

You can calculate the exact amount of connectable expansion modules by means of the JX3-sysbus_configurator_xxx_e which is available for download from our [Homepage](#).

7.2.1 Numbering registers and I/Os

Module registers - Definition

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

- 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:

- From an application program
- From the JetSym setup pane
- From a visualization application

The register number within the system is unique.

INFO

Further information

For further information on this topic, refer to chapter *Register and I/O Numbering of the JX3 Station* in the Application-oriented Manual *JX3 System* in the Download area of our [homepage](#).

Expansion modules connected with a controller

Our products offer a host of functions which can be accessed by the user via registers. Every register has got an unambiguous number, the register number. Each digital input or output has got an unambiguous 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. 10: 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

The inputs or outputs of the module are directly accessed via I/O numbers. 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. 11: 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

Ethernet busnode and 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

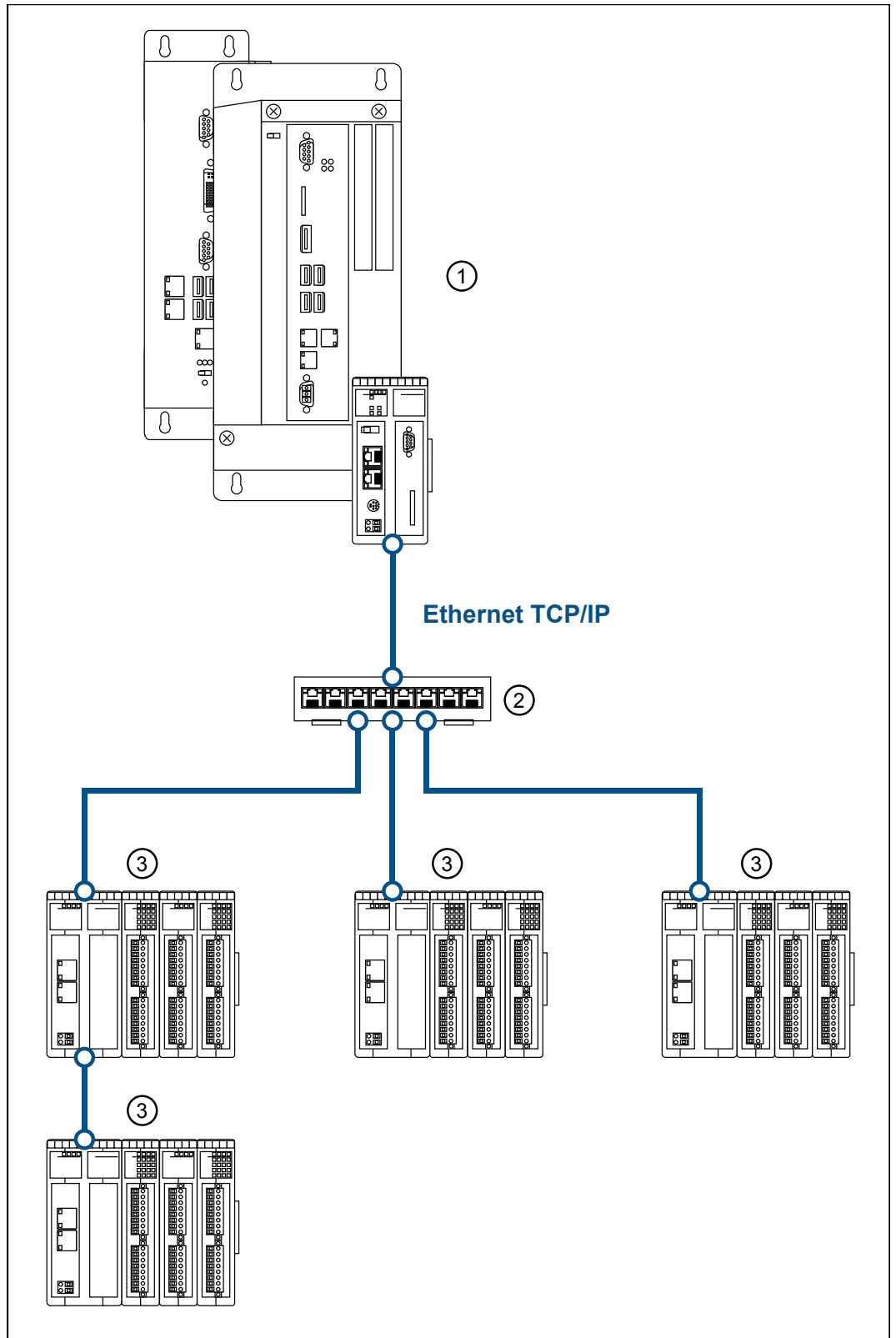


Fig. 12: System overview

1	Controller	2	Ethernet switch
3	Up to 64 Ethernet bus nodes per controller Up to 16 JX3 I/O modules per Ethernet bus node		

Definition - Global Node Number

The Global Node Number (GNN) is an ID number to identify Jetter devices (e.g. controllers, bus nodes) within an Ethernet network.

- The GNN within a network must be unambiguous for each Jetter device.
- The JetSym Hardware Manager automatically assigns the GNN during configuration.
- The value range of the GNN within a project is 000 ... 199.
- The controller has always got GNN 000.

Register numbering system

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

1NNNXXZZZZ

Fig. 13: 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

The inputs or outputs of the module are directly accessed via I/O numbers. 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. 14: 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

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 | Jetter - We automate your success.](#)

7.3.1 Updating the operating system of a bus node

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

- By means of the JetSym IDE
- Via FTP connection

Operating system update by means of the IDE

The Integrated Development Environment JetSym offers an easy way to transfer an OS file to the JX3-BN-ETH bus node.

Performing the update

- ✓ The latest OS file for the bus node has been downloaded from the Jetter homepage.
 - ✓ Controller and JetSym are connected
 - ✓ The JX3-BN-ETH is configured in JetSym.
 - ✓ Controller and JX3-BN-ETH are connected.
 - ✓ The JX3-BN-ETH is waiting in the boot loader for the OS update or the operating system is running.
 - ✓ The bus node is and remains switched on.
1. Launch the JetSym IDE.
 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.

Performing the update

- ✓ The latest OS file for the bus node has been downloaded from the Jetter homepage.
- ✓ An FTP connection to the bus node has been established.
- ✓ The login parameters for a user with administrator or system rights must be at hand.
- ✓ The operating system of the bus node is running.
- ✓ The bus node is and remains switched on.
- 1. Establish an FTP connection to the bus node.
- 2. Log in with administrator or system rights
- 3. In the file system, open the folder **OS**.
- 4. Transfer the OS file **Update.ini** into this folder.
- 5. Restart the bus node.
- ⇒ The updated operating system is launched.

7.4 File system

This chapter describes the file system of the JX3-BN-ETH bus node. The file system lets you access files located 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.

File categories

The files of the file system are categorized as follows:

- System directories or system files used by the operating system
- Files accessible to the user

System directories

The user is not allowed to delete system directories. System directories even survive formatting.

Directory	Description
/System	<ul style="list-style-type: none"> ■ System configuration ■ System information

Tab. 21: System directories

INFO

Further information

Further information on the file system can be found in the Application-oriented manual *File System* that can be downloaded from our [homepage](#).

7.4.1 Properties

The following conventions apply to the internal flash disk:

- 8 files max. to be opened simultaneously
- Separate directory names by a slash "/", not by 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

Properties

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.

7.5 Identification

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

- 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

7.5.1 Electronic Data Sheet (EDS)

Each device in a JX3 system has 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 file "eds.ini"

EDS data can be read from the **eds.ini** file.

Properties

- You can access this file through the file system on bus node.
- 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.
- This file is not affected by formatting the flash disk.

File structure

The EDS file is a text file the entries of which are grouped into several sections.

Example

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

```
;Jetter 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
```

Section [IDENTIFICATION]

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

Name	Example	Function
Version	0	Version of this section
Code	315	Modul 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. 22: Section [IDENTIFICATION]

Section [PRODUCTION]

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. 23: Section [PRODUCTION]

Section [FEATURES]

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. 24: Section [FEATURES]

EDS registers

EDS registers let you retrieve entries made in the Electronic Data Sheet (EDS). These registers mirror 1:1 the contents of the EDS file. They are to be read only (ro, read only).

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. 25: Register numbers of the EDS

Registers - Overview

The following table lists the EDS registers of a bus node and, 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.

