

User Manual



60888517_02

JX4-DI32 / JX4-DO32 / JX4-DI16 / JX4-DO16 / JX4-DI16DO16

Digital I/O expansion modules

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Bucher Automation AG

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

Technical support

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

Sales

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

www.bucherautomation.com

Translation of the german original User Manual

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1 Introduction

1.1 Document Information

This document is part of the product and must be read and understood before using the device. It contains important and safety-related information to ensure that the product is used properly and in accordance with its intended purpose.

Target audiences

This document is intended for qualified personnel.

The device must only be put into operation by qualified and trained personnel.

Safe use of the device must be ensured throughout every stage of its life cycle. A lack of or insufficient technical and documentation knowledge will result in the loss of any liability claims.

Availability of information

Ensure that this information is readily available near the product throughout its entire service life.

Please check the Downloads section of our website for updates and the latest version of the document. This document is not subject to automatic version control.

For further information refer to the following information products:

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

Info

Further information

For more information on system immunity to interference, please refer to Application Note 016 *EMC-Compliant Control Cabinet Installation* at www.bucherautomation.com.

Info

EtherCAT®

EtherCAT® is a registered trademark and patented technology licensed by Beckhoff Automation GmbH, Germany.

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

Further information and practical tips

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

2 Security

2.1 General

At the time of its introduction to the market, the product reflects the current state of science and technology. In addition to the operating instructions, the laws, regulations, and guidelines of the country of use or the EU apply to the operation of the product. The operator is responsible for complying with the relevant accident prevention regulations and generally accepted safety standards.

2.2 Purpose

2.2.1 Intended use

The JX4 system works with a combination of bus nodes and I/O modules.

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

Due to its low operating voltage, the device falls under the Safety Extra Low Voltage category and is therefore not subject to the EU Low Voltage Directive. The device must be powered only from a SELV source.

2.2.2 Usage other than intended

Do not use the device in technical systems that require a high level of reliability.

Machinery Directive

This device is not a safety component as defined by the Machinery Directive 2006/42/EC and is not suitable for use in safety-related applications.

2.3 Warnings Used

DANGER



High risk

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

WARNING



Medium risk

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

CAUTION



Low risk

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

NOTICE



Material damage

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

3 Product description

3.1 System overview

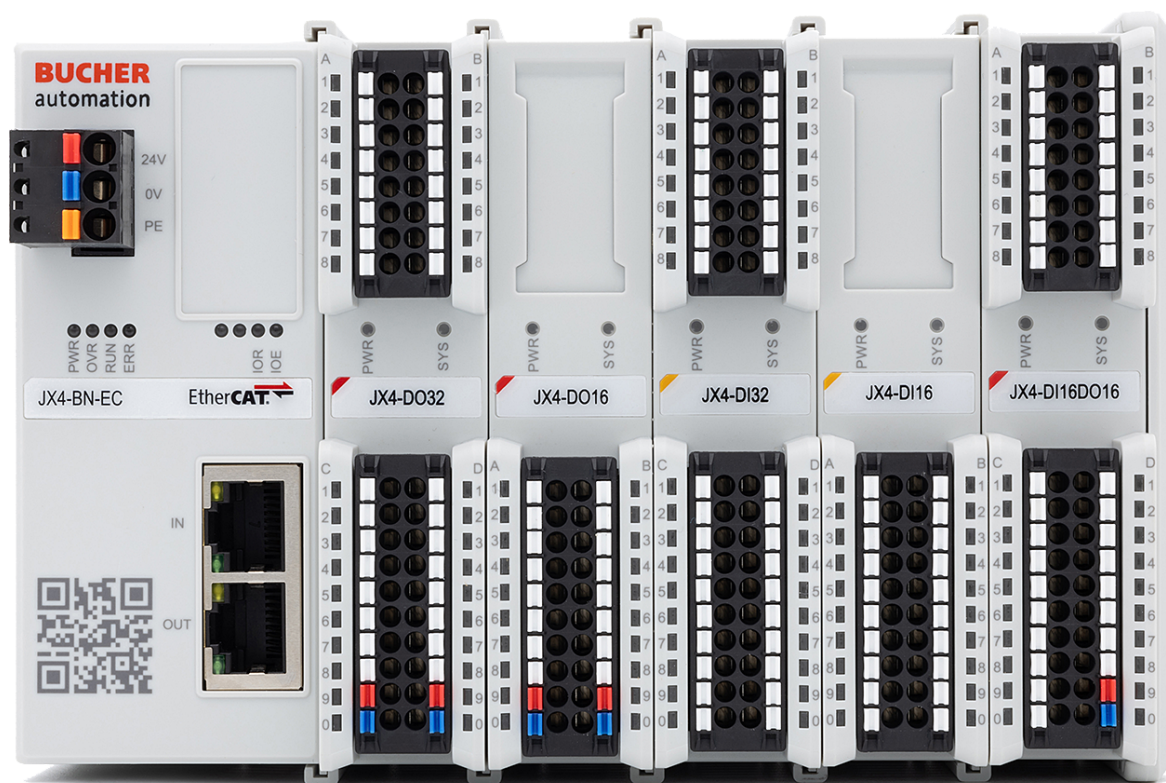


Fig. 1: System Overview

3.2 Design

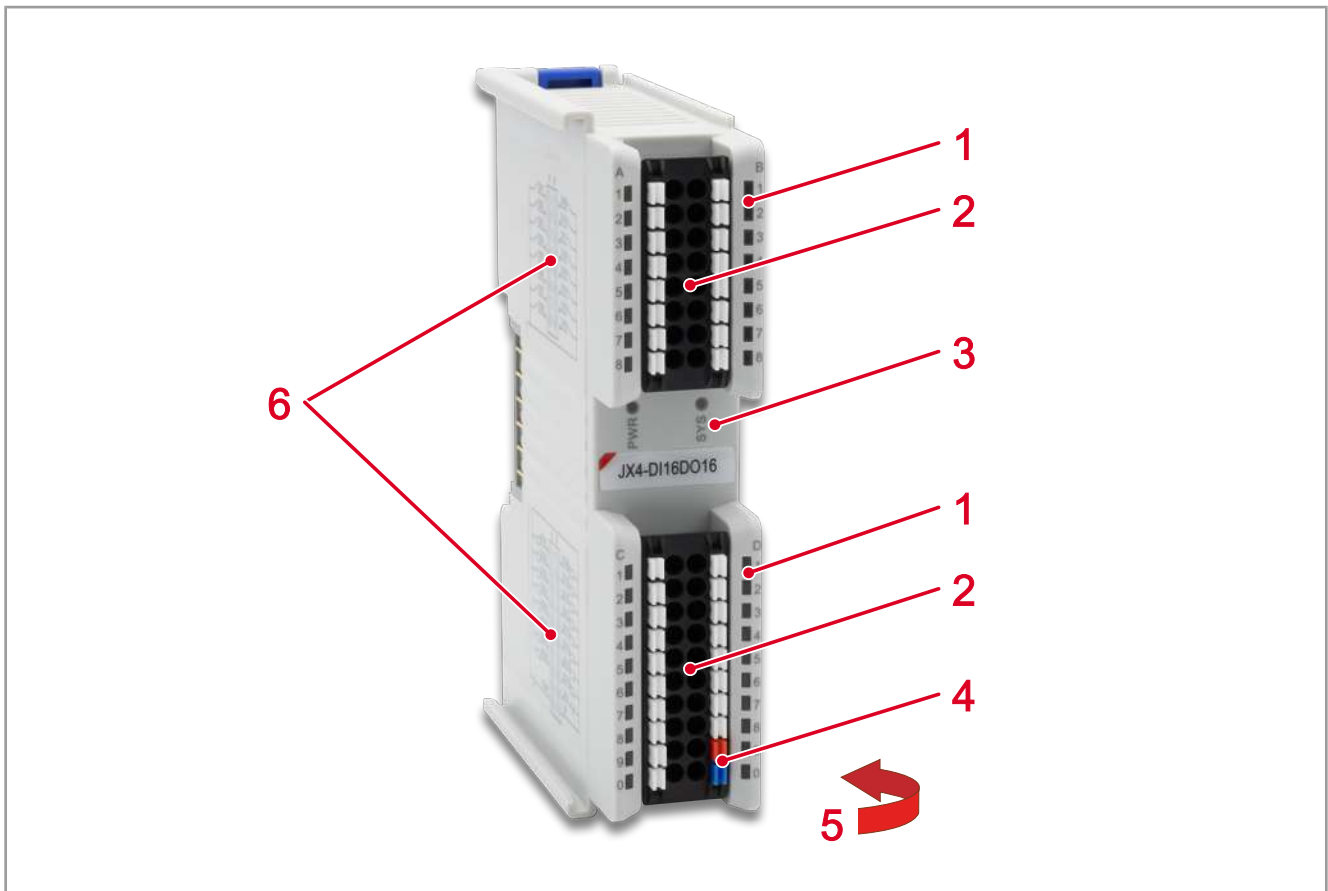


Fig. 2: Design

1	Channel display
2	Inputs and outputs
3	System display
4	Output power supply and/or input reference potential
5	Nameplate (on the right-hand side of the housing)
6	Pinout

3.3 Product features

- Up to 32 digital inputs and outputs
- Adjustable input filter
- Supported load types: resistive, inductive, capacitive
- Overload- and short-circuit-proof outputs, and protection against polarity reversal
- Push-in terminals
- Electrical isolation
- LEDs for monitoring supply voltage and communication

3.4 Status indication

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

Color and status of the LEDs facilitate diagnosing various states.

3.4.1 Lighting patterns of the LEDs

Parameter	Lighting pattern	Description
OFF	-	LED turned off
ON	Continuously lit	LED turned on
Blinking	1 Hz	Slow and continuous blinking
Flickering	10 Hz	Fast and continuous blinking

Tab. 1: Lighting patterns of the LEDs

3.4.2 LED status indicators

LED	Description	Color	Status	Status description
PWR	Operating status indicator	Green	ON	Power is supplied properly to the module
			OFF	Module is turned OFF or power supply is irregular
SYS	Operating status indicator	Green	ON	System works normally
			Flashing	Not connected or waiting for connection
			Flickering	Firmware upgrade
			OFF	System does not work
1 ... 8	Input channel indicator	Yellow	ON	Input state = ON
			OFF	Input state = OFF
1 ... 8	Output channel indicator	Yellow	ON	Output status = ON
			OFF	Output status = OFF

Tab. 2: Diagnostic capabilities by means of status indicators

3.5 Nameplate

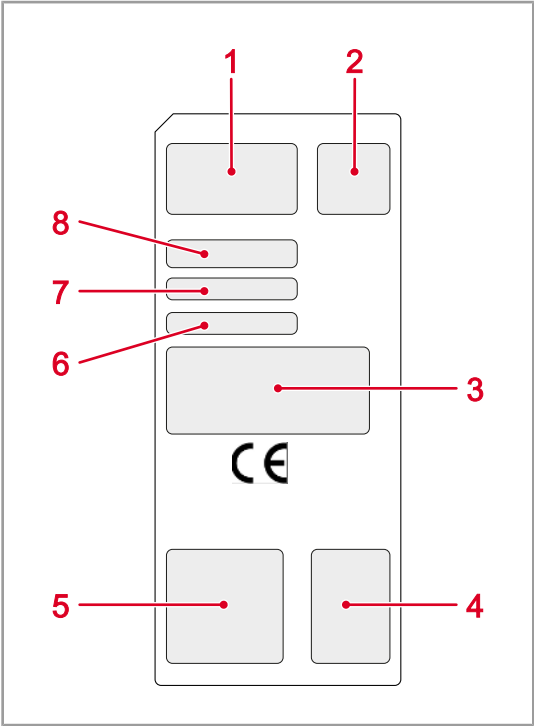


Fig. 3: Nameplate

1	Company logo
2	QR code pointing to Website
3	Power data
4	Warning and mandatory signs
5	Data Matrix Code with product information
6	Serial number
7	Item number
8	Item name

3.6 Scope of delivery

Scope of delivery	Item number	Quantity
JX4-DI32	10002676	1
or		
JX4-DO32	10002677	1
or		
JX4-DI16	10002678	1
or		
JX4-DO16	10002679	1
or		
JX4-DI16DO16	10002680	1

4 Technical specifications

This chapter contains information on electrical, mechanical and operating data of the digital JX4-IO modules.

4.1 Dimensions

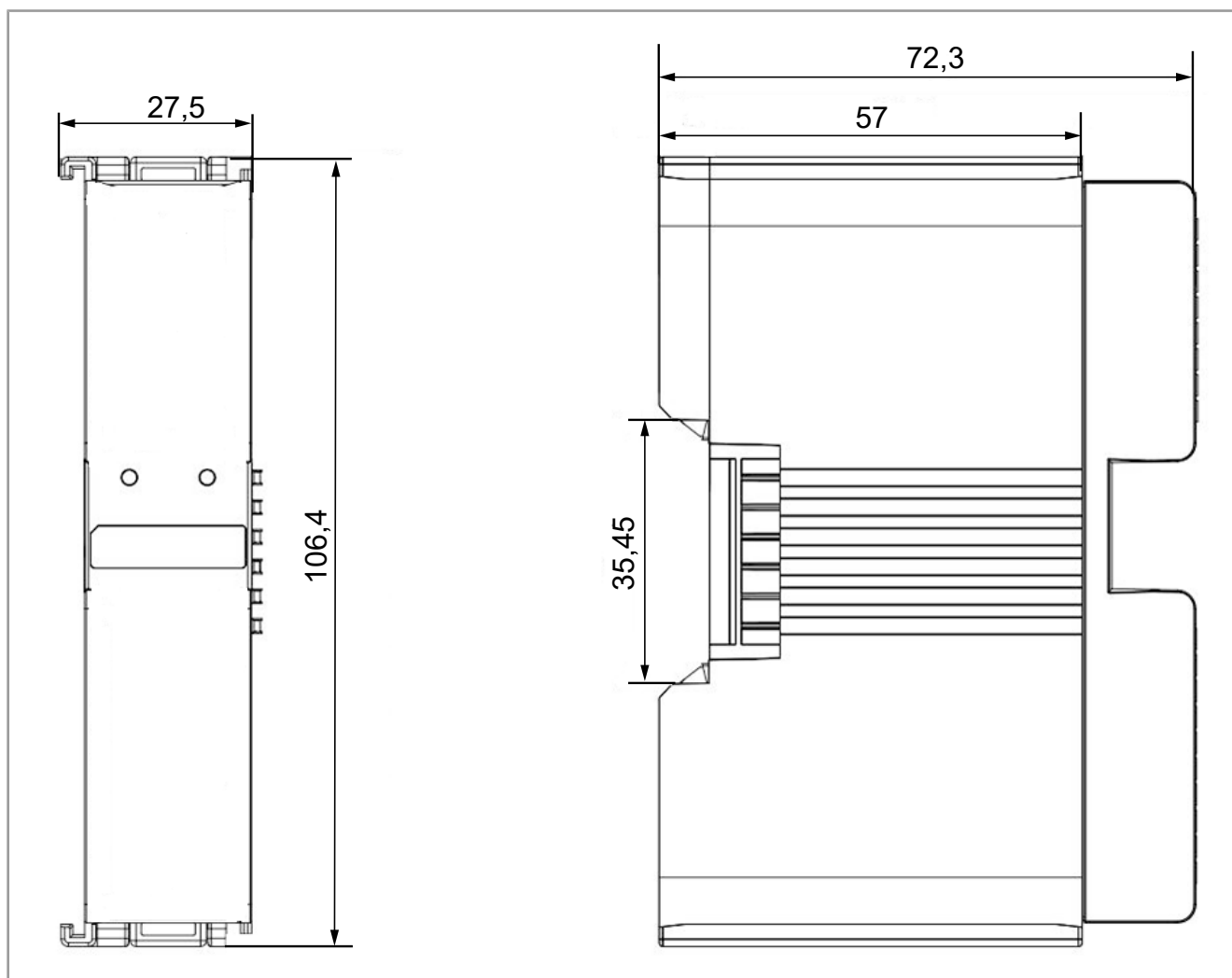


Fig. 4: Dimension in mm

4.2 Mechanical specifications

Parameter		Description	Standards
Mounting orientation		Vertically mounted on DIN rail	
Weight	Expansion modules featuring 16 channels	90 g	
	Expansion modules featuring 32 channels	110 g	
Housing specifications			
Material		Plastic	
Maximum drop height			
with shipping packaging		1 m	DIN EN 61131-2
with 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 ≤ 8.4 Hz
Constant acceleration		1 g	8.4 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	
Degree of protection			
Degree of protection		IP20	DIN EN 60529

Tab. 3: Mechanical specifications of digital expansion modules

4.3 Electrical properties

Digital input modules

Parameter	JX4-DI32	JX4-DI16
Channels	32	16
Type	Type1, Type3, PNP	
Nominal input current	5 mA/channel	
Max. operating point OFF	5 V (0.9 mA max)	
Min. operating point ON	11 V (2.1 mA min)	
Input delay time	<50 µs	
Input filters	No filter, 0.1 ms, 0.2 ms, 0.5 ms, 1 ms, 2 ms, 3 ms (factory setting), 4 ms ... 18 ms, 19 ms, 20 ms	
Maximum input frequency	150 Hz (filtering time: 3 ms)	
Input impedance	5.4 kΩ	
Electrical isolation	Optoisolator	
Isolation resistor	500 V	
Logic voltage of the system bus	DC 5 V (-15 % ... +10 %)	
Current consumption of logic voltage	85 mA	68 mA
Power consumption	0.425 W	0.34 W

Tab. 4: Electrical properties – digital input modules

Digital output modules

Parameter	JX4-DO32	JX4-DO16
Channels	32	16
Type	PNP	
Load current per output	0.5 A max	
Output load type	Resistive, inductive, capacitive	
Voltage drop at the output	<1 V	
Cycle time	<150 µs	
Leakage current	<10 µA	
Protective circuits	Short-circuit-proof, overload-proof	
Module protection	Protection against polarity reversal	
Electrical isolation	Optoisolator	
Isolation resistor	500 V	
Logic voltage of the system bus	DC 5 V (-15 % ... +10 %)	
Current consumption of logic voltage	98 mA	79 mA
Power consumption/wattage	0.49 W	0.395 W

Tab. 5: Electrical properties of the digital output modules

Digital input and output modules

Parameter	JX4-DI16DO16
Digital input	
Channels	16
Type	Type1, Type3, PNP
Nominal input current	5 mA/channel
Max. operating point OFF	5 V (0.9 mA max)
Min. operating point ON	11 V (2.1 mA min)
Input delay time	<50 µs
Input filters	No filter, 0.1 ms, 0.2 ms, 0.5 ms, 1 ms, 2 ms, 3 ms (factory setting), 4 ms ... 18 ms, 19 ms, 20 ms
Maximum input frequency	150 Hz (filtering time: 3 ms)
Input impedance	5.4 kΩ
Digital output	
Channels	16
Type	PNP
Load current per output	0.5 A max
Output load type	Resistive, inductive, capacitive
Voltage drop at the output	<1 V
Leakage current	<10 µA
Cycle time	<150 µs
Complete module	
Electrical isolation	Optoisolator
Module protection	Protection against polarity reversal
Isolation resistor	500 V
Logic voltage of the system bus	DC 5 V (-15 % ... +10 %)
Current consumption of logic voltage	90 mA
Power consumption/wattage	0.45 W

Tab. 6: Digital properties – input and output module

NOTICE! The power supply input for the outputs has a capacitive load of approximately 330 µF, which causes a brief, high inrush current.

4.4 Environmental conditions

Parameter	Description	Standards
Operating temperature	-20 °C ... +60 °C	DIN EN 61131-2
Storage temperature	-40 °C ... +80 °C	DIN EN 60068-2-1
Humidity	10 % ... 95 %, non-condensing	DIN EN 60068-2-2
Maximum operating altitude	2,000 m above sea level	DIN EN 61131-2
Corrosion immunity and chemical resistance	No special anti-corrosion precautions have been taken. The ambient air must not contain higher concentrations of acids, alkaline solutions, corrosive agents, salts, metal vapors and other corrosive or electroconductive contaminants.	
Degree of pollution – Electronics	Level 2	DIN EN 61131-2
	Usually, the pollution is non-conductive. However, temporary conductivity due to condensation may occur.	

Tab. 7: Environmental conditions

4.5 EMC Values

Emitted interference

Parameter	Values	Standards
Frequency band	30 MHz ... 230 MHz	DIN EN 61000-6-4
Limit value	50 dB (µV/m) at 3 m distance	DIN EN 61131-2
Frequency band	230 MHz ... 1,000 MHz	DIN EN 55011
Limit value	57 dB (µV/m) at 3 m distance	
	Class A	

Tab. 8: 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
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	8 kV	DIN EN 61131-2
Test peak voltage		DIN EN 61000-6-2
Contact discharge	4 kV	DIN EN 61000-4-2
Test peak voltage	Criterion A	

Tab. 9: Immunity to interference

5 Assembly

This chapter describes how to install and replace the device.

NOTICE



Damaged devices

Damaged devices may cause considerable physical damage.

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

5.1 Order and arrangement

The following guidelines apply for arranging and installing the devices:

- The devices can be mounted on the DIN rail side by side with no gaps between them.
- The devices must be installed in the following order from left to right: JX4-BN-EC – I/O modules – end cover.

5.2 Installing the device on the DIN rail

NOTICE



Functional impairment due to incorrect installation

- ▶ Install the device only in vertical position on the DIN rail (DIN EN 60715).
- ▶ To allow for sufficient venting, ensure a minimum distance of 50 mm above and below the module.

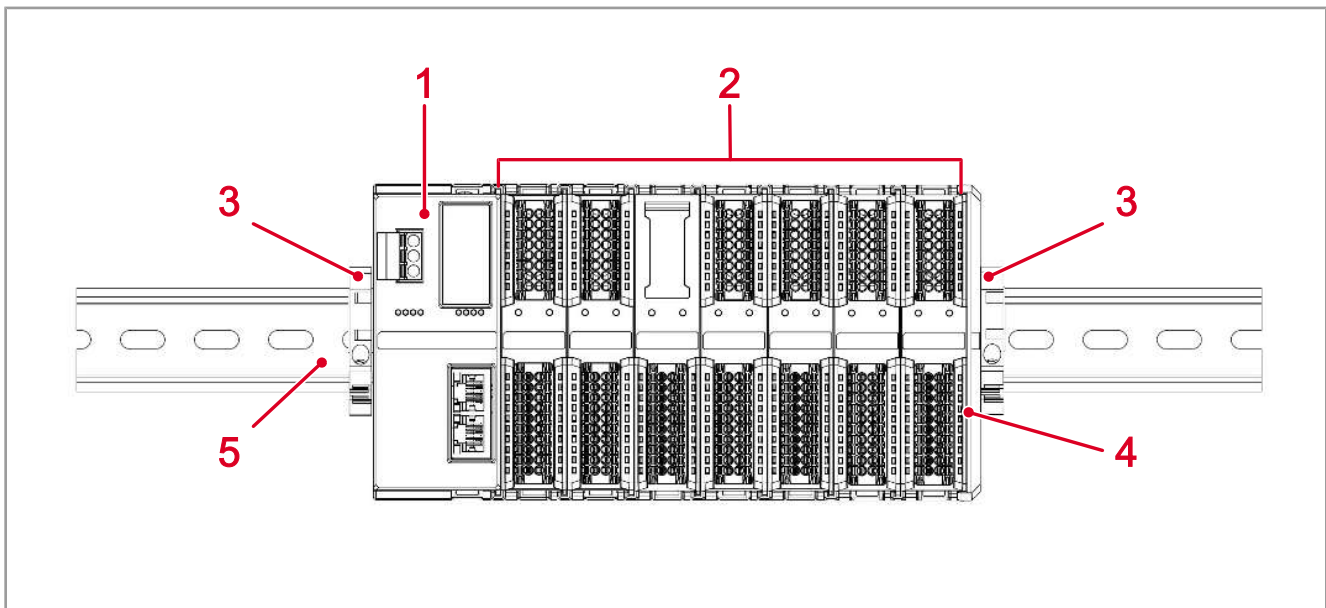
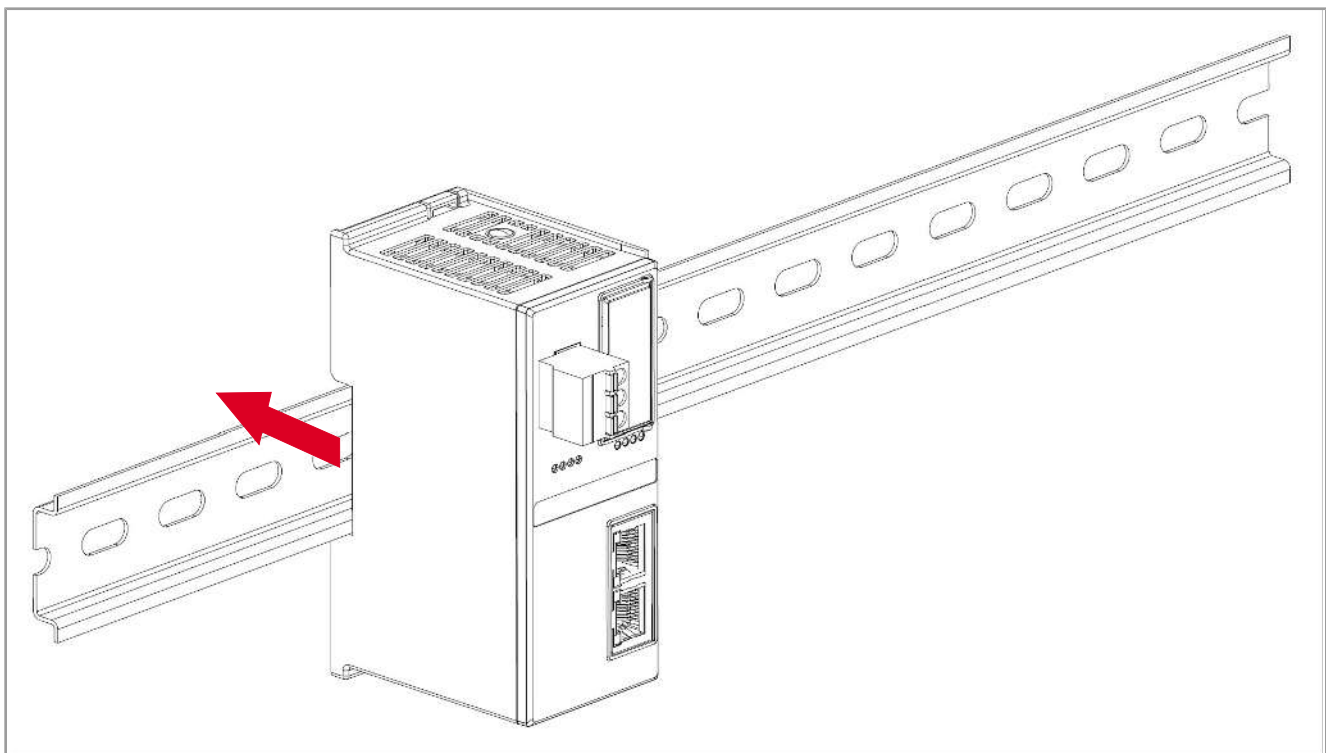


Fig. 5: System overview

1	Bus node
2	Expansion modules
3	Clamping parts
4	End cover
5	DIN rail

1. De-energize the system.
2. Align the device vertically on the DIN rail.



3. Press the device toward the DIN rail.
4. Listen for it to click into place.

5.3 Assembling the expansion module

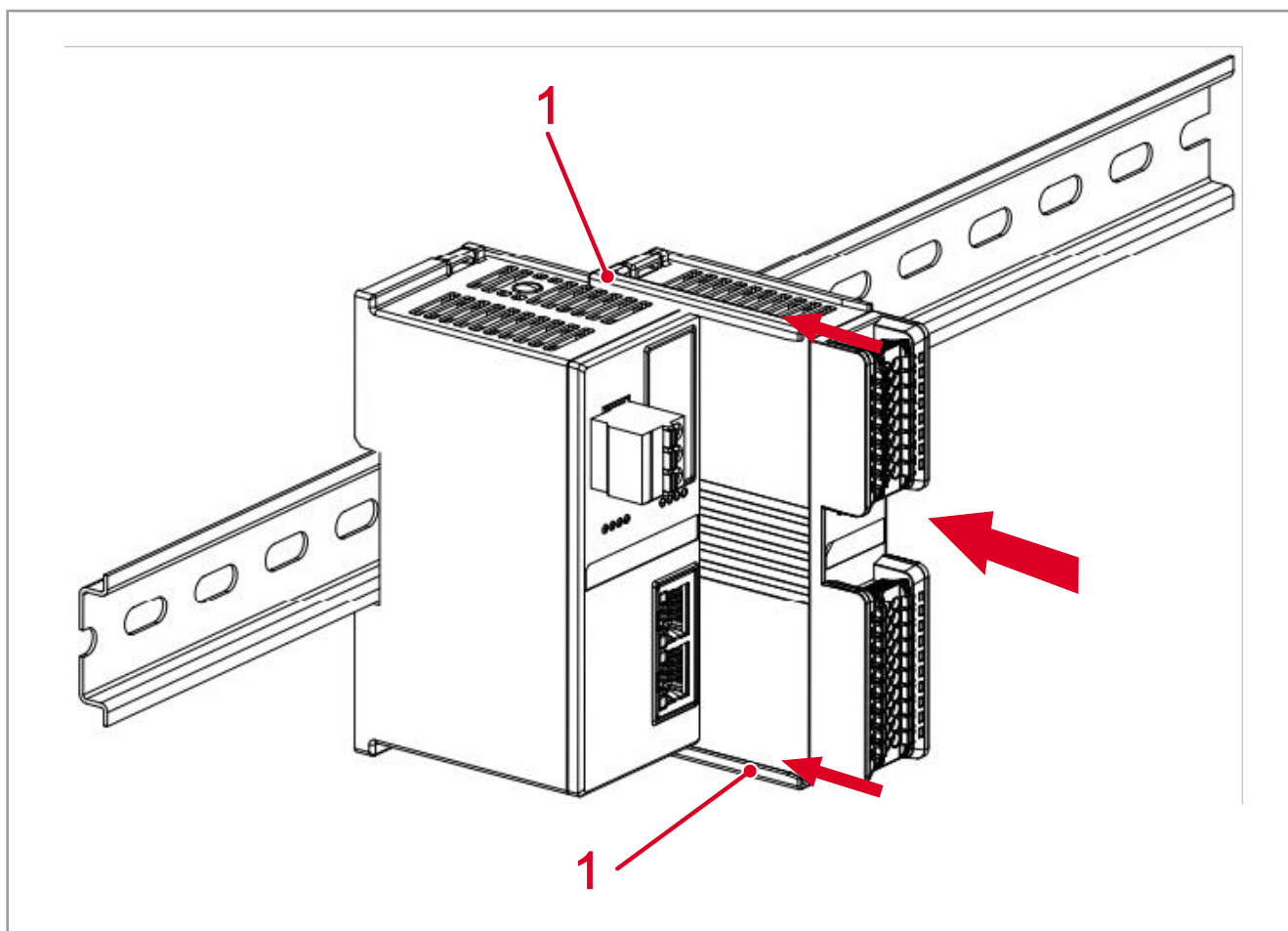


Fig. 6: Assembling the expansion module

1	Guide rail
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1. Add expansion modules to complement the device.
2. Align the guide rails (1) and push the devices back until they click into place.

5.4 Installing the end cover and retainers

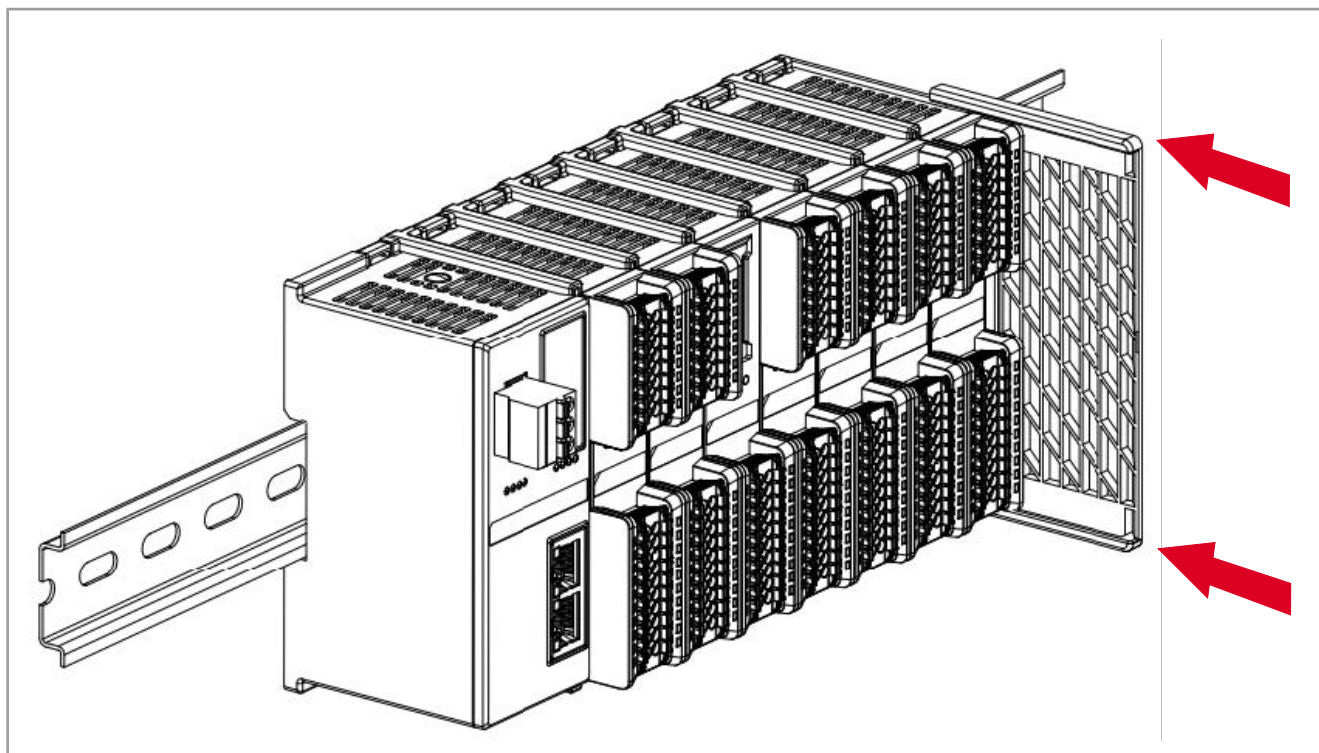


Fig. 7: Installing the end cover

1. Install the end cover on the right-hand side next to the last expansion module. The grooved surface faces toward the expansion module.

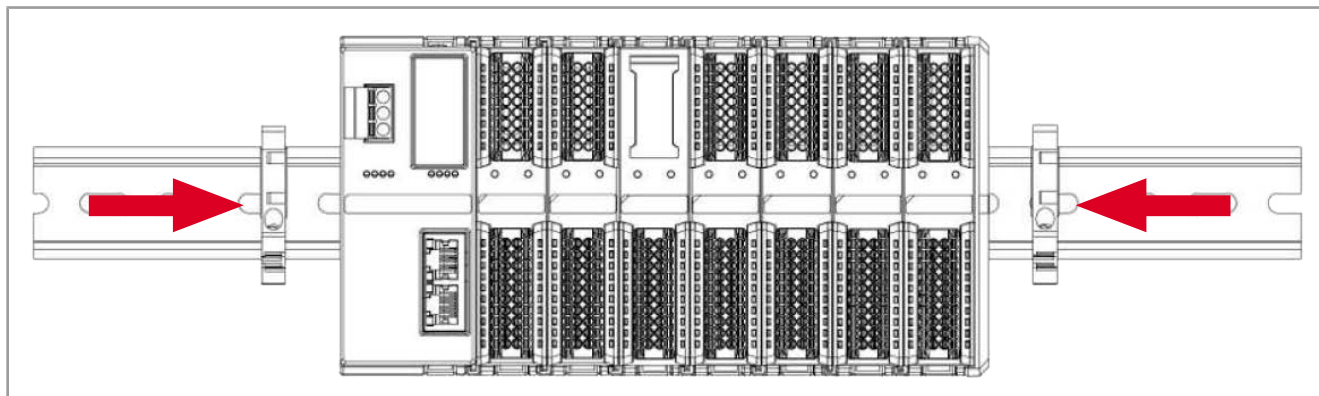


Fig. 8: Installing the retainers

2. Place the retainers on both sides of the assembly and push them firmly against the devices.

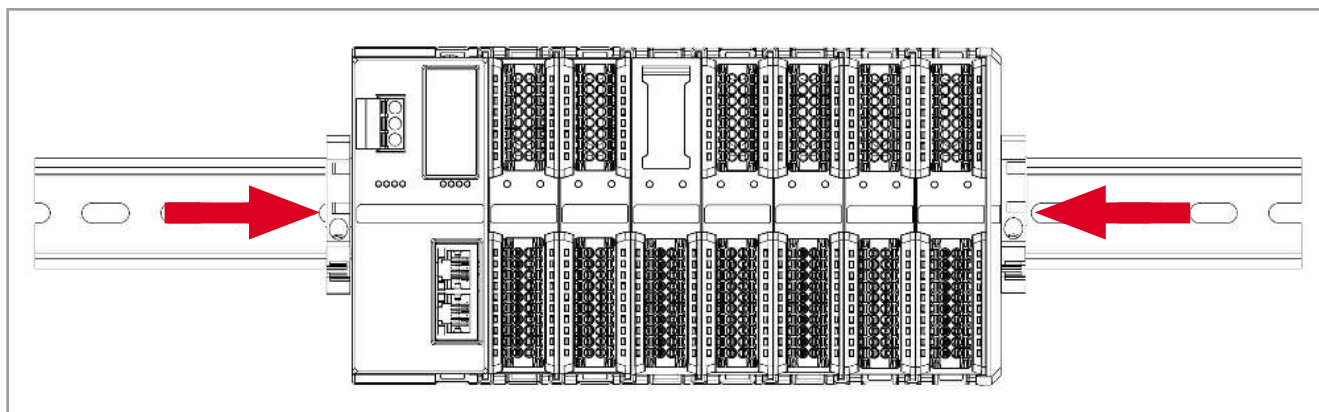


Fig. 9: Retainers firmly in place

3. Lock both retainers with a screwdriver.

5.5 Removing the device from the DIN rail

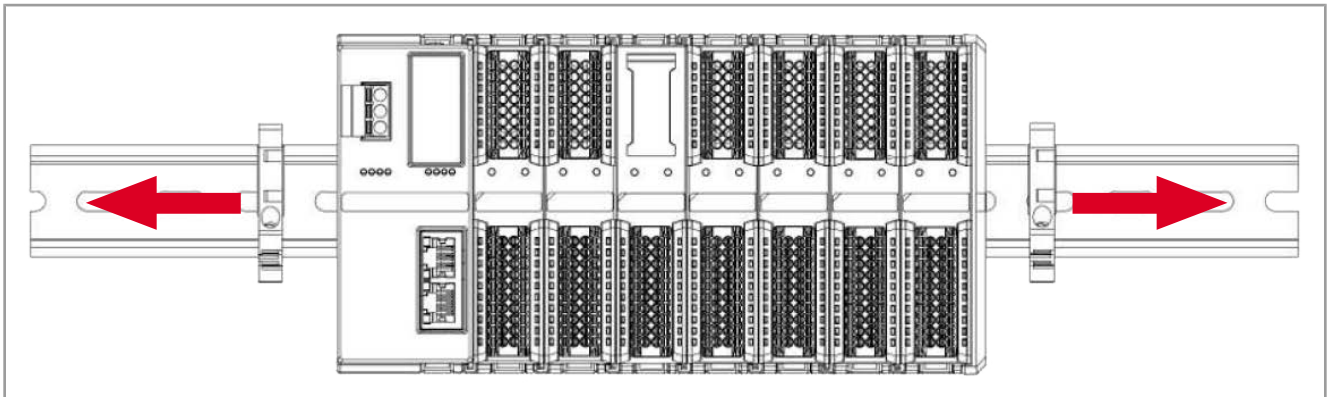


Fig. 10: Removing the retainers

1. De-energize the system.
2. Remove the retainers.

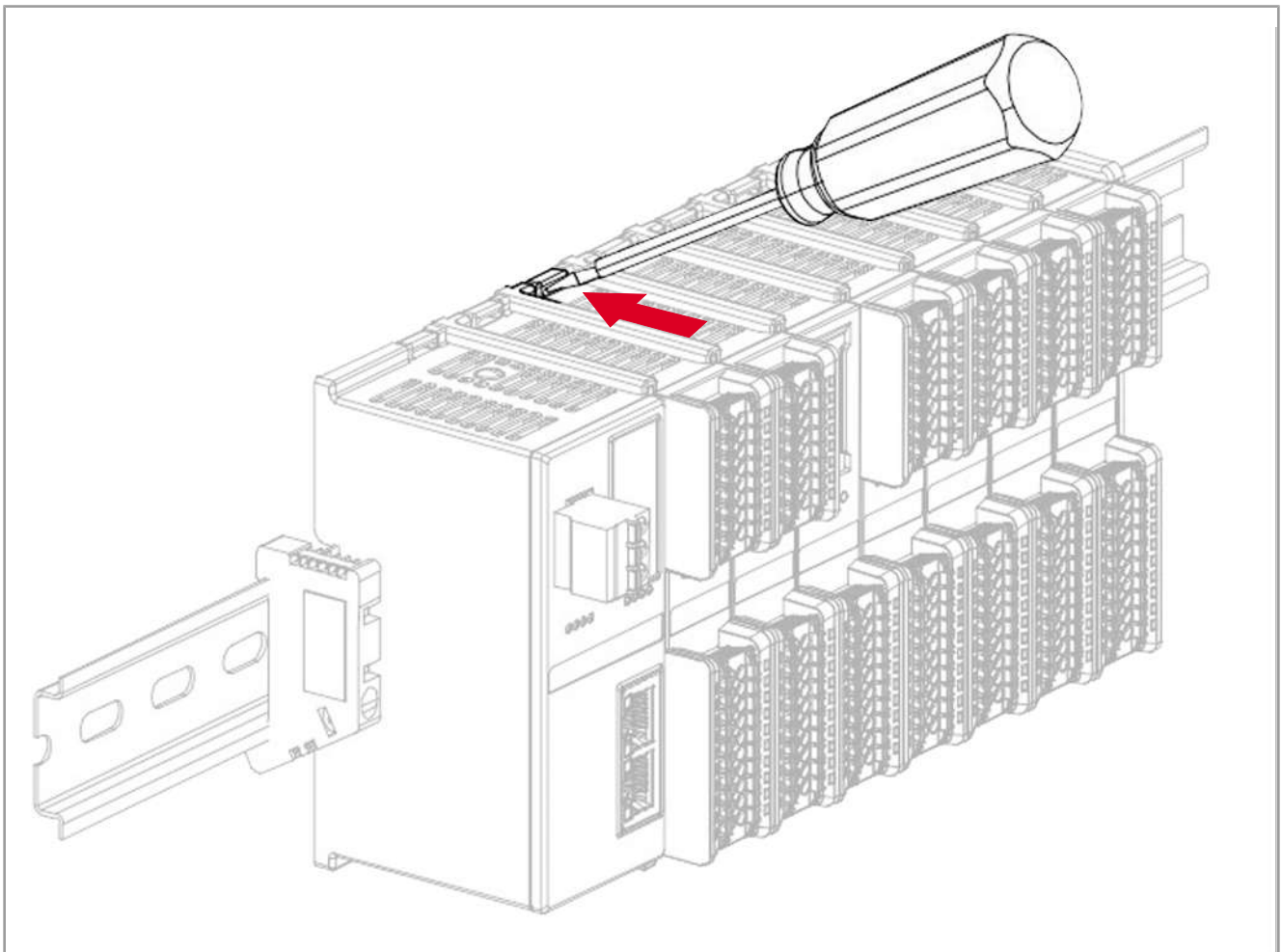


Fig. 11: Place a screwdriver on the latch.

3. Push the screwdriver into the latch.

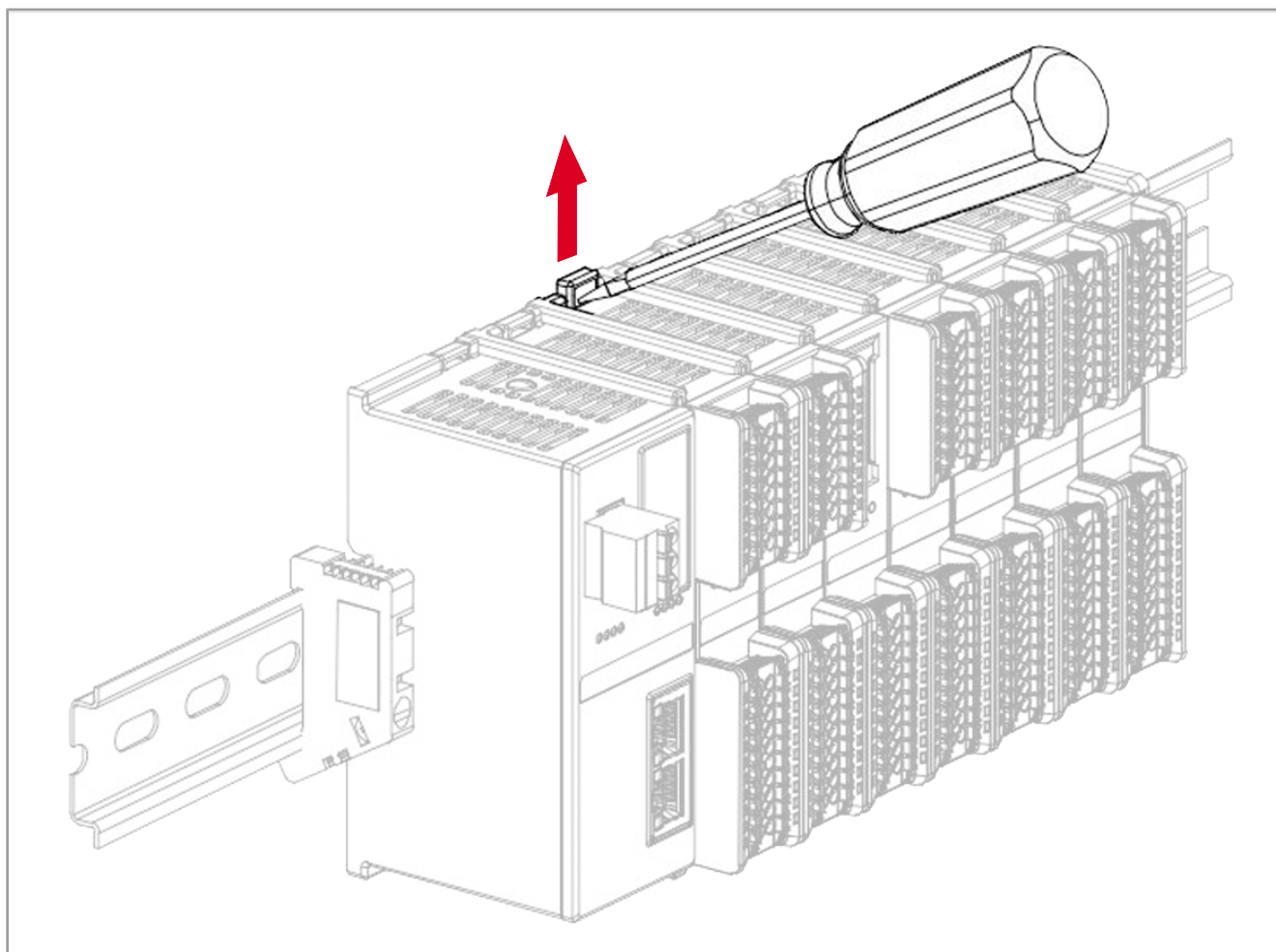


Fig. 12: Loosening the latch

4. Loosen the latch.

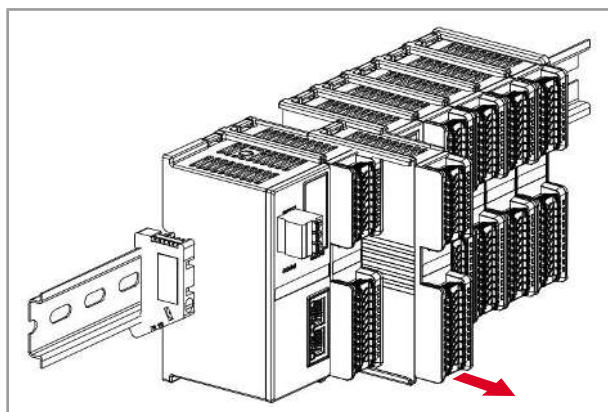


Fig. 13: Removing the module

5. Pull the device toward you and off the rail.

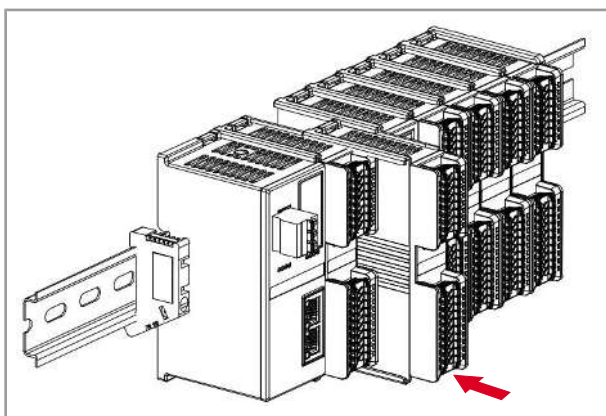
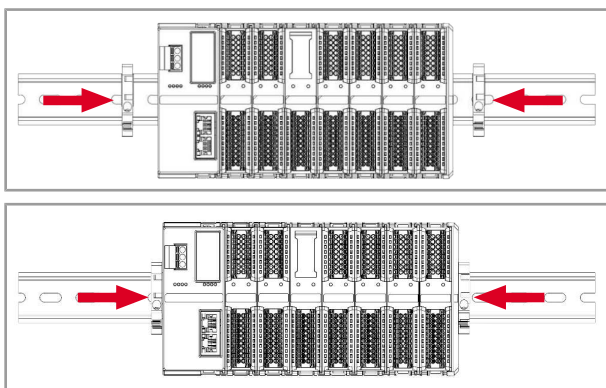


Fig. 14: Inserting the module

6. Insert a new device.



7. Install the retainers to secure the assembly.

6 Electrical connection

NOTICE



Damages to material or functional impairment

Improper implementation of the wiring harness may cause mechanical stress.

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

6.1 Improving EMC Noise Immunity

A system's immunity to noise is determined by its weakest component. Key factors are correct connections, lines and proper shielding. Observe the measures set out in this chapter.

Info

Further information

For more information on system immunity to interference, please refer to Application Note 016 *EMC-Compliant Control Cabinet Installation* at www.bucherautomation.com.

DIN rail

- Mount the device on a DIN rail sized 35 mm x 7.5 mm as per DIN EN 60715.

Application Note 016

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

The following instructions are excerpts from Application Note 016:

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

6.2 Wiring

Parameter	Signal cable terminals (input and output terminals)
Voltage rating	200 V
Rated current	9.5 A
Number of pins	16P + 20P
AWG	22 ... 17
Terminal range	0.3 ... 1.0 mm ²
Stripping length	10 mm

Tab. 10: Specification of connection terminals

6.3 Block diagrams

6.3.1 JX4-DI32

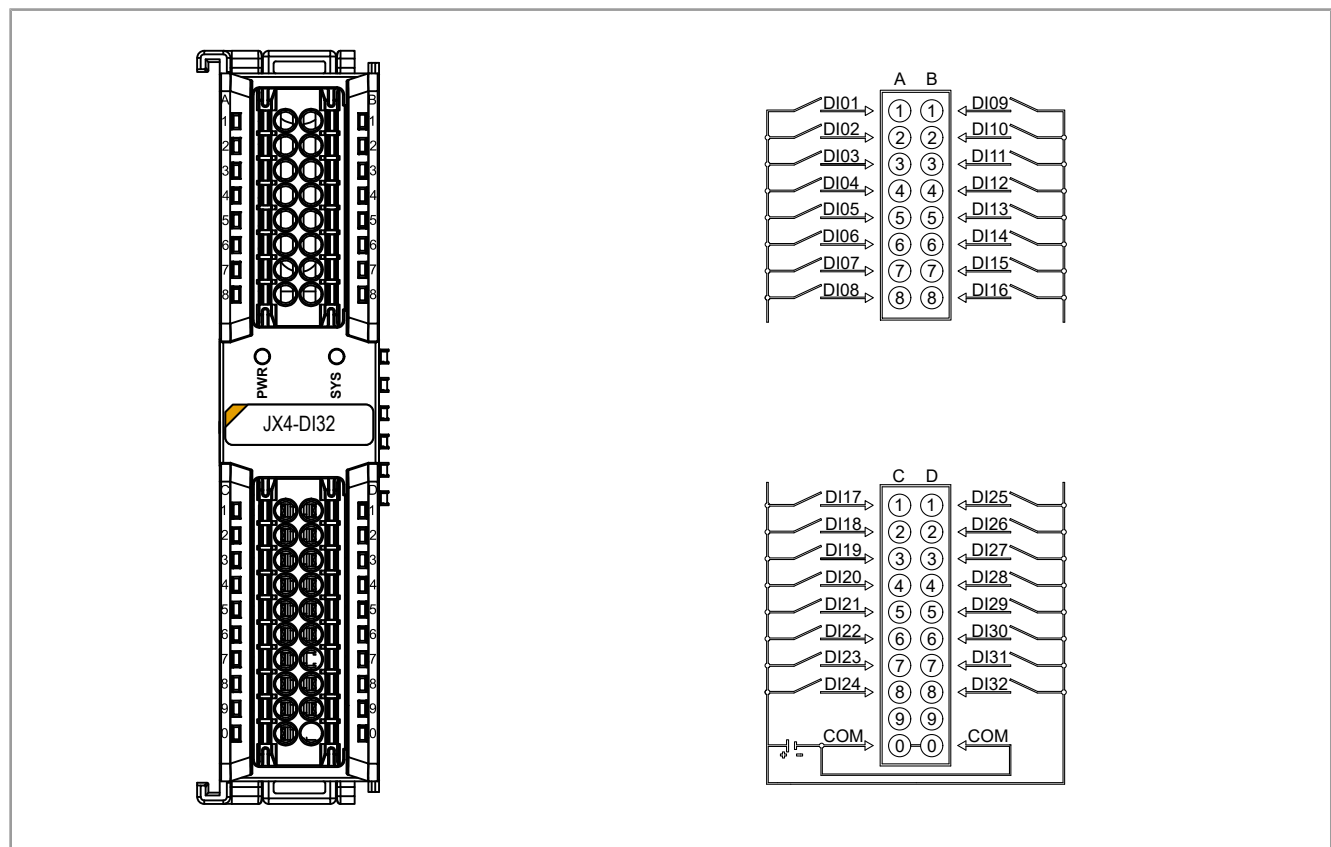


Fig. 15: JX4-DI32 block diagram

6.3.2 JX4-DO32

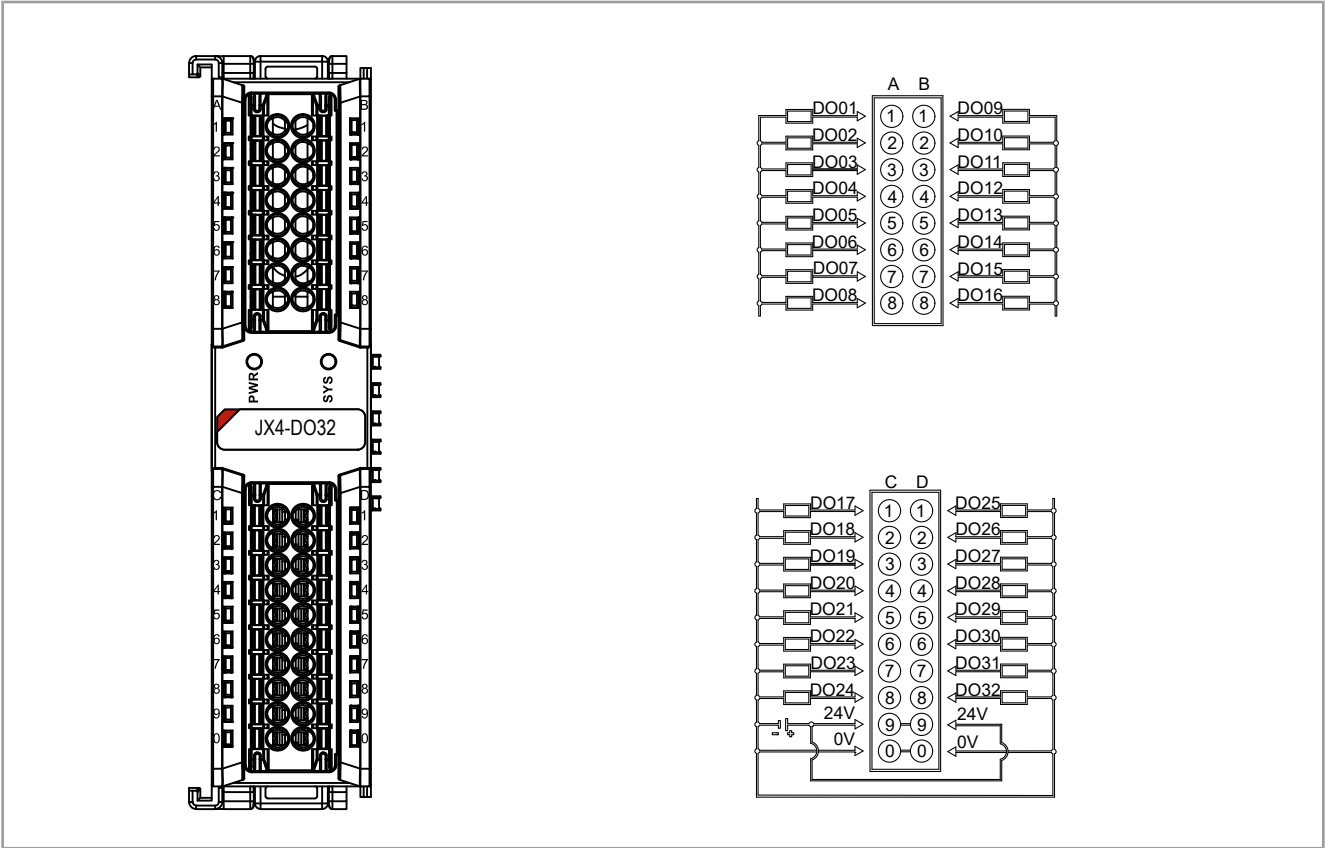


Fig. 16: JX4-DO32 block diagram

6.3.3 JX4-DI16

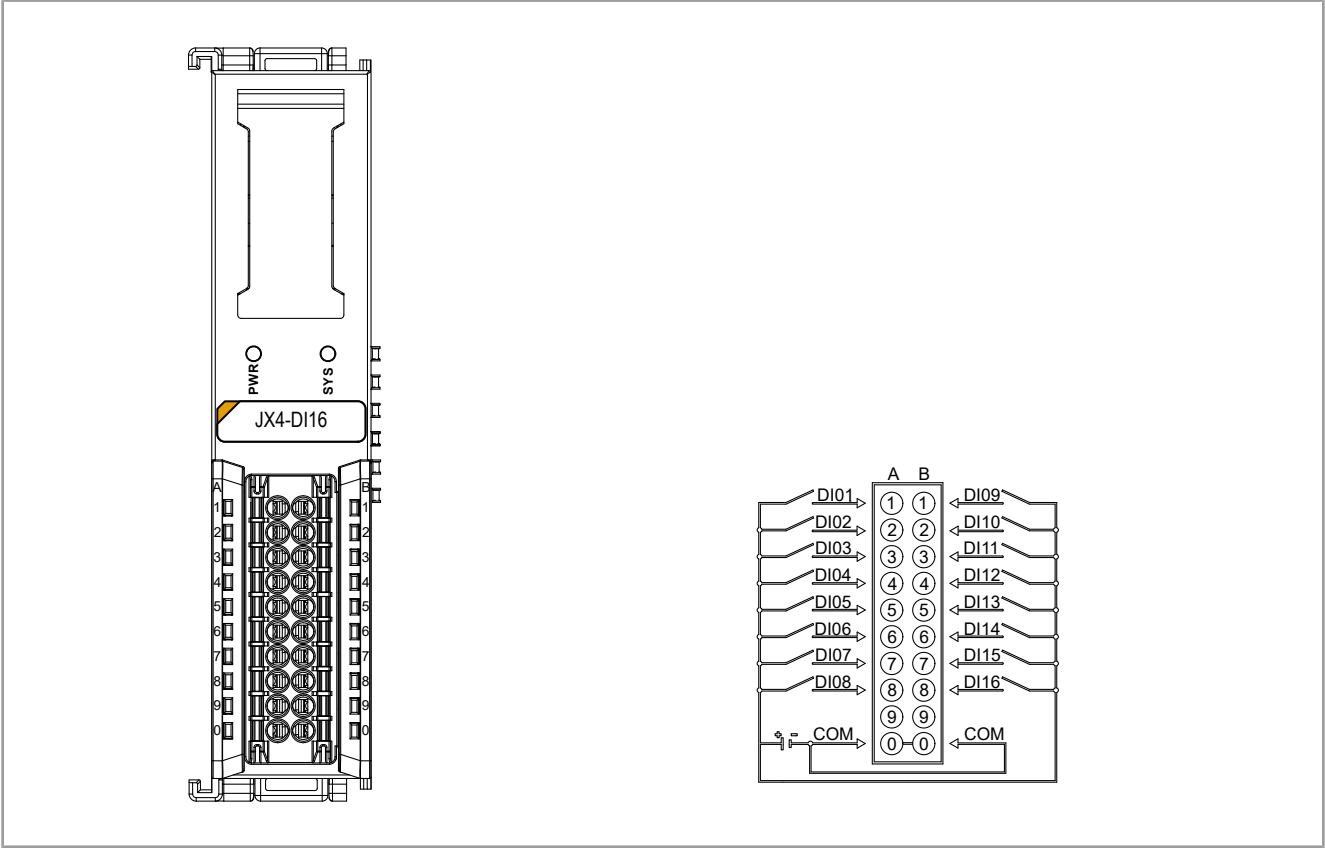


Fig. 17: JX4-DI16 block diagram

6.3.4 JX4-DO16

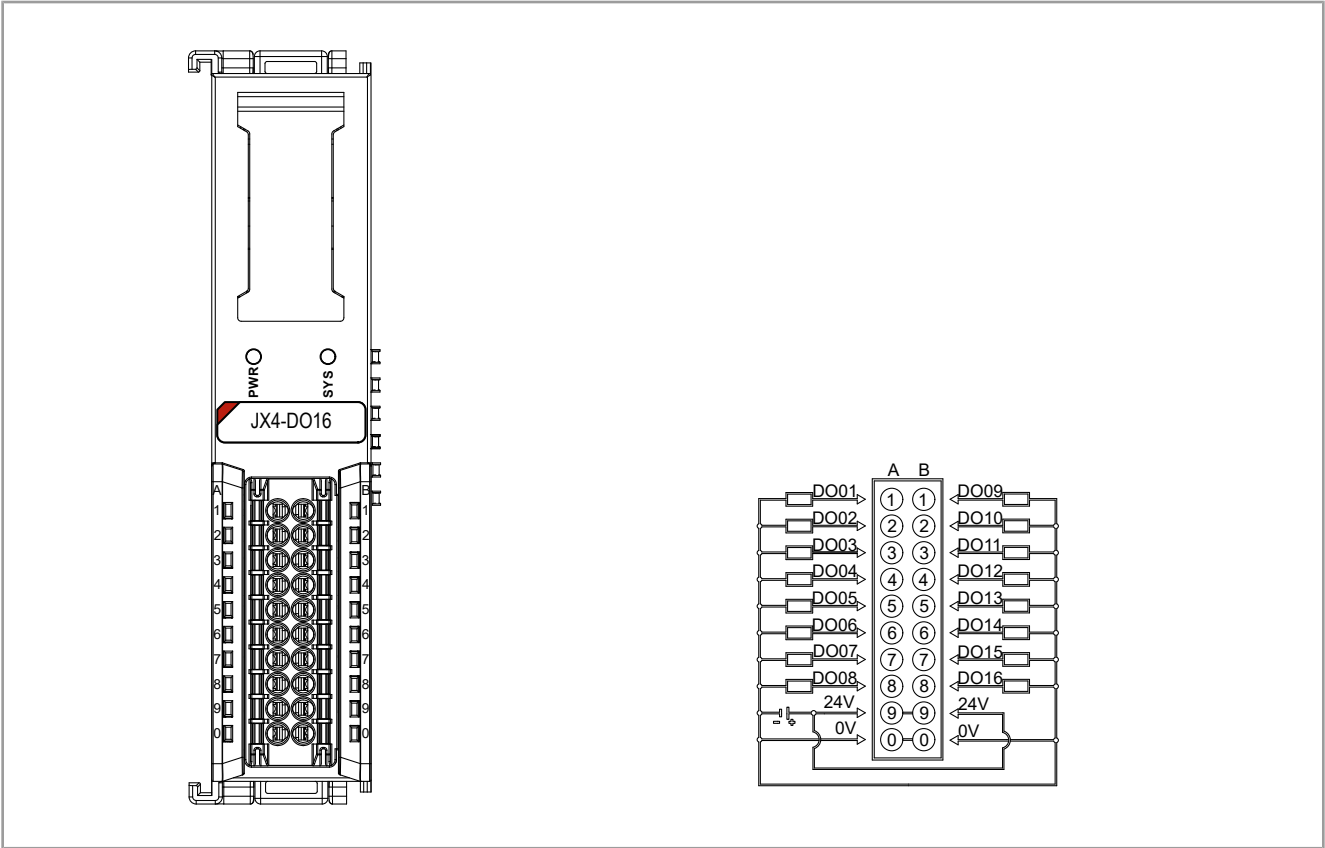


Fig. 18: JX4-DO16 block diagram

6.3.5 JX4-DI16DO16

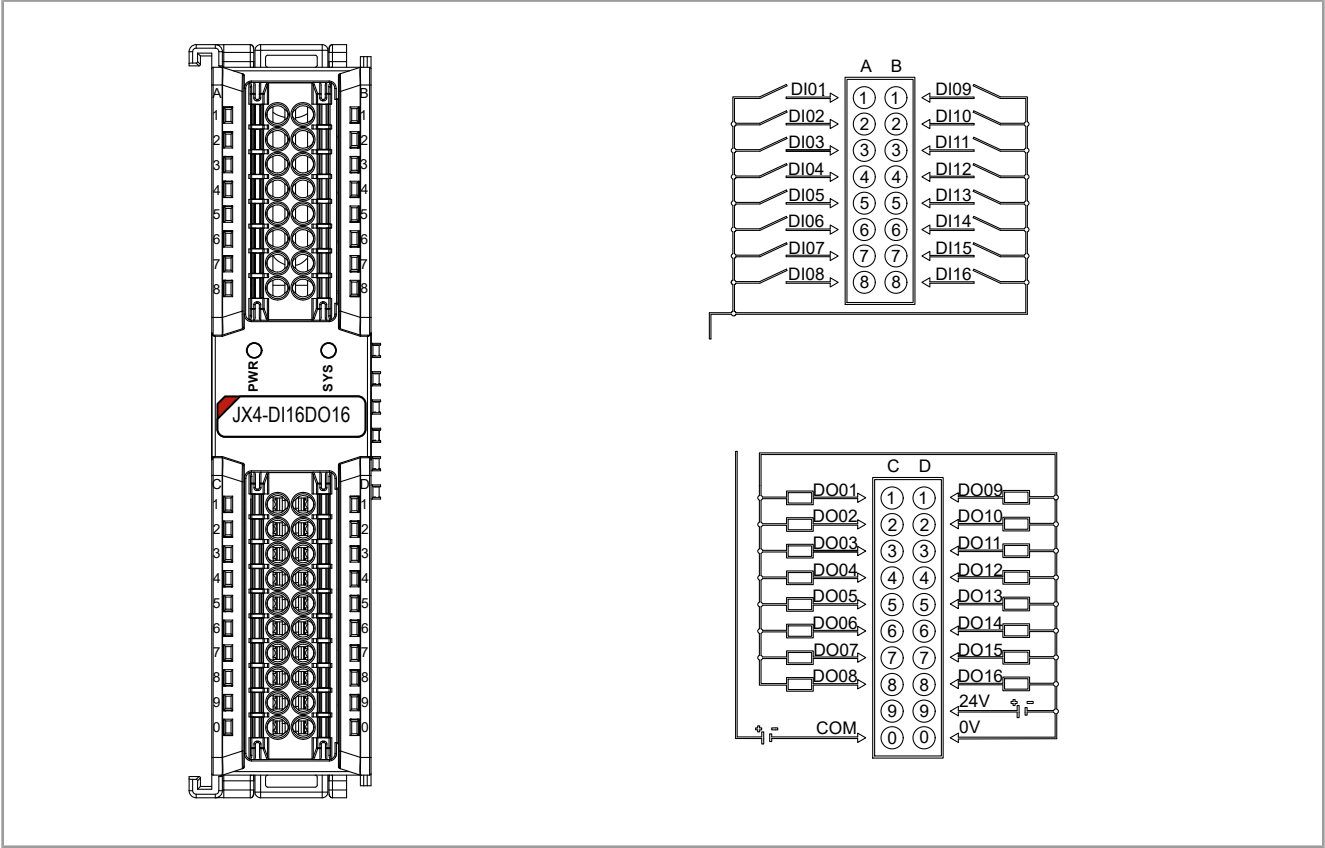


Fig. 19: JX4-DI16DO16 block diagram

7 Identification and configuration

Prerequisites

- JetSym software version 6.1 or later is installed.

i Info

Further information

For more information, refer to the JetSym online help.

7.1 Integrate JX4-BN-EC

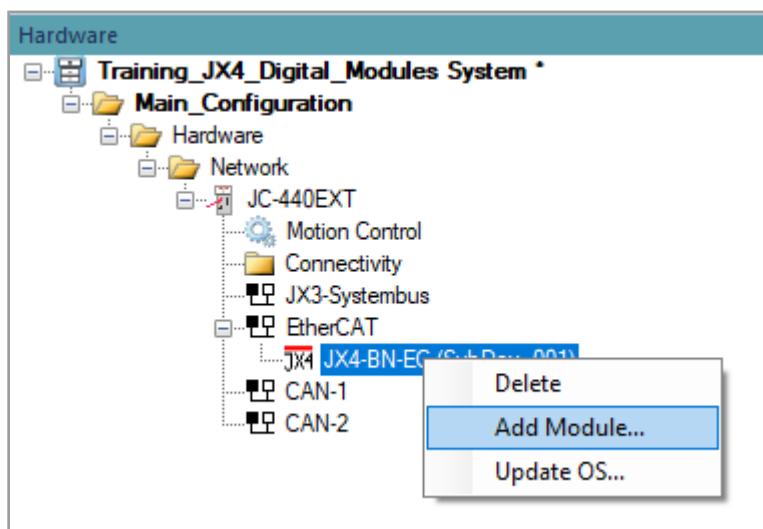
i Info

Order of device configuration

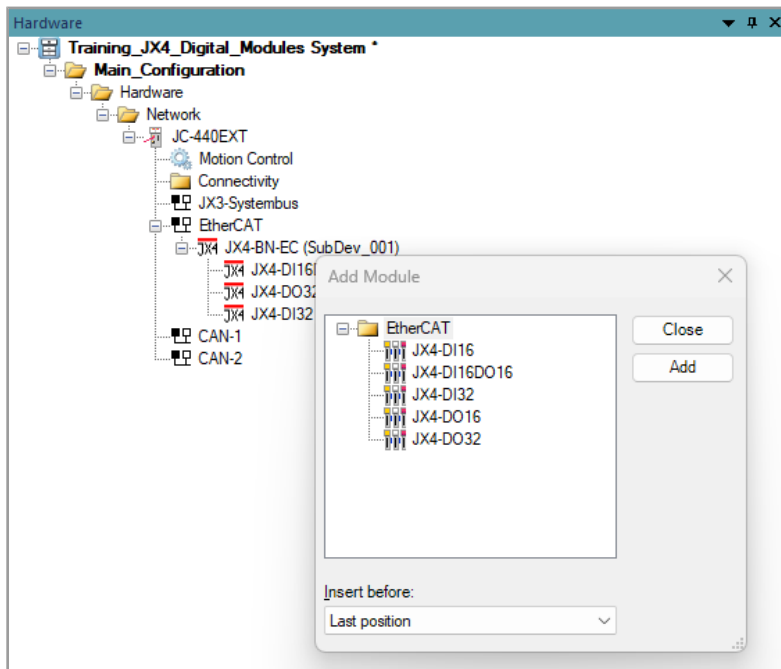
It is mandatory that the bus node be added prior to adding any expansion modules.

For further information refer to the JX4-BN-EC user manual available for download on the homepage. Go to www.bucherautomation.com and open *Products > Expansion modules > JX4 modules*.

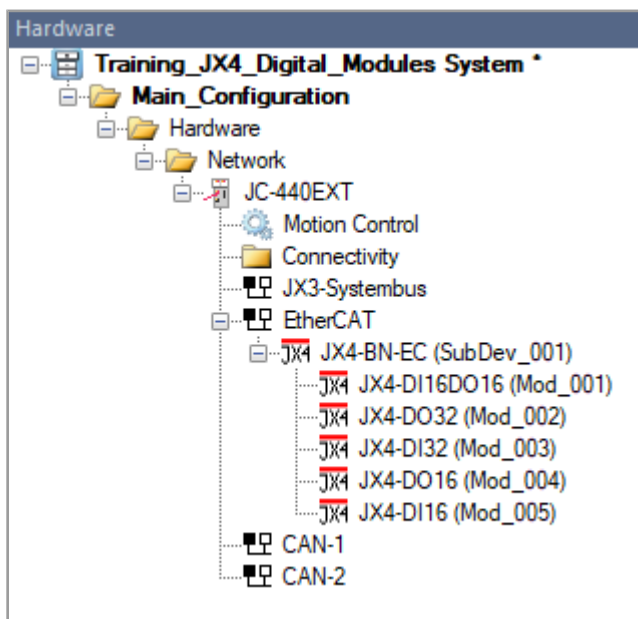
7.2 Adding expansion modules



1. Under Hardware > Network, open the controller folder.
2. Open the EtherCAT subfolder.
3. Right-clicking on JX4-BN-EC opens a context menu.
4. Select Add Module.



5. Select each desired module individually and click Add for each one.

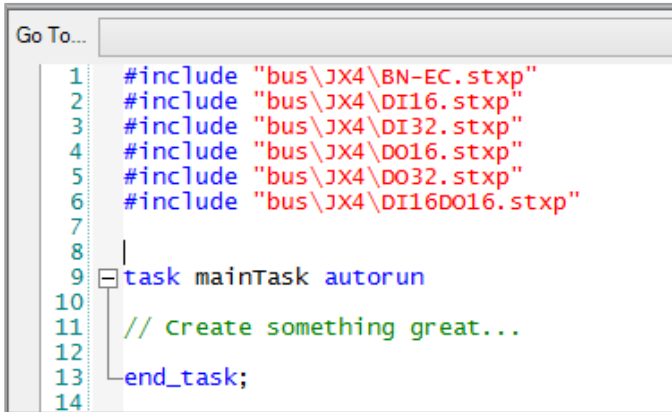


⇒ The selected modules appear in the list.

8 Programming

8.1 Incorporating the files in the project

1. Double-click the file Training_JX4_Digital_Modules.stxp to open it.

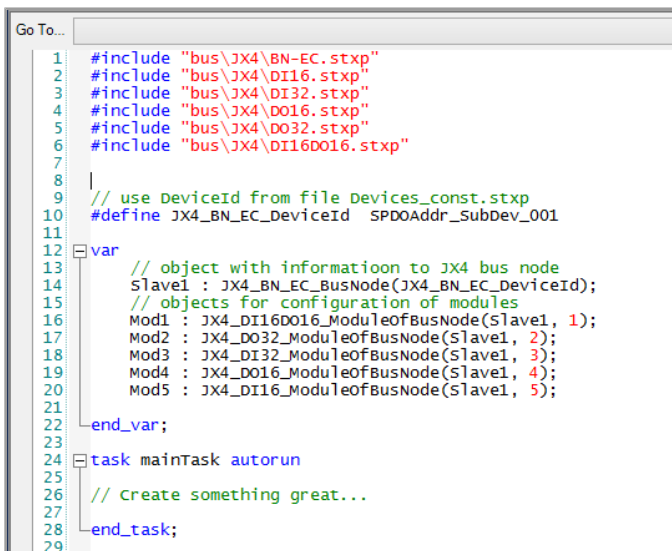


```

Go To...
1  #include "bus\JX4\BN-EC.stxp"
2  #include "bus\JX4\DI16.stxp"
3  #include "bus\JX4\DI32.stxp"
4  #include "bus\JX4\DO16.stxp"
5  #include "bus\JX4\DO32.stxp"
6  #include "bus\JX4\DI16DO16.stxp"
7
8  |
9  task mainTask autorun
10 |
11 |   // Create something great...
12 |
13 | end_task;
14

```

2. Include support files in the project using `#include`.

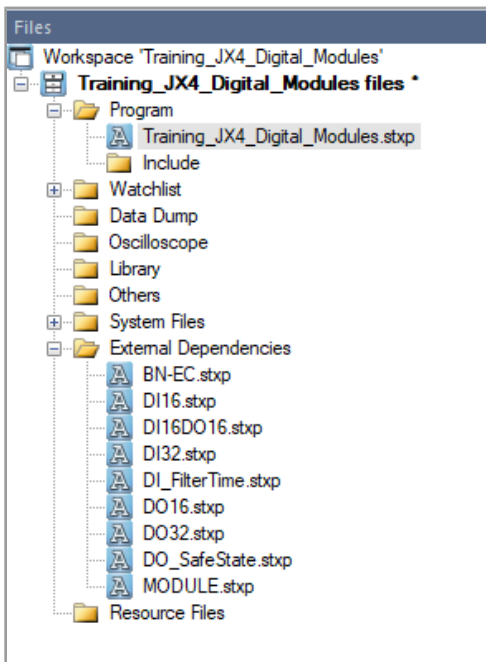


```

Go To...
1  #include "bus\JX4\BN-EC.stxp"
2  #include "bus\JX4\DI16.stxp"
3  #include "bus\JX4\DI32.stxp"
4  #include "bus\JX4\DO16.stxp"
5  #include "bus\JX4\DO32.stxp"
6  #include "bus\JX4\DI16DO16.stxp"
7
8  |
9  // use DeviceId from file Devices_const.stxp
10 #define JX4_BN_EC_DeviceId  SPDOAddr_SubDev_001
11
12 | var
13 |   // object with information to JX4 bus node
14 |   Slave1 : JX4_BN_EC_BusNode(JX4_BN_EC_DeviceId);
15 |   // objects for configuration of modules
16 |   Mod1 : JX4_DI16DO16_ModuleOfBusNode(Slave1, 1);
17 |   Mod2 : JX4_DO32_ModuleOfBusNode(Slave1, 2);
18 |   Mod3 : JX4_DI32_ModuleOfBusNode(Slave1, 3);
19 |   Mod4 : JX4_DO16_ModuleOfBusNode(Slave1, 4);
20 |   Mod5 : JX4_DI16_ModuleOfBusNode(Slave1, 5);
21 |
22 | end_var;
23
24 task mainTask autorun
25 |
26 |   // Create something great...
27 |
28 | end_task;
29

```

3. Create objects for the modules.



⇒ After compilation, the support files will appear in the "External Dependencies" folder.

8.2 Configuring the objects and modules

The I/O modules are configurable.

The corresponding support files have been downloaded, as described in Adding support files for JX4 modules.

8.2.1 Digital input filter

The digital input filter protects the JX4 module against undesired rapid signal changes as induced by bouncing switches or electric disturbance. The filter time can be adjusted per module, yet not per channel.

Settings:

- **Filter times:** From „no filter“ to 0.1 ms, 0.2 ms, 0.5 ms, 1 ms, 2 ms, 3 ms (default), 4 ms and more.
- **Operating principle:** It takes the signal to last at least as long as the set filter time for the filter to detect a signal change. Pulses shorter than the set filter time will be ignored.

Example: A filter time set to 3 ms, filters signals shorter than 3 ms. The signal change must last for at least 3 ms to be valid.

This way, the filter ensures reliable signal processing and prevents false triggering caused by short disturbances.

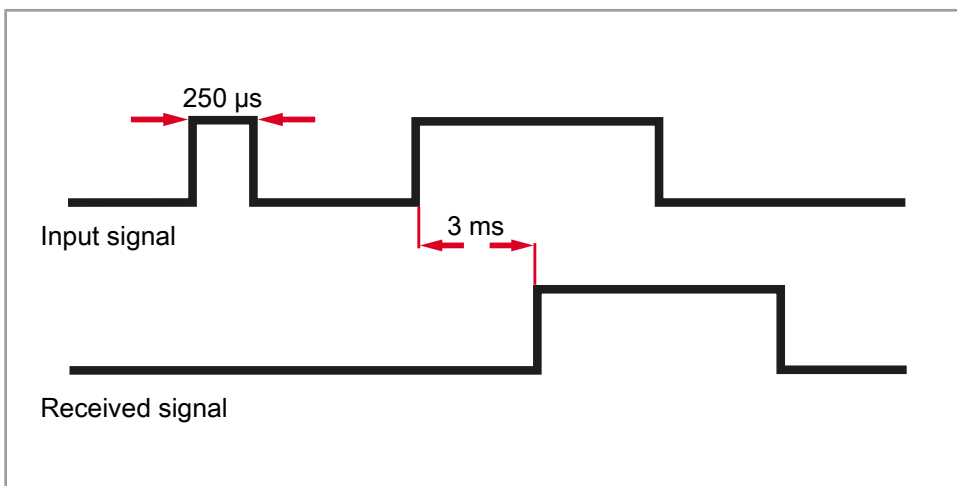


Fig. 20: Digital input filter

Support file of digital input filter

```

//*****
// * Enumeration for filter time
//*****
type
  JX4_DI_FilterTime_CONF : enum (FT_0ms = 0, FT_100us = 110, FT_200us = 120, FT_500us = 150, FT_1ms = 1, FT_2ms = 2,
                                FT_3ms = 3, FT_4ms = 4, FT_5ms = 5, FT_6ms = 6, FT_7ms = 7, FT_8ms = 8, FT_9ms = 9,
                                FT_10ms = 10, FT_11ms = 11, FT_12ms = 12, FT_13ms = 13, FT_14ms = 14, FT_15ms = 15,
                                FT_16ms = 16, FT_17ms = 17, FT_18ms = 18, FT_19ms = 19, FT_20ms = 20)
end_type

```

The support file contains all customizing options of the digital input filter.

- ▶ Enter the code of the desired filter time in the configuration settings.

8.2.2 Clear/hold feature of the digital output

The clear/hold feature applies to modules with output channels. This feature controls the behavior of the output channels whenever the module is not in an operating state; for example:

- Operation was stopped.
- Network connection to the coupler was interrupted.

The clear/hold feature supports settings to be made for the entire module (template mode) or individual channels (single-channel mode). Single-channel mode settings override template mode settings. The default setting clears all outputs.

Parameter	Value	Description
Template mode	1 (default)	PresetLow: – Clears the output – Output = 0
	2	PresetHigh: – Sets the output – Output = 1
	3	Keep: – Keeps the latest output value
Single-channel mode channel X	0 (default)	TemplateValue: – Output value is identical with template mode – Single-channel mode is disabled
	1	PresetLow: – Clears the output – Output = 0
	2	PresetHigh: – Sets the output – Output = 1
	3	Keep: – Keeps the latest output value

Tab. 11: Clear/hold parameters of a digital output module

Support file - clear/hold feature

```

//*****
//* Enumeration for filter time
//*****
type
  JX4_DO_SafeState_CONF : enum(Template = 0, Reset = 1, Set = 2, Keep = 3)
end_type

```

The support file contains all customizing options of the clear/hold feature.

- Enter the code in the configuration settings.

8.2.3 Configuration example

```

10
11
12 var
13   // object with information to JX4 bus node
14   Slave1 : JX4_BN_EC_BusNode(JX4_BN_EC_DeviceId);
15   // objects for configuration of modules
16   Mod1 : JX4_DI16DO16_ModuleOfBusNode(Slave1, 1);
17   Mod2 : JX4_DO32_ModuleOfBusNode(Slave1, 2);
18   Mod3 : JX4_DI32_ModuleOfBusNode(Slave1, 3);
19   Mod4 : JX4_DO16_ModuleOfBusNode(Slave1, 4);
20   Mod5 : JX4_DI16_ModuleOfBusNode(Slave1, 5);
21 end_var;
22
23 task mainTask autorun
24 var
25   FilterTime : JX4_DI_FilterTime_CONF;
26   Safestate : JX4_DO_SafeState_CONF;
27 end_var
28 // Frist check configuration
29 // does the bus coupler found 5 modules?
30 if Slave1.byNoOfDetectedModules = 5 then
31
32   // the first module should be a mixed input and out put module
33   if Slave1.DetectedModule[0] == Mod1.ModuleType then
34     // read the configured filtertime of Mod1
35     Mod1.FilterTimeRead(FilterTime);
36     if FilterTime != JX4_DI_FilterTime_CONF.FT_3ms then
37       // correct the filtertime to 3 ms
38       Mod1.FilterTimewrite(JX4_DI_FilterTime_CONF.FT_3ms);
39     end_if
40     // read the configured error template mode of Mod1
41     Mod1.TemplateModeRead(Safestate);
42     if Safestate != JX4_DO_SafeState_CONF.Reset then
43       // correct the safe state to RESET
44       Mod1.TemplateModewrite(JX4_DO_SafeState_CONF.Reset);
45     end_if
46   end_if
47
48   // the second module should be a output module
49   if Slave1.DetectedModule[1] == Mod2.ModuleType then
50     // read the configured error template mode of Mod2
51     Mod2.TemplateModeRead(Safestate);
52     if Safestate != JX4_DO_SafeState_CONF.Reset then
53       // correct the safe state to RESET
54       Mod2.TemplateModewrite(JX4_DO_SafeState_CONF.Reset);
55     end_if
56   end_if

```

The above image shows a **sample configuration** with the *digital input filter* set to 3 ms and the *clear/hold feature* set to Reset.

8.3 Declaring inputs and outputs

The address data of each input and output must be declared.

Address syntax

1. Name of the JX4-BN-EC (slave1)
2. Name of the module (in this example JX4-DI16DO16 Mod_001)
3. Name of the PDO (with the example of the JX4-DI16DO16, this is either Outputs or Inputs)
4. Name of the PDO entry, for an output 'DO 01' ... 'DO 16', or 'DI 01' ... 'DI 16' for an input

Procedure



1. Go to Hardware>Network and open the node of the respective controller.
2. Open the EtherCAT submenu.
3. Double-click the desired module. In this example JX4-DI16DO16.

⇒ The submenu Configuration>I/O mapping opens.

Aktiