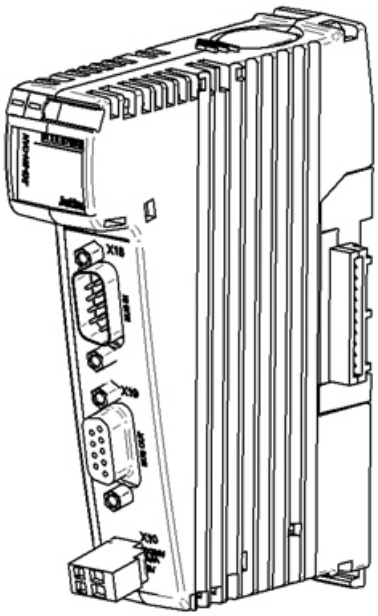
JX3-BN-CAN

Peripheral Module



JetWeb

User Manual

Jetter
Automation. Made easy.

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This User Manual belongs to the JX3-BN-CAN:

Type: _____

Serial #: _____

Year of construction: _____

Order #: _____

CE

To be entered by the customer:

Inventory #: _____

Place of operation: _____

Significance of this User Manual

This User Manual is part of the JX3-BN-CAN and

- and must be kept in a way that it is always at hand until the JX3-BN-CAN will be disposed
- the JX3-BN-CAN must be handed over, if it is sold, alienated, or loaned

Please contact the manufacturer in any case you encounter difficulties to clearly understand this User Manual.

We would appreciate any suggestions and contributions on your part and would ask you to contact us. This will help us to produce manuals that are more user-friendly and to address your wishes and requirements.

This User Manual contains important information on how to transport, erect, install, operate, maintain and repair the JX3-BN-CAN.

Therefore, the persons carrying out these jobs must carefully read, understand and observe this User Manual, and especially the safety instructions.

Missing or inadequate knowledge of the User Manual results in the loss of any claim of liability on part of Jetter AG. Therefore, the operating company is recommended to have the instruction of the persons concerned confirmed in writing.

History

Edition	Comment
1.03.1	Original issue
1.03.2	Changes, see ***Recent Revisions*** (on page 38)

Description of Symbols

Warning

This sign is to indicate a possible impending danger of serious physical damage or death.

Caution

This sign is to indicate a possible impending danger of light physical damage. This sign is also to warn you of material damage.

Warning

This sign indicates hazard of life due to electric shock caused by a high operating voltage.

Warning

This sign is to indicate hazard of serious physical damage or death due to accidentally touching dangerous parts of the device.

Warning

You are asked to wear goggles. Failure to comply may lead to bodily injuries.

Warning

This sign is to warn you of material damage due to applying hard blows or shocks to the motor flange and shaft.

Important

This sign is to indicate a possible impending situation which might bring damage to the product or to its surroundings.

It also identifies requirements necessary to ensure faultless operation.

You will be informed of various possible applications and will receive further useful suggestions.

It also gives you words of advice on how to efficiently use hardware and software in order to avoid unnecessary efforts.

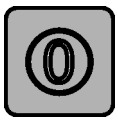
Note

· / -

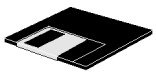
Enumerations are marked by full stops, strokes or scores.

Operating instructions are marked by this arrow.

Automatically running processes or results to be achieved are marked by this arrow.



PC and user interface keys.



Reference to a program or file.

This symbol informs you of additional references (data sheets, literature, etc.) associated with the given subject, product, etc. It also helps you to find your way around this manual.

Contents

1 Safety Instructions

1.1 Generally Valid Safety Instructions

The device complies with the valid safety regulations and standards. Special emphasis was given to the safety of the users.

Further, the user should adhere to the following regulations:

- relevant accident prevention regulations;
- accepted safety rules;
- EC guidelines and other country-specific regulations.

1.1.1 Usage to the Intended Purpose

Usage to the intended purpose includes operation in accordance with the User Manual.

The JX3-BN-CAN module is for remote connection of JX3 expansion modules to all controllers of the JetControl series. Up to 8 expansion modules can directly be connected to the JX3-BN-CAN bus head. By means of a JX3-PS1 module, eight further JX3 modules can be connected.

The supply voltage of the JX3-BN-CAN module is DC 24 V. This operating voltage is classified as SELV (Safety Extra Low Voltage). The JX3-BN-CAN module is therefore not subject to the EU Low Voltage Directive.

The JX3-BN-CAN module may only be operated within the limits of the stated data.

The device is used to control machinery, such as conveyors, production machines, and handling machines.

1.1.2 Non-Intended Use

The device must not be used in technical systems which to a high degree have to be fail-safe, e.g. ropeways and aeroplanes.

If the device is to be run under ambient conditions which differ from the conditions mentioned in chapter ***Operating Conditions*** (on page 42), the manufacturer is to be contacted beforehand.

1.1.3 Who may Operate the Device?

Only instructed, trained and authorised persons are permitted to operate this device.

Transport:	Only by personnel with knowledge in handling electrostatically sensitive components.
Installation:	Only by specialists with training in electrical engineering.
Commissioning:	Only by specialists with extensive knowledge of, and experience with, electrical engineering / drive technology.

1.1.4 Modifications and Alterations to the Module

For safety reasons, no modifications and changes to the device and its functions are permitted.

Any modifications to the device not expressly authorised by the manufacturer will result in a loss of any liability claims to Jetter AG.

The original parts are specifically designed for the device. Parts and equipment of other manufacturers are not tested on our part, and are, therefore, not released by us.

The installation of such parts may impair the safety and the proper functioning of the device.

Any liability on the part of Jetter AG for any damages resulting from the use of non original parts and equipment is excluded.

1.1.5 Repair and Maintenance

This device must not be repaired by the operators themselves. The device does not contain any parts that could be repaired by the operator.

The device must be sent to Jetter AG for repair.

1.1.6 Decommissioning and Disposal

The environmental regulations for the respective country apply to decommissioning and disposing of devices on the operating company’s premises.

1.2 Ensure Your Own Safety

Warning

- Isolate the JX3-BN-CAN module from the mains, if maintenance works have to be carried out. By doing so, you will prevent accidents resulting from electric voltage and moving parts.
- Safety and protective devices, e.g. the barrier and cover of the terminal box must never be shunted or by-passed.
- Dismantled protective equipment, such as the fuses must be reattached prior to commissioning and checked for proper functioning.
- Prior to commissioning, the machine manufacturer shall conduct a hazard analysis for the machine and take appropriate measures to prevent personal injury and damage to property resulting from accidental movements.

1.2.1 Malfunctions

- **In case of failures or damages, disconnect the device from the mains immediately.**
- Malfunctions or other damages are to be reported to an authorised person at once.
- The device must be protected from improper or inadvertent use.

1.2.2 Information Signs and Labels

- Writings, information signs, and labels always have to be observed and kept readable.
- Damaged or unreadable information signs and labels have to be exchanged.

1.3 Instructions on EMI

The noise immunity of a system corresponds to the weakest component of the system. For this reason, correct wiring and shielding of cables is of paramount importance.

Important!

Measures for increasing immunity to interfering in electric plants:

- The JX3-BN-CAN module has to be attached to a DIN rail acc. to EN 50022-35 x 7.5.
- Follow the instructions given in Application Note 016 "EMC-Compatible Installation of the Electric Cabinet" published by Jetter AG.

The following instructions are excerpts from Application Note 016:

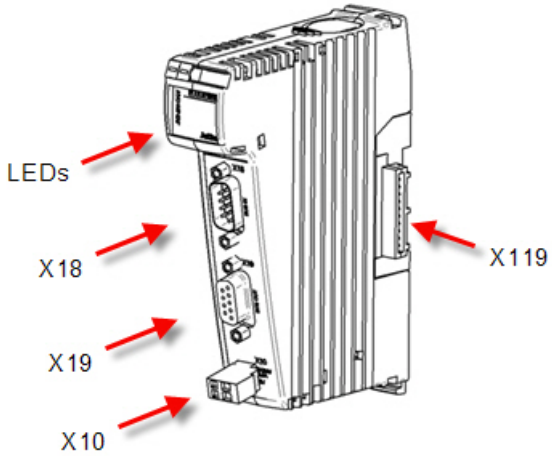
- On principle, **physical separation** should be maintained between signal and power lines. We recommend spacings greater than 20 cm. Cables and lines should cross each other at an angle of 90°.
- Shielded cables **must** be used for the following lines:

  Analog lines, data lines, motor cables coming from inverter drives (servo output stage, frequency converter), lines between components and interference suppressor filter, if the suppressor filter has not been placed at the component directly.
- Shield cables **at both ends**.
- Unshielded wire ends of shielded cables should be as short as possible.
- The entire shield has, **in its entire perimeter,** be drawn behind the isolation, and then be clamped under an earthed strain relief **with the greatest possible surface area.**

2 Introduction

2.1 Product Description JX3-BN-CAN

Via the module JX3-BN-CAN, the JX3 expansion modules can be connected to all controllers of the JetControl series as remote manuals. Up to 8 expansion modules can directly be connected to the JX3-BN-CAN bus head. By means of a JX3-PS1 module, eight further JX3 modules can be connected.

Product Description JX3-BN-CAN	
	
Article #	10000544
Module code	30
LED-display	Supply voltage Communication of the JX3 system bus Connection to the Controller
Connection X18	BUS-IN Jetter system bus
Connection X19	BUS-OUT Jetter system bus
Connection X10	Power supply for logic circuit
Connection X119	8 modules can be connected directly, 8 further modules via a JX3-PS1 module
Configuration of the Jetter system bus	Baud rate, address, bus termination: automatically

2.2 Minimum Requirements

The functions described in this document have got minimum requirements on modules, controllers and software. They have been listed in the following table.

System Requirements	
Controller / Software	**Starting from Software Release**
JC-24x	V 3.23
JX6-SB / JX6-SB-I	V 2.18
JC-647	V 3.50
JetSym	V 3.00
JM-D203-JC-24x	V 1.12

2.3 Scope of Delivery

Scope of Delivery JX3-BN-CAN		
Article #	**Quantity**	**Description**
10000544	1	JX3-BN-CAN
60870409	1	BU_02_BLZF_SW_RM3.5 2-pin female connector, contact spacing 3.5 mm
60870411	10	DIV_DEK_5/5_MC-10_NEUT._WS Terminal markers
60871026	1	Installation Instructions

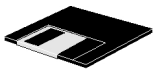
2.4 Document Survey

Document Survey of the JX3-I/O System

JX3-I/O System, User Information
JX3-BN-CAN, Installation Manual

Document Survey of the JX2-I/O System

JX2-I/O System, User Information



SysBus_Configuration_xxx_e.xls
Configuration aid for the Jetter system bus: The file can be processed in Microsoft Excel directly.
xxx: Version index

3 Power Supply

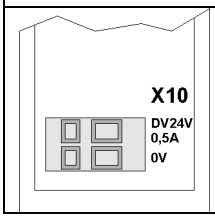
3.1 Technical Data

Power supply has to be made through a 24 V DC power supply unit with SELV output. The power supply must meet the following requirements:

Power Supply Unit Requirements	
Rated voltage	DC 24 V
Voltage range	-15 % ... +20 %
Filtering of the residual ripple	< 5 %
Power consumption	0.5 A x 24.0 V = 12 W max.

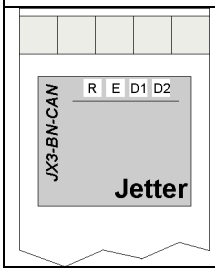
The JX3-BN-CAN module generates several internal supply voltages out of the connected voltage supply. If all internal supply voltages are ok, the R-LED is lit green.

3.2 Description of Connections

Assignment of Terminal X10			
View	**Pin**	**Signal**	**Comment**
	X10.DC24 V	+ 24 V	Supply voltage
	X10.0V	0 V	Reference potential

3.3 Meaning of LEDs

Module JX3-BN-CAN has been equipped with four LEDs. The LEDs R and E indicate the status of the voltage supply.

LEDs				
View	**LED**	**Color**	**Status**	**Function**
	R	green	Off	At least one internal power supply is not ok
			is lit	All internal voltage supplies are ok
	E	red	Off	No error

3.4 Module Register for the Logic Voltage of the JX3 Modules

The JX3-BN-CAN module internally generates three different kinds of voltages. The voltage of the logic supply of the JX3 modules can be read via module register 10.

Voltage of the JX3 Module Logic Supply	
Module Reg.	**10**
Description	The JX3-BN-CAN module supplies the connected JX3 modules with a 5 V logic voltage.
Access	Read only
Value Range	0 ... 5,500 [Millivolt]
Value After Reset	5,000, typical

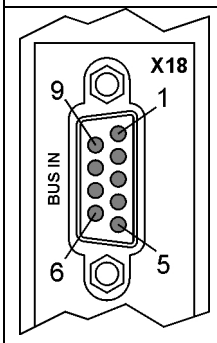
4 Jetter System Bus Connections

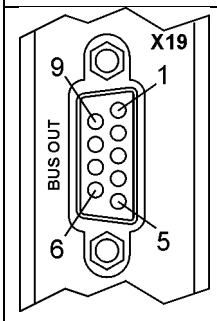
4.1 Technical Data

The JX3-BN-CAN module can be integrated into the Jetter system bus directly via the connections BUS-IN X18 and BUS-OUT X19.

Technical Data	
Setting the module number	automatically
Setting the baud rate	automatically
Bus terminating resistor	automatically

4.2 Description of Connections

Assignment of Terminal X18			
View	**Pin**	**Signal**	**Comment**
	1	CMODE0	
	2	CL	
	3	GND	
	4	CMODE1	
	5	TERM	internally shunted by X18.3
	6	unassigned	
	7	CH	
	8	unassigned	
	9	do not connect	

Assignment of Terminal X19			
View	**Pin**	**Signal**	**Comment**
	1	CMODE0	
	2	CL	
	3	GND	
	4	CMODE1	
	5	TERM	
	6	unassigned	
	7	CH	
	8	unassigned	
	9	do not connect	

Important!

For deactivating the internal bus terminating resistor, pin X19.5 must be connected with pin X19.3 at JX3-BN-CAN.

In original Jetter AG connection cables for the Jetter system bus, pin 3 has been shunted by pin 5 in the connector.

4.3 Module Numbering

At numbering the modules at the Jetter system bus, the I/O module number and the slave module number are differentiated. The module number is part of the coding for input and output numbers, as well as for the register numbers of the expansion modules, which are connected to the Jetter system bus.

I/O Module Number

An I/O module number is not assigned to all non-intelligent JX2 modules and all JX3 modules. I/O module numbers are assigned according to the following rules:

- I/O module number 1 is always assigned to the controller.
- I/O module number 2 is assigned to the first non-intelligent JX2, respectively JX3 module connected to the Jetter system bus.
- The modules JX2-PS1 and JX3-PS1 are not counted.
- Intelligent JX2 modules are not counted.
- The first JX3-BN-CAN connected to the Jetter system bus is assigned to I/O module number 33.

Slave Module Number

A slave module number is assigned to all intelligent JX2 modules and JetMove motion systems. Slave module numbers are assigned according to the following rules:

- The controller is always assigned to slave module number 1.
- The first intelligent JX2 module connected to the Jetter system bus is assigned to slave module number 2.
- Non-intelligent JX2 and JX3 modules are not counted.

Example: Module Numbering

In this example, various expansion modules have been connected with a JC-24x. The I/O module numbers are shown above, the slave module numbers below the modules.

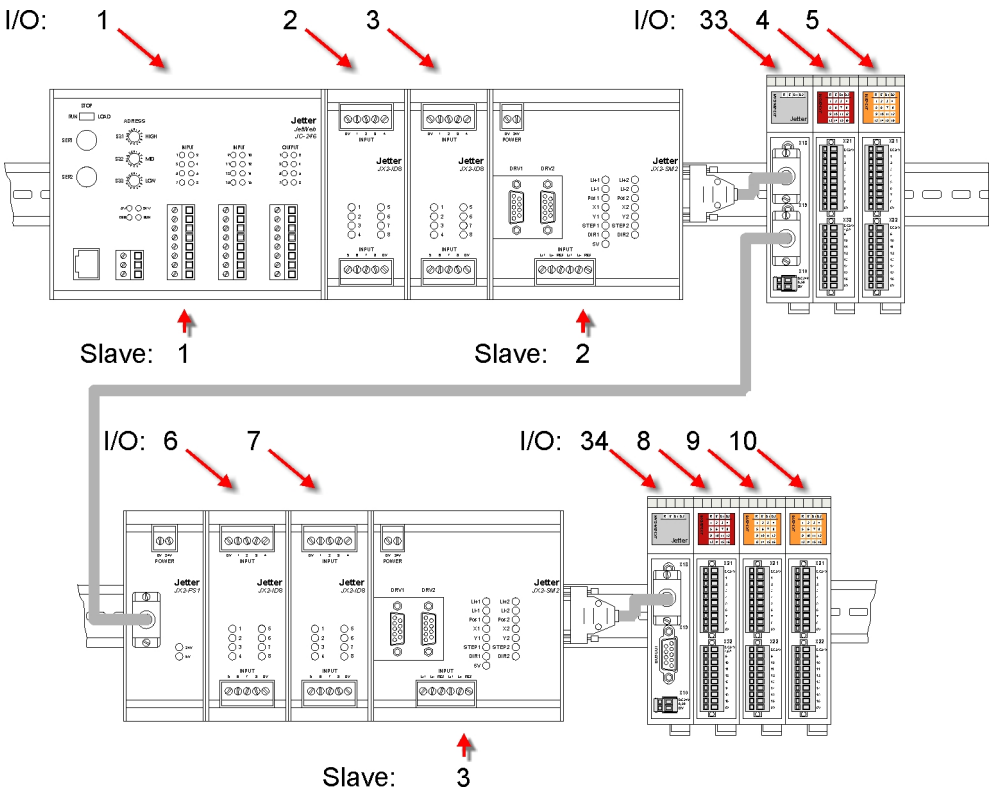


Figure 1: Module numbering in the Jetter system bus

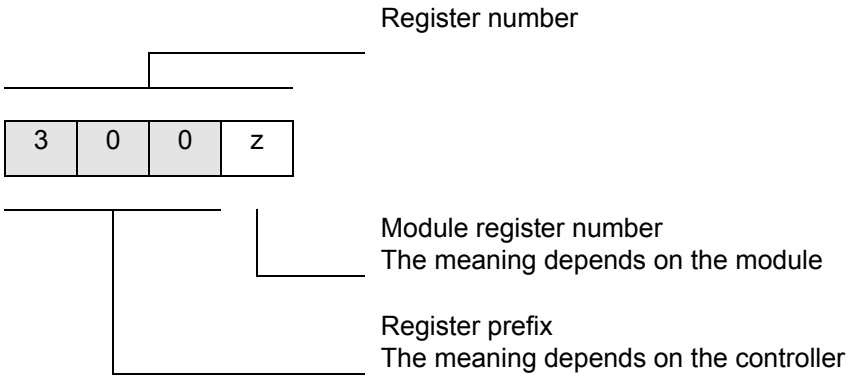
Survey of the Module Numbers		
Module	**I/O Module Number**	**Slave Module Number**
JC-24x	1	1
JX2-ID8	2	-
JX2-ID8	3	-
JX2-SM2	-	2
JX3-BN-CAN	33	-
JX3-DIO16	4	-
JX3-DI16	5	-
JX2-PS1	-	-
JX2-ID8	6	-
JX2-ID8	7	-
JX2-SM2	-	3
JX3-BN-CAN	34	-
JX3-DIO16	8	-
JX3-DI16	9	-
JX3-DI16	10	

5 Register Addressing

5.1 Register Array for JX3 Modules

Each JX3 module is equipped with over 10,000 module registers. The module registers, on the other hand, have been assigned to the controller registers. By means of registers, process, configuration and diagnose data can be read by module JX3-BN-CAN, respectively written to the module.

Registers can be accessed directly in the application program of the controller, in a setup window of JetSym, or via the user interface directly.

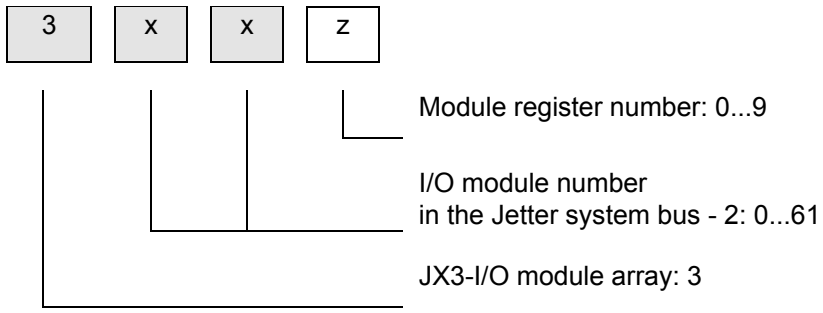


The register number results from a register prefix and a module register number. The register prefix depends on the position of the JX3-BN-CAN module in the Jetter system bus, and on the controller that is applied.

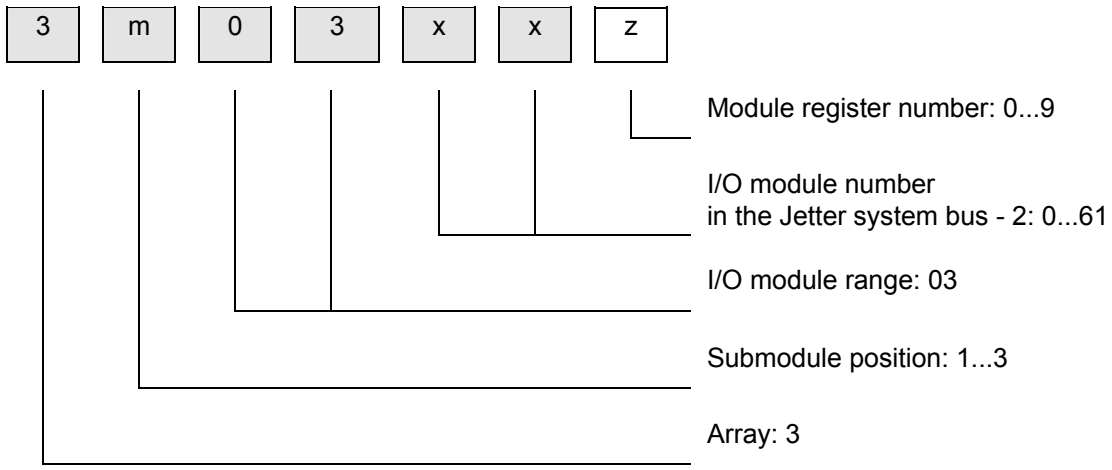
At determining the register prefixes, the following parameters have to be considered:

- Controller (JC-24x, JC-64x, JC-800, JM-D203-JC-24x)
- Submodule position (at JX6-SB, JX6-SB-I)
- I/O module number in the Jetter system bus

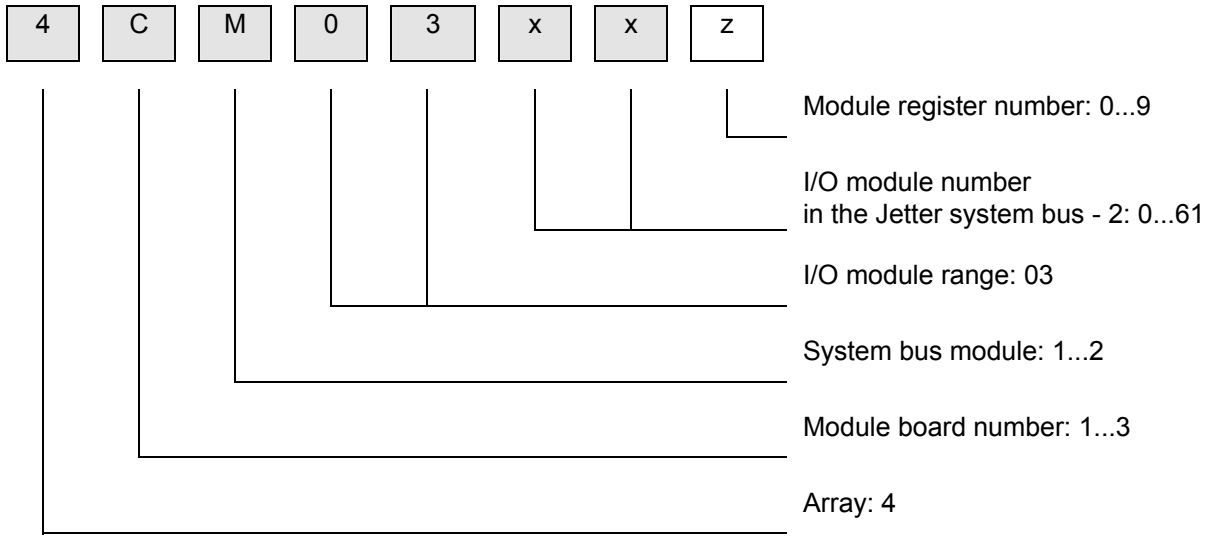
JX3-I/O-modules connected to JC-24x and JM-D203-JC-24x



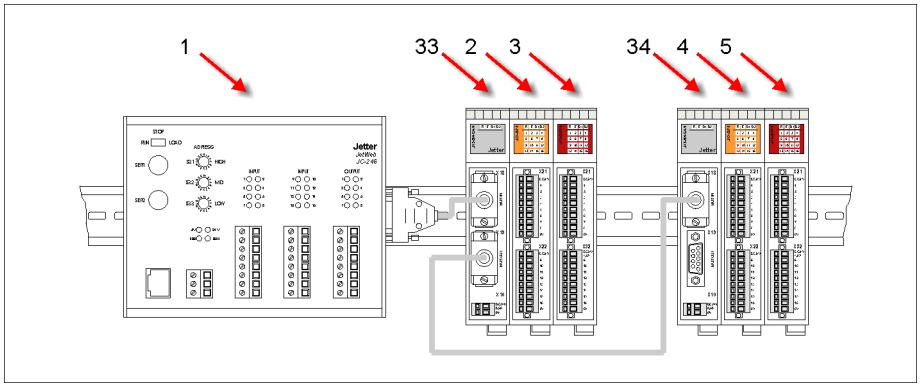
JX3-I/O modules connected to JX6-SB(-I) and JC-647



JX3-I/O modules connected to JX6-SB(-I) and JC-800



Example: Register and I/O Addressing of a JX3 Module in the Jetter System Bus



Six modules, JX3-BN-CAN (33, 34), JX3-DI16 (2, 4) and JX3-DIO16 (3, 5), have been connected to a JC-24x controller. The register and I/O numbers listed in the table below result from the module position in the Jetter system bus.

- In the Jetter system bus, no I/O numbers have been assigned to the JX3-BN-CAN.
- The first JX3-BN-CAN connected to the JetControl is assigned the I/O module number 33.
- The first JX3 module is assigned I/O module number 2.

Register and I/O Numbers			
I/O Module Number	**Module**	**Register Number**	**I/O Numbers**
1	JC-24X	0 ... 1999 20000 ... 49999	101 ... 116
33	JX3-BN-CAN	3310 ... 3319	-
02	JX3-DI16	3000 ... 3009	201 ... 216
03	JX3-DIO16	3010 ... 3019	301 ... 316
34	JX3-BN-CAN	3320 ... 3329	
04	JX3-DI16	3020 ... 3029	401 ... 416
05	JX3-DIO16	3030 ... 3039	501 ... 516

5.2 Indirect Access to JX3 Module Registers

Each JX3 module is equipped with over 10,000 module registers. One index and one data register make access to all 10,000 module registers possible.

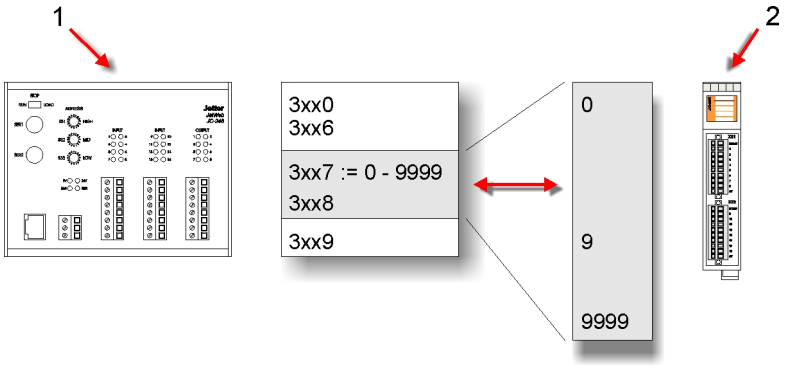


Figure 2: Indirect register access to JX3 modules

Above, indirect access to the JX3 module registers (2) has been illustrated. In the Jetter system bus, the JX3 modules can be accessed via register numbers 3xxz (1). At indirect access, the number of the JX3 module register is written to 3xx7. After this, the content of the JX3 module register can be accessed via 3xx8.

Register Numbering Dependent on the Controller

- For JC-24x controllers: Register number 3xxz
- For JC-647 controllers: Register number 3m03xxz
- For JC-800 controllers: Register number 4CM03xxz

Indirect Register Access in the Application Program

- Indirect access to JX3 module registers of a module may only be carried out within a task. If indirect access is made out of several tasks, the index may be overwritten after a task change.

Index for Indirect Register Access	
Module Register	**7**
Description	At indirect register access to JX3 modules, the index contains the module register number. It functions as a pointer.
Access	read and write access
Value Range	0 ... 9999
Value After Reset	9
Comment	After switching on, the index points to the module register "operating system version".

Data for Indirect Register Access	
Module Registers	**8**
Description	This module register is for reading, respectively writing, the value of the selected module register. The JX3-BN-CAN module copies the value of the actual module register to this register.
Access	Read and write access
Value Range	32 bits
Value After Reset	Operating System Release

Example: Directly Checking Communication with the JX3 Modules

In a JX3-BN-CAN module, communication with the connected JX3 modules is to be checked. For this, bit 15 in register 0 **the status of the JX3-BN-CAN** must be queried.

```
VAR
      nm_State : INT at %vl 3310;            //   Status register JX3-BN-CAN
END_VAR;

CONST
      c_ComActive = 15;                      //   Bit number
END_CONST;

TASK 0
      WHEN
      BIT_SET (nm_State, c_ComActive)        //   Communication active
      CONTINUE;
                                             //   ...
END_TASK;
```

Example: Indirect Reading of the Connected JX3 Modules

The number of JX3 modules connected to a JX3-BN-CAN is to be read. The number of connected JX3 modules has been written to module register 256 of the JX3-BN-CAN.

The JX3-BN-CAN has got I/O module number 33.

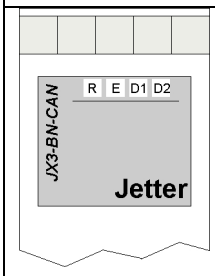
As a first step, JX3 module register number 256 has to be written into the index register. As a next step, the number of connected modules can be read via the data register.

```
VAR
      nm_Index : INT at %vl 3317;            //   Index register
      nm_Data : INT at %vl 3318;             //   Data register JX3-BN-CAN
END_VAR;

CONST
      c_RegNumModules = 256;                 //   Parameter number
END_CONST;

TASK 0
      nm_Index := c_RegNumModules;
      IF
      nm_Data = 0                            //   there are no modules
                                                  connected
      THEN
      // ...
      END_IF;
                                             //   ...
END_TASK;
```

6 Diagnostics and Administration

6.1 Diagnostics by LEDs

Module JX3-BN-CAN has been equipped with four LEDs.

LEDs				
View	**LED**	**Color**	**Status**	**Function**
	R	green	Off	At least one internal power supply is not ok
			is lit	All internal voltage supplies are ok
	E	red	Off	No error
			flashing	At least one internal power supply is not ok
			is lit	At least one error bit has been set in the status module register.
	D1	red	flashing fast	The JX3-BN-CAN module is waiting for setup by the controller
			Off	The connection to the controller via the Jetter system bus is active
	D2	red	flashing fast or slowly	There is no valid operating system available on the JX3-BN-CAN module. Carry out the update.
			flashing fast	The JX3-BN-CAN module is waiting for setup by the controller
			flashing slowly	The connection to the controller via the Jetter system bus is active.
	E, D1, D2	red	jointly flashing	The operating system update is active.

6.2 Diagnostics by JX3 Module Registers

Status of JX3-BN-CAN	
Module Register	**0**
Description	The JX3-BN-CAN module reads the error bit statuses of all connected JX3 modules in cyclic mode. If in at least one connected JX3 module an error bit has been set, the corresponding collective error bit is set in the status module register.
Access	Read
Value Range	16 bits, bit-coded
Value After Reset	Present state

The meaning of the individual bits in the status module register:

Bit 0: Collective error bit 0 of the connected JX3 modules

0 = Error bit 0 has not been set

1 = At least one error bit 0 has been set

Bit 1: Collective error bit 1 of the connected JX3 modules

0 = Error bit 1 has not been set

1 = At least one error bit 1 has been set

Bit 2: Collective error bit 2 of the connected JX3 modules

0 = Error bit 2 has not been set

1 = At least one error bit 2 has been set

Bit 8: Exceeding the time limit at cyclic data exchange

0 = Time has not been exceeded

1 = Time has been exceeded

0 = This error can only be fixed by restarting the Jetter system bus.

Bit 9: Fatal error at cyclic data exchange

0 = No error

1 = Fatal error

This error can only be fixed by restarting the Jetter system bus.

Bit 15: Cyclic data exchange with the connected JX3 modules

0 = Not active

1 = Activated

This error can only be fixed by restarting the Jetter system bus.

The error bits of the individual JX3 modules are always displayed in the JX3 module register 0. An error bit, respectively a collective error bit remains only set as long as the cause of the error exists.

Operating System Release	
Module Register	**9**
Description	The operating system release of the JX3-BN-CAN module in the "Major.Minor.Branch.Build" format
Access	Read
Value Range	32 bits
Value After Reset	Up-to-date operating system release
Comment	A released operating system can be recognized by both Branch and Build having got value zero. For displaying the operating system release number in the setup window of JetSym, please select the format "IP address".

Example: Displaying the Operating System Release Number as an IP Address in the Setup Window

The operating system release number of a JX3-BN-CAN module is displayed in a setup window of JetSym. The JX3-BN-CAN module has been connected to a JC-24x controller. The operating system release number can be read via register 3319 (2).

The format "IP address" has to be selected via the context menu of the respective line. The operating system release number is now displayed with dots as separators.

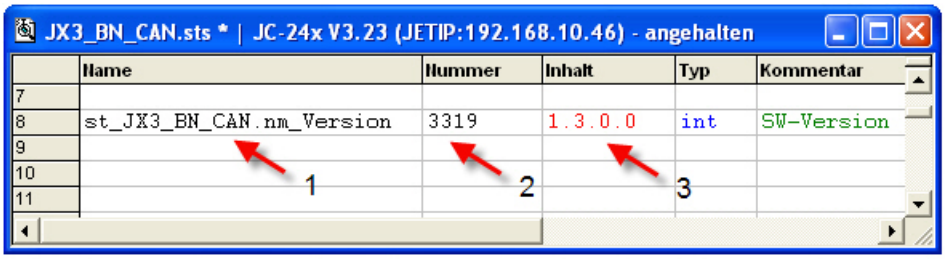


Figure 3: SW version, displayed in the format of the IP address

The operating system release number 1.3.0.0 (3) is displayed in the variable st_JX3_BN_CAN.nm_Version (1).

Firmware Version	
Module Register	**32**
Description	The firmware version is stored to the JX3-BN-CAN module. The firmware cannot be updated by the user.
Access	Read
Value Range	32 bits
Value After Reset	Up-to-date firmware version
Comment	Similar to an IP address, the firmware version is displayed in the format "Major.Minor.Branch.Build". A released firmware version can be recognized by both Branch and Build having got value zero. For displaying the operating firmware version number in the setup window of JetSym, please select the format "IP address".

Amount of Connected JX3 Modules	
Module Register	**256**
Description	Out of this module register, the amount of JX3 modules connected to the JX3-BN-CAN module can be read.
Access	Read
Value Range	0 ... 16
Value After Reset	Amount of modules presently connected

Example: Evaluating an Error Message by a Diagnostic Register

In the application program of the controller, the error register is monitored. When bit 9 "Error Output Driver" has been set, the first JX3 module having got an error message, is searched for in a loop. After this, the I/O module number and the number of the status register is calculated.

```
VAR
      n_ModuleErrorBuffer : INT at %vl 100;     //   Auxiliary register
      n_Counter : INT at %vl 101;               //   Auxiliary register
      pn_State : INT at %vl 102;                //   Pointer to diagn. registers
      n_ModuleNumber : INT at %vl 103;          //   Register for module number
      ns_Error : INT at %vl 2008;               //   Error register
      ns_ModuleError: INT at %vl 2039;          //   Diagnostics error register
END_VAR;

TASK t_Main
      WHEN                                      //   Wait for error
      BIT_SET(ns_Error, 9)
      CONTINUE;

      n_ModuleErrorBuffer := ns_ModuleError;    //   Buffer the error message
      n_Counter := 0;

      WHILE n_Counter < 32 DO                   //   Search buffer
```

```
        SHIFT_RIGHT(n_ModuleErrorBuffer, 1);
        IF
        n_ModuleErrorBuffer WAND 0x01              //   Bit 0 = 1
        THEN
        EXIT;                                      //   -> Module has been found
        END_IF;
        INC(n_Counter);                            //   Next module
        END_WHILE;

        pn_State := 3000 + (n_Counter * 10);       //   Calculate the pointer
        n_ModuleNumber := n_Counter + 2;           //   Calculate the module number

End_Task;
```

6.3 Connection Monitoring at the Jetter System Bus

Between the controller and the JX3-BN-CAN module, telegrams are regularly exchanged via Jetter system bus. This way, the controller can monitor the connection to the JX3-BN-CAN module. An interrupted connection can be restored by restarting the Jetter system bus.

Monitoring Interval for I/O Modules	
Register(s)	**2028**
Description	By means of register 2028, the time interval between two monitoring telegrams can be set. The monitoring interval is configured in steps of 10 ms. 0 : no monitoring 1 : Monitoring time 10 ms 2 : etc.
Access	Read / Write
Value Range	0 ... 255
Value After Reset	20 : Monitoring interval 200 ms
Comment	Connection monitoring is carried out by the following modules: • JX2-I/O modules • JX3 modules via the JX3-BN-CAN module • Third-party modules • LioN modules • LJX7-CSL Compactbox modules

Monitoring Timeout	
Module Register	**2**
Description	By means of JX3 module register 2, connection monitoring at the JX3-BN-CAN module can be activated. The monitoring timeout is configured in steps of 10 ms. 0 : no monitoring 1 : monitoring timeout 10 ms 2 : etc.
Access	Read / Write
Value Range	0 ... 255
Value After Reset	0

At active monitoring, the JX3-BN-CAN module waits for at least one monitoring telegram transmitted by the controller within the set monitoring timeout. If, within the monitoring timeout, no monitoring telegram has been received, the JX3 system bus is stopped. The JX3 modules write the configured error statuses to the outputs.

The monitoring timeout within JX3 module register 2 must be at least twice as big as the monitoring interval of the I/O modules in register 2028.

Important!

If data exchange within the JX3 system bus has been stopped, the JX3 modules write the configured error statuses to the outputs.

Modules with a Peripheral Error	
Register(s)	**2039**
Description	If the controller recognizes a peripheral error at a JX2-I/O respectively JX3 expansion module, the respective bit is set in register 2039.
Access	Read / Write
Value Range	32 bits, bit-coded
Value After Reset	0
Comment	Only the user is allowed to reset the error by writing zero to the register.

The Meaning of the Individual Bits in the Peripheral Error Register:

Bit 1: 1 = I/O module 2 reports a peripheral error

Bit 2: 1 = I/O module 3 reports a peripheral error

etc.

6.4 Connection Monitoring by the JX3 System Bus

Between the JX3-BN-CAN and the connected JX3 modules, telegrams are regularly exchanged via JX3 system bus. The bus head JX3-BN-CAN and the JX3-BN-CAN module can detect an interrupted connection this way. An interrupted connection can be restored by restarting the JX3 system bus.

Occasionally, the JX3-BN-CAN bus head stops data exchange with the connected JX3 modules.

- The JX3-BN-CAN bus head is not connected with the superordinate controller any more.
- The JX3-BN-CAN bus head has recognized an internal error.

Important!

If data exchange within the JX3 system bus has been stopped, the JX3 modules write the configured error statuses to the outputs.

6.5 Electronic Data Sheet (EDS)

In the individual JX3 modules, various product relevant data have been stored to a remanent memory. These include serial number, hardware version, etc. All data have been combined in the so-called Electronic Data Sheet (EDS).

Survey of the EDS Registers		
Register(s)	**Description**	**Remanent**
10040 ... 10041	EDS data are selected	no
10042 ... 10105	EDS data	yes (read only)

Pointer onto I/O-Module Number for EDS	
Register(s)	**10040**
Description	Via this register, a JX3 module of which the EDS data are to be accessed is selected.
Access	Read / Write
Value Range	2 ... 63
Value After Reset	33

Pointer to EDS Page	
Register(s)	**10041**
Description	By means of this register, an EDS page of the JX3 module is selected.
Access	Read / Write
Value Range	0 ... 1
Value After Reset	0

The EDS data can be read by the controller via registers. Writing data is not possible. In order to read the EDS files, the I/O module number has to be written to register 10040. Then, the respective EDS page has to be written to register 10041. Dependent on the selected EDS page, the EDS data can then be read out of register 10042 and the following. At reading the EDS files in JetSym, the respective type has to be selected.

EDS Page 0 - Identification		
Register(s)	**Type**	**Description**
10042	int	Version of the EDS page
10043	int	Module code
10044 ... 10054	string	Module name
10055	int	Hardware version
10056	int	Hardware version

EDS Page 1 - Production		
Register(s)	**Type**	**Description**
10042	int	Version of the EDS page
10043 ... 10049	string	Module serial number
10050	int	Production date, day
10051	int	Date of production, month
10052	int	Production date, year

Example: Reading the EDS via the JetSym Setup Window

For reading the EDS via setup window of JetSym, the structure of the EDS pages is defined as a type. After this, three variables are defined basing on the type.

```
TYPE
      JX3_EDS:                                  //   EDS selection of registers
      STRUCT
            ns_Module : INT;
            ns_page : INT;
```

```
        END_STRUCT;
        JX3_EDS0:                                   //   Registers of EDS page 0
        STRUCT
              ns_Version : INT;
              ns_Code : INT;
              s_Name : STRING[31];
              ns_PCB_Rev : INT;
              ns_PCB_Opt : INT;
        END_STRUCT;
        JX3_EDS1:                                   //   Registers of EDS page 1
        STRUCT
              ns_Version : INT;
              s_Sernum : STRING[19];
              ns_TS_Day : INT;
              ns_TS_Month : INT;
              ns_TS_Year : INT;
        END_STRUCT;
END_TYPE;

VAR
        st_EDS : JX3_EDS at %vl 10040;          //   EDS selection
        st_EDS0 : JX3_EDS0 at %vl 10042;        //   EDS Page 0
        st_EDS1 : JX3_EDS1 at %vl 10042;        //   EDS Page 1
END_VAR;
```

EDS.sts | JC-24x V3.23 (JETIP:192.168.10.46) - angehalten

	Name	Nummer	Inhalt	Typ	Kommentar
1	st_EDS.ns_Module	10040	9	int	
2	st_EDS.ns_Page	10041	0	int	
3					
4	// --- EDS-Page 0 ---				
5	st_EDS0.ns_Version	10042	0	int	
6	st_EDS0.ns_Code	10043	300	int	
7	st_EDS0.s_Name	10044	"JX3-DI16"	string	
8	st_EDS0.ns_PCB_Rev	10055	1	int	
9	st_EDS0.ns_PCB_Opt	10056	0	int	
10					

Figure 4: EDS Page 0 displayed in the setup window

In the setup window above, EDS Page 0 (st_EDS.ns_Page) is displayed by the JX3 module of I/O module number 9 (st_EDS.ns_Module).

Appendix

7 Recent Revisions

The following modifications have been made in revision 1.03.2:

Chapter	Comment	Revised	Added	Deleted
System Requirements				✓
Minimum Requirements	JM-D203-JC240		✓	
Prefix Definition	JM-D203-JC240		✓	
Register Area	JM-D203-JC240		✓	
Indirect Access	Note	✓		
Software Programming				✓
Survey of Module Registers	Links within register table reviewed		✓	
Design	Remark on physical dimensions		✓	

8 Survey of Module Registers

Survey of the JX3 Module Registers		
Module Registers	**Description**	**Remanent**
0 ... 256	Configuration and diagnostics of the module	no

Register Table		
Direct Access via Jetter System Bus		
Module Reg.	**Description**	**1) Value Range 2) Reset Value 3) Cross Ref.**
0	Status	1) 16 bit 2) Status ***3)*** (on page 29)
2	Monitoring timeout	1) 0 ... 255 2) 0 ***3)*** (on page 33)
7	Index for indirect module register access	1) 0 ... 9,999 2) 9 ***3)*** (on page 26)
8	Data for indirect module register access	1) 32 bit 2) Version ***3)*** (on page 26)
9	Operating system release	1) 32 bit 2) Version ***3)*** (on page 30)
Indirect Access via Jetter System Bus		
Module Reg.	**Description**	**1) Value Range 2) Reset Value**
10	Voltage of the JX3 module logic supply	1) 0 ... 5,500 2) 5,000, typical ***3)*** (see "Module Register for the Logic Voltage of the JX3 Modules" on page 17)
32	Firmware version	1) 32 bit 2) Version ***3)*** (on page 31)
256	Amount of connected JX3 modules	1) 0 ... 16 2) Amount ***3)*** (on page 31)

9 Design

9.1 Physical Dimensions

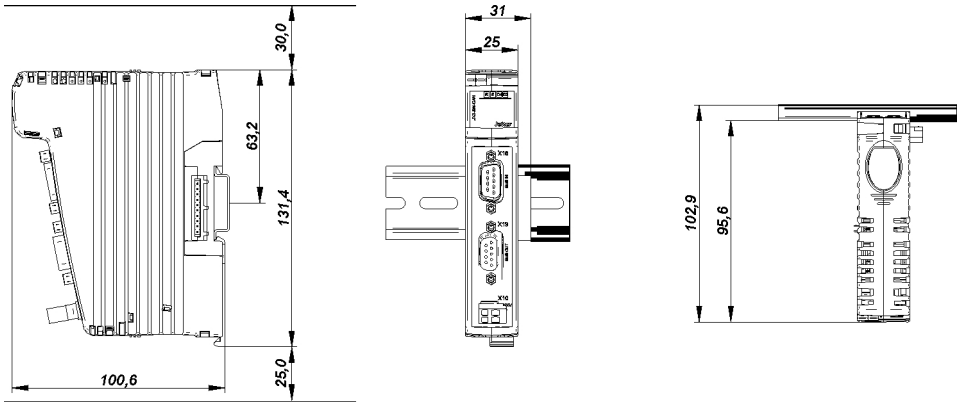


Figure 5: Physical dimensions, mounted on DIN-rail EN 50022 - 35 x 7.5

Note!

At mounting the JX3 modules, a minimum clearance above and below must be maintained. The minimum clearance above is 30 mm, the minimum clearance below is 25 mm.

The clearance is needed for dismounting the JX3 module from the JX3 backplane module.

The first JX3 module requires a space of 31 mm width. Each further JX3 module increases the width of a JX3 station by 25 mm.

The JX3 modules must be mounted in vertical position. Only at vertical mounting, optimum heat dissipation of the modules is guaranteed.

Design	
Dimensions (H x W x D in mm)	131 x 31 x 100
Weight	approx. 160 g
LED-sheeting	RAL 7035, light grey
JX3 module enclosure	Plastic RAL 7035, light grey
JX3 backplane module	Plastic RAL 5002, ultramarine blue
Installation	on DIN rail EN 50022 - 35 x 7.5 or EN 50022 - 35 x 15
Diagnostic indicators (LEDs)	4
Mounting position	Vertical

9.2 Connections

Module JX3-BN-CAN has been equipped with the following connections:

X10	Voltage supply for module JX3-BN-CAN and connected JX3 modules 2-pin female connector, contact spacing 3.5 mm, spring cage
X18	IN-interface for Jetter system bus 9-pin male SUB-D connector
X19	OUT-interface for Jetter system bus 9-pin female SUB-D connector

10 Operating Conditions

10.1 Environment and Mechanics

Operating Parameters (Environmental Data)		
Parameters	**Value(s)**	**Standard**
Operating Temperature Range	0 ... +50 °C	
Storage Temperature Range	-40 ... +70 °C	DIN EN 61131-2 DIN EN 60068-2-1 DIN EN 60068-2-2
Air Humidity	10 ... 95 % (non-condensing)	DIN EN 61131-2
Pollution Degree	2	DIN EN 61131-2
Corrosion Immunity / Chemical Resistance	No special protection against corrosion. Ambient air must be free from higher concentrations of acids, alcaline solutions, corrosive agents, salts, metal vapours, or other corrosive or electroconductive contaminants	
Atmospheric Pressure	2,000 m	DIN EN 61131-2

Operating Parameters (Mechanical Data)		
Parameters	**Value(s)**	**Standard**
Free Falls Withstanding Test	Free fall at ... Shipping container 1 m Product packaging 0.3 m	DIN EN 61131-2 DIN EN 60068-2-32
Vibration Resistance	5 Hz - 9 Hz: 3.5 mm amplitude 9 Hz - 150 Hz: 1 g Acceleration 1 octave/minute, 10 frequency sweeps (sinusoidal), all 3 spatial axes	DIN EN 61131-2 DIN EN 60068-2-6
Shock Resistance	15 g occasionally, 11 ms, sinusoidal half-wave, 3 shocks in the directions of all three spatial axes	DIN EN 61131-2 DIN EN 60068-2-27
Protection Class	IP 20	DIN EN 60529
Mounting Position	Vertical position, snapped on DIN rail	

10.2 Enclosure

Operating Parameters (Electrical Safety)		
Parameters	**Value(s)**	**Standard**
Protection Class	III	DIN EN 61131-2
Dielectric Test Voltage	Functional ground is connected to chassis ground internally.	DIN EN 61131-2
Protective Connection	0	DIN EN 61131-2
Overvoltage Category	II	DIN EN 61131-2

Operating Parameters (EMC) - Emitted Interference		
Parameters	**Value(s)**	**Standard**
Enclosure	Frequency band 30-230 MHz, limit 30 dB (µV/m) at 10 m distance Frequency band 230 through 1,000 MHz, limit 37 dB (µV/m) at 10 m distance (class B)	DIN EN 61000-6-3 DIN EN 61000-6-4 DIN EN 55011

Operating Parameters (EMC) - Immunity to Interference		
Parameters	**Value(s)**	**Standard**
Magnetic Field with Mains Frequency	50 Hz 30 A/m	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-8
RF Field, amplitude-modulated	Frequency band 80 MHz - 2 GHz Test Field Strength 10 V/m AM 80 % with 1 kHz Criterion A	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-3
ESD	Discharge through air: Test peak voltage 8 kV Contact Discharge: Test peak voltage 4 kV Criterion A	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-2

10.3 Direct Current Input Connectors and Output Connectors

Operating Parameters (EMC) - Emitted Interference		
Parameters	**Value(s)**	**Standard**
Signal and Control Connection Direct Voltage Supply Inputs and Outputs	Frequency bands: 0.15 to 0.5 MHz, limit 40 to 30 dB 0.5 to 30 MHz, limit 30 dB (class B)	DIN EN 61000-6-3

Operating Parameters (EMC) - Immunity to Interference		
Parameters	**Value(s)**	**Standard**
RF, asymmetric	Frequency band 0.15 - 80 MHz Test voltage 3 V AM 80 % with 1 kHz Source impedance 150 Ohm Criterion A	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-6
Bursts	Test voltage 2 kV tr/tn 5/50 ns Repetition rate 5 kHz Criterion A	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-4
Voltage Surges, asymmetric (line to earth), symmetric (line to line)	tr/th 1.2/50 µs Common mode launching 1 kV Push-pull launching 0.5 kV	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-5

10.4 Shielded Data and I/O Lines

Operating Parameters (EMC) - Immunity to Interference		
Parameters	**Value(s)**	**Standard**
Asymmetric RF, amplitude-modulated	Frequency band 0.15 - 80 MHz Test voltage 3 V AM 80 % with 1 kHz Source impedance 150 Ohm Criterion A	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-6
Burst (Bursts)	Test voltage 1 kV tr/tn 5/50 ns Repetition rate 5 kHz Criterion A	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-4
Voltage Surges, asymmetric (line to earth)	tr/th 1.2/50 µs Common mode launching 1 kV	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-5

Operating Parameters EMC - Immunity to Interference Functional Ground Connection		
Parameters	**Value(s)**	**Standard**
RF, asymmetric	Frequency band 0.15 - 80 MHz Test voltage 3 V AM 80 % with 1 kHz Source impedance 150 Ohm Criterion A	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-6
Bursts	Test voltage 1 kV tr/tn 5/50 ns Repetition rate 5 kHz Criterion A	DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-4

11 Glossary General

A

A/D

Analog/**D**igital

AC

Alternating **C**urrent Alternating Current

AM

Amplitude **M**odulate

C

CAN

Controller **A**rea **N**etwork

CE

Communautés **E**uropéenes

or

Windows CE

COM

COMunication;

The first serial port is identified as COM 1, the second as COM 2, etc.

CTS

Clear **T**o **S**end

D

D/A

Digital/**A**nalog

DC

Direct **C**urrent Direct current

DIN

Deutsches **I**nstitut für **N**ormung = German Industry Standard

E

EC Low Voltage Directive

To be considered when using electric devices of a rated voltage between 50 V and 1,000 V AC and between 75 and 1,500 V DC.

Electro-Magnetic Compatibility (EMC)

Definition according to the EMC regulations:

"EMC is the ability of a device to function in a satisfactory way in an electro-magnetic environment without causing electromagnetic disturbances itself, which would be unbearable for other devices in this environment."

EMC

Electro **M**agnetic **C**ompatibility;

Definition according to the EMC regulations: "EMC is the ability of a device to function in a satisfactory way in an electro-magnetic environment without causing electromagnetic disturbances itself, which would be unbearable for other devices in this environment."

EN

Europäische **N**orm, that is: European Standard

ESD

Electro **S**tatic **D**ischarge

EU

European **U**nion

F

Firmware

Startup routines and low-leel software are stored in the firmware. Firmware falls between software and hardware in terms of ease of modification.

H

Hazard Analysis

Extract from the Machinery Directive 98/37/EC:

The manufacturer is under an obligation to assess the hazards in order to identify all of those which apply to his machine; he must then design and construct it taking account of his assessment.

I

IEC

International **E**lectrotechnical **C**ommission .

IP

International **P**rotection

or

Internet **P**rotocol

J

Jetter System Bus

The Jetter system bus is a system-bus system of a cable length of 200 m max., and of fast data transmission rates of 1 Mbit/s. In addition to this, the Jetter system bus is highly immune to interferences. Therefore, the Jetter system bus is suited to realise field bus applications in a limited space.

JetWeb

Control technology comprising control systems, motion systems, user interfaces, visualization devices, remote I/Os and industrial PCs. Programming by means of multitasking and a modern sequence-oriented language. Communication by means of Ethernet TCP/IP and making use of the Web technologies.

L

LED

Light - **E**mitting **D**iode .

N

NN

Normal **N**ull = Sea Level

R

RS-232

An accepted industry standard for serial data transmission.

RS: **R**ecommended **S**tandard

For transmission distances of less than 15 m. No differential evaluation. Transmitting and receiving on different lines.

RS-422

An accepted industry standard for serial data transmission.

RS: **R**ecommended **S**tandard

For transmission distances over 15 m. Two differential evaluations each. Transmitting and receiving on different lines.

RS-485

An accepted industry standard for serial data transmission.

RS: **R**ecommended **S**tandard

For transmission distances over 15 m. Two lines with differential evaluation. Transmitting and receiving on the same line.

RTS

Request **T**o **S**end

RxD

Receive (**RX**) **D**ata: Receive Data

A line used to carry received serial data from one device to another.

S

SELV

Safe Extra Low Voltage:

Voltage, which, under all operating conditions will not exceed a peak or DC voltage of 42.4 V. This voltage is either measured between two conductors or between one conductor and earth.

The circuit, in which this voltage occurs, must be separated from the mains power supply by a safety isolating transformer or some equivalent.

SUB-D

Type name of a plug-in connector

T

th

Hold time of a burst ('time hold')

tn
: Total time of burst ('time normal')

tr
: Rise time of burst ('time rise')

TXD
: Transmit (**TX**) **D**ata: Transmit data
A line used to carry transmitted serial data from one device to another.

V

Vcc
: Supply voltage; generally DC 5 V

12 Glossary Peripherial Modules

D

Diagnostic bit

A diagnostic bit describes a status. A status can be, for example, missing supply of the actuators or reaching a limit.

Diagnostic bits can be read via status register.

E

ENC

Encor: "Coding device"

Error bit

An error bit marks a critical error requiring intervention by the user. A critical error might be cable break or short circuit.

Error bits can be read via status register.

J

JX3 backplane module

The JX3 modules are linked with each other by means of the backplane module (via the JX3 system bus connector).

The JX3 backplane module is snapped onto the DIN rail.

JX3 module

It consists of a JX3 module enclosure and a JX3 backplane module.

JX3 module enclosure

Contains the specific electronic devices for the respective JX3 module.

JX3 system bus

The JX3 modules are interconnected via the JX3 system bus.

M

Module Registers

Every module has got a diagnostics, administration and configuration to be carried out via module register.

The entire register number results from the number of the module register, and of a register prefix. The register prefix is determined by the position of the module in the system.

P

PID

Proportional-**I**ntegral-**D**ifferential (controller)

R

Register Prefix

The register prefix is part of the register number. It is determined by the position of a module in the system. The register prefix in connection with the module register number results in the register number.

Register(s)

Registers can be accessed directly in the application program of the controller, in a setup window of JetSym, or via the user interface directly. A register is marked by a number consisting of a register prefix and a module register number.

T

Tap Line

Open end of a line connected to the system bus.

Thermistor

A thermistor is a thermometer, at which the temperature is measured by means of the temperature dependence of the electric resistance of a substance. Frequently, thermistors are also called resistive sensors. Pt100 and Pt1000, for example, are thermistors.

U

Universal I/O

Combined digital I/Os are called universal I/Os. Sensors and actuators can be connected to a universal I/O.

13 List of Illustrations

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