Register	Section in eds.ini	Name in eds.ini	Description
MR 500	-	-	Functional group 0: Controller 1: JX3 module
MR 501	-	-	Module number (if MR 500 > 0)
MR 600	IDENTIFICATION	Version	Version of this section
MR 601		Code	Module code
MR 602		Name	Module name or controller name
... MR 612			
MR 613		PcbRev	PCB revision
MR 614		PcbOpt	PCB option
MR 700	PRODUCTION	Version	Version of this section
MR 701		SerNum	Serial number
... MR 707			
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. 26: Overview of EDS registers

EDS file of JX3 modules

The assignment of module registers 6xx and 7xx corresponds to the assignment with 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.

7.5.2 Revisions

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 hotline of Jetter AG in case of a problem.

Hardware revisions

The device has special registers, the content of which lets you identify the hardware.

Registers - Overview

The registers listed below let you retrieve the hardware revisions:

Register	Description
108020	Hardware revision of the backplane module
108021	Hardware revision - CPU board
200170	Controller model

Tab. 27: Register overview - Hardware revisions

Operating system version

The device has special registers, the content of which are unique OS version numbers.

Format of software version numbers

The software version numbers of the JX3-BN-ETH are represented by 4 numbers.

1 . 2 . 3 . 4

Fig. 15: Software version numbers

Digits	Description
1	Major or main version number
2	Minor or secondary version number
3	Branch or intermediate version number
4	Build version number

Tab. 28: Format of software version numbers

Released version

A released version can be recognized by both Branch and Build having got value 0.

Registers - Overview

The registers listed below let you retrieve the operating system versions:

Register	Description
200168	Boot loader version
200169	Operating system version
100002000	Version of the JX3 system bus driver

Tab. 29: Registers - Overview

7.6 IP configuration

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

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

7.6.1 Factory settings

Before the bus node JX3-BN-ETH is delivered, various parameters are set to a default value. These parameters can be changed by the user.

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Important note

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

Factory settings

Parameter	Value
IP address of the bus node	192.168.1.1
Subnet mask	255.255.255.0
IP address of 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 debugger	52000
IP port number for JetIP	50000
DIP switch slider	DIP switch slider 1 = ON All other DIP switch sliders = OFF
User's password <i>admin</i>	admin
User's password <i>system</i>	system

Tab. 30: Factory settings

7.6.2 Configuration memory

During the boot phase, the bus node reads the parameters for initializing the IP interface from the configuration file **config.ini**, which is physically part of the configuration memory.

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

- Read and change data via the **config.ini** file in the system directory using FTP
- Read and change data via configuration registers. When saving, a new configuration file is created from the data.

i 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

The bus node checks the data from the configuration memory for plausibility before the controller further processes it.

If entries are invalid or absent, the bus node uses the following default values:

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

Tab. 31: Configuration memory - Default values

Storage location/replacement of the bus node

The configuration memory is located on the JX3 backplane module. Owing to this approach, configuration data will be preserved when the function module of the bus node is replaced.

7.6.3 Configuration file "config.ini"

The configuration file **config.ini** lets you access the configuration memory of the JX3-BN-ETH.

Properties

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

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

File structure

The configuration file is a text file the entries of which are grouped into several sections. The JX3-BN-ETH replaces missing IP configuration parameters by their default values.

Example

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

```

;JX3-BN-ETH System Configuration
;Copyright (c) 2020 by Jetter 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
JVMDDebug = 52000
    
```

Section [IP]

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

Address

Property	Description
In the given example	192.168.10.15
Function	IP address of 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 defaults.

Tab. 32: Address

SubnetMask

Property	Description
In the given example	255.255.255.0
Function	Specifies the subnet mask
Allowed values	≥ 128.0.0.0

Property	Description
Illegal values	1 and 0 mixed
In the event of an illegal value	The JX3-BN-ETH resets all 4 values to their defaults.

Tab. 33: SubnetMask

DefGateWay

Property	Description
In the given example	192.168.4.1
Function	IP address of the gateway to other subnets; The JX3-BN-ETH must be able to reach the subnet (Address/SubnetMask), otherwise it will set this parameter to 0.0.0.0.
Allowed values	≥ 0.0.0.0 < 223.255.255.255
Illegal values	<ul style="list-style-type: none"> ■ Network address ■ Broadcast address ■ A value (Address/SubnetMask) which cannot be reached by the bus node. ■ The "Address" value
In the event of an illegal value	The JX3-BN-ETH sets the value to 0.0.0.0

Tab. 34: 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. 35: DNSServer

Section [HOSTNAME]

In the section [HOSTNAME] the name of the bus node is specified. The bus node is able to automatically generate an individual name. This host name is currently not in use.

SuffixType

Property	Description
In the given example	0
Function	Type of the automatically generated suffix that is attached to the name of the bus node
Allowed values	0 No suffix
	1 Low-order byte of the IP address in decimal notation
	2 Low-order byte of the IP address in hexadecimal notation
In the event of an illegal value	0

Tab. 36: SuffixType

Name	Property		Description
	In the given example		
Function	Specifies the bus node name.		
Allowed values	First character	'A' ... 'Z', 'a' ... 'z'	
	Next characters	'A' ... 'Z', 'a' ... 'z', '0' ... '9', '_'	
In the event of an illegal value	JX3-BN-ETH		

Tab. 37: Name

Section [PORTS]

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	Property		Description
	In the given example		
Function	IP port for OS updates and communication between controllers		
Allowed values	1024 ... 65535		
In the event of an illegal value	50000		

Tab. 38: JetIPBase

JVMDDebug	Property		Description
	In the given example		
Function	IP port for debugger/setup in JetSym		
Allowed values	1024 ... 65535		
In the event of an illegal value	52000		

Tab. 39: JVMDDebug

Changing the IP configuration via the configuration file

You can change the IP configuration directly in the **config.ini** configuration file. To do this, carry out the following steps:

1. Create on your PC a configuration file named **config.ini** using a text editor and make the corresponding entries.
2. Open an FTP connection between the PC and JX3-BN-ETH.
3. Log in as user with administrator or system rights.
Default login information:
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. Clear the FTP connection.

7. Reboot the JX3-BN-ETH.
- ⇒ The new configuration is active.

Configuration registers let you also make changes to the IP configuration.

7.6.4 Configuration registers

The configuration registers let you read out and modify IP configuration parameters. The configuration registers have 2 register areas that may differ in content.

Register numbers

The basic register numbers of both ranges are dependent on the device. The register number is calculated by adding the number of the module register (MR) to the number of the basic register.

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

Tab. 40: Register numbers of the 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 this 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 this data.

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

- The position of the DIP switch affects 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.

Registers - Overview

Register	Section in config.ini	Name in config.ini	Description
MR 0	IP	Address	IP address of the bus node
MR 1		SubnetMask	Specifies 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 that is attached to the name of the bus node
MR 33		Name	Specifies the bus node name.
... MR 51			

Register	Section in config.ini	Name in config.ini	Description
MR 64	PORTS	JetIPBase	IP port number for OS updates and communication between controllers
MR 65		JVMDebug	IP port number for debugger/ setup in JetSym

Tab. 41: Overview of configuration registers

7.6.5 Setting the IP address of the bus node

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

Replacing the bus node

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

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

Configuration options

You can configure the IP address in the following ways:

- Setting the default IP address
- Configuration via file **config.ini**
- Configuration via **config.ini** file and DIP switch
- Configuration during runtime via special registers

Making changes to the IP address

1. Disconnect the JX3-BN-ETH from the power supply.
 2. Remove the bus node enclosure from the backplane module.
 3. Make the corresponding DIP switch settings.
 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.

Setting the default IP address

The bus node JX3-BN-ETH has the default IP address 192.168.10.15. You may change the IP address of the bus node to its default IP address at any time.

i 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 module to its default IP address 192.168.10.15, move the DIP switch sliders to the positions shown below (1 ... 12 = OFF):

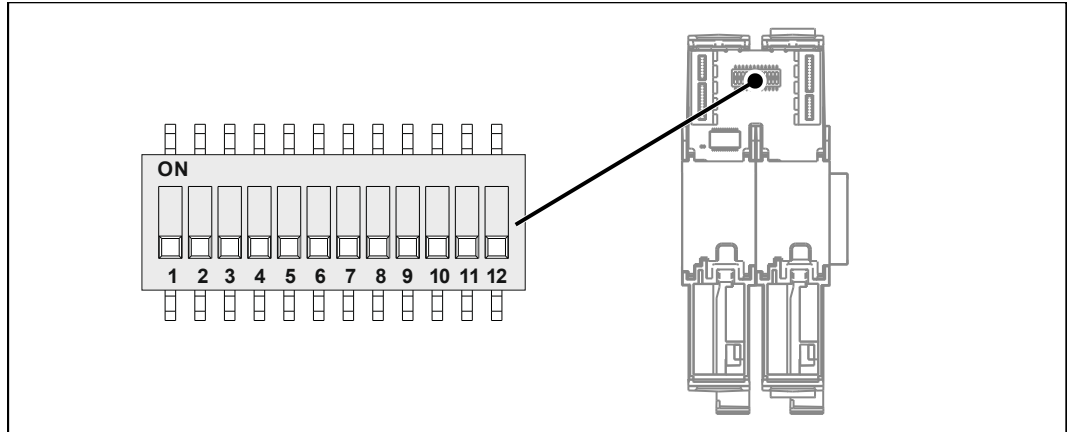


Fig. 16: DIP switch sliders 1 ... 12 OFF

Setting the IP address via configuration file

Setting the IP address

The **config.ini** file lets you set the IP address of the bus node JX3-BN-ETH.

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

Element	Description
Address	Enter the IP address into this line.
aaa	First byte of IP address
bbb	Second byte of IP address
ccc	Third byte of IP address
ddd	Fourth byte of IP address

Tab. 42: Elements of the IP address

DIP switch slider settings

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**:

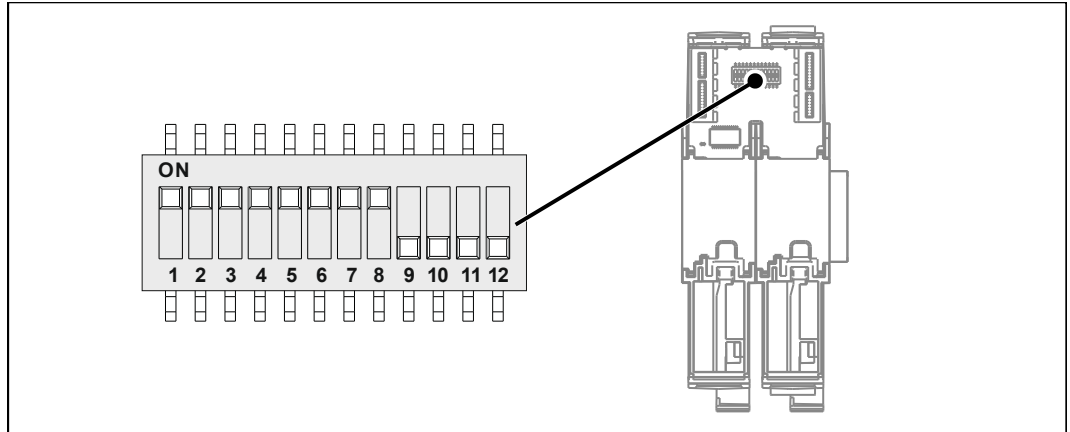


Fig. 17: DIP switch sliders 1 ... 8 ON

Transferring the configuration file

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

Setting the IP address via configuration file and DIP switch

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. To this end, set the 3 upper bytes of the IP address in the **config.ini** file, and the lower byte using the DIP switch sliders 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 IP address
bbb	Second byte of IP address
ccc	Third byte of IP address
1	Dummy entry - must be 1

Tab. 43: Elements of the IP address

DIP switch slider settings

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:

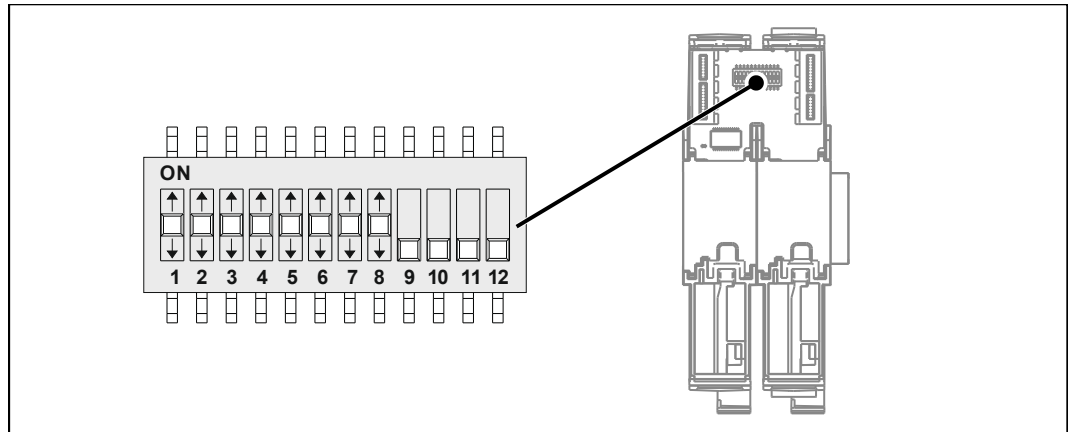


Fig. 18: DIP switch sliders 1 ... 8 any position

DIP switch slider									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

Transferring the configuration file

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

Setting the IP address during runtime

The IP interface is initialized by the settings in the configuration memory during the boot phase. Registers let you make changes to the settings listed below. These changes will then be saved to a volatile memory.

- IP address of the bus node
- Subnet mask
- IP address of default gateway

i INFO

Important note

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

To set the IP address and the subnet mask, proceed as follows:

- ✓ While settings are being made, no communication via IP interface is allowed. Otherwise, this would lead to a loss of data.
 - ✓ The values entered must be valid. This can be ensured, e.g. by including a validity check in the application program.
This is important because there is no check if you set the parameters at run-time of the bus node.
1. Enter the value 0.0.0.0 into R 104533.
 2. Enter the value 0.0.0.0 into R 104532.
 3. Enter the desired IP address into R 104531.
 4. Enter the desired subnet mask into R 104532.
 5. Enter the desired IP address of the default gateway into R 104533.
- ⇒ The settings are completed. Communication is possible again.

7.6.6 Using names for IP addresses

You can also use names when specifying IP addresses from external communication partners of the JX3-BN-ETH, for example, when configuring the e-mail client. The bus node resolves the names into IP addresses. A configuration file or the Domain Name System is used to resolve a name into its corresponding IP address.

Name resolution

Names are resolved to IP addresses in the following way:

Step	Description	
1	During the boot process the bus node reads the IP address of the DNS server from the configuration memory.	
2	During the boot process the bus node reads the file <code>/etc/hosts</code> . Then, the controller creates a translation table with the names and IP addresses found in this file.	
3	After the boot process the bus node recognizes a name instead of an IP address.	
4	Based on the translation table, the bus node tries to resolve the name into a related IP address.	
	If then ...
	... the bus node has resolved the name, proceed with step 6.
... the bus node could not resolve the name, proceed with step 5.	
5	The bus node tries to resolve the name into a related IP address by sending a request to the DNS server.	
	If then ...
	... the bus node has resolved the name, it enters the name and IP address into the translation table; → proceed with step 6.
... the bus node could not resolve the name, the bus node aborts the function, e.g. the system function for sending an e-mail, and issues an error message.	
6	The bus node uses the IP address found for further communication.	

Tab. 44: Name resolution

**Configuration file
“hosts“**

The configuration file **hosts** holds the static assignment between names and IP addresses. During the boot phase, the JX3-BN-ETH reads the file once.

- File format: TEXT
- Location: */etc*
- File name: **hosts**

**Domain Name
System (DNS)**

If a name cannot be found in the file **/etc/hosts**, the JX3-BN-ETH tries to resolve the IP address by obtaining the corresponding IP address from a DNS server. During the boot process the JX3-BN-ETH reads the IP address of the DNS server from the configuration memory.

7.7 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.

7.7.1 Operating system memory

The OS is stored to a non-volatile flash memory in the CPU. Therefore, the OS can be executed immediately after the device is powered up.

Properties

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

Memory access

- The user is not allowed to directly access the OS memory.
- To modify the OS, it must be updated.

7.7.2 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 the internal flash disk: 4 MB

Memory access

- By operating system
- By means of JetSym
- Via FTP connection
- By the e-mail client
- Via a browser (via the HTTP server)
- By means of file commands from within the application program

7.7.3 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 means of JetSym
- By the e-mail client
- From other controllers

7.7.4 Inputs and outputs

Inputs and outputs are 1-bit variables. This means they can either have the value TRUE or FALSE.

Properties of virtual inputs/outputs

- Global variables assigned to permanent addresses (%IX, %QX)
- Quantity: 16,000
- 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

Memory access

- By means of JetSym
- By the e-mail client
- From HMIs
- From the application program

7.8 Ethernet system bus

Controllers and modules produced by der Jetter AG offer a host of functions which can be accessed by the user via registers.

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

i INFO

Further information

Further information on this topic can be found in the Application-oriented Manual *Jetter Ethernet System Bus* that can be downloaded from our [homepage](#).

7.9 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

The user has the option of using a command line FTP client, which comes with many PC operating systems, or graphic FTP tools.

Number of possible connections

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

Any additional FTP client, which tries to connect with the FTP server, will get no response to its request for establishing a connection.

Logging in

To be able to access the file system via FTP, the FTP client must log on when the connection is established.

- As **Server Name** enter the IP address of the device.
- As **User Name** enter your user name, e.g. *admin*.
- As **Password** enter your password, e.g. *admin*.

Factory settings

The factory settings of the <Produktname> include one user account:

- NAME = admin
- PW = admin

INFO

Further information

Further information on the FTP server can be found in the application-oriented manual *File System* that can be downloaded from our [homepage](#).

8 Registers - Overview

This register overview describes the registers of the JX3-BN-ETH in summarized form.

Module code

For identification purposes, each module has a unique module code (refer to module register 100601 *Module Identification*).

- 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

Register range	Description
10000mm01 ... 10000mm16	JX3 modules (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 <i>If register 100500 = 1</i>

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 <i>If register 100500 = 1 and register 100501 = 2 ... 17</i>
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 <i>If register 100500 = 0</i>
100800	Internal version number
100801	MAC address (Jetter)
100802	MAC address (device)
100803	Serial port
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

Register range	Description
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

Register	Description
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
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	"D1" LED
Bit 3	"D2" LED
108003	"R" LED
108004	"E" LED
108005	"D1" LED
108006	"D2" LED
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

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]

Register	Description
100003mm0 ... 100003mm9	Registers on I/O modules (compatibility mode) mm: Module number - 2 (00 ... 15)
100004000 ... 100004367	Inputs/outputs mapped to registers
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

Register Description				
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
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

Register Description				
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

Register Description		
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

Register Description	
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
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

Register Description				
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

Register Description				
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		
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

Register	Description	
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
4333	709 ... 716

Register	Description
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

9 Maintenance and repairs

9.1 Maintenance, repairs and disposal

Maintenance	<p>This device is maintenance-free. Therefore, for the operation of the device no inspection or maintenance are required.</p>
Repairs	<p>Defective components could cause dangerous malfunctions and could compromise safety. Only the manufacturer is allowed to repair the device. Do not open the device!</p>
Disposal of obsolete equipment	<p>The device must be disposed of in accordance with the Environmental Product Declaration EPD. Applicable local environmental directives and regulations must be complied with. This product must be disposed of as waste electronic equipment. Waste packaging material must be recycled or reused.</p>
Modifications and alterations to the device	<p>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.</p>

9.2 Storage and shipment

Storage	<p>When storing the device observe the environmental conditions given in chapter "Technical specifications".</p>
Shipment and packaging	<p>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 Jetter AG of the damage caused during shipment. If the device is damaged or has been dropped, it is strictly forbidden to use it.</p>

10 Service

10.1 Customer service

Should you have any questions, suggestions, or problems, please don't hesitate to contact our service representatives. To contact them, please call our technical hotline or use the contact form on our homepage:

[Technical hotline | Jetter - We automate your success.](#)

You are also welcome to send an e-mail to our technical hotline:

hotline@jetter.de

Please supply the following information when contacting our technical hotline:

- Hardware revision and serial number
For the hardware revision number, please refer to the nameplate.
- OS version
To determine the operating system version, use the functions of the development environment.

11 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 Jetter AG.

11.1 Spare parts

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

Tab. 45: Spare parts

11.2 Accessories

INFO

The accessories are not part of the scope of delivery. Suitable accessories can be obtained from Jetter AG.

Component	Item number
Screwdriver	60871712
End clamp for DIN rail	60863970

Tab. 46: Accessories

11.2.1 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

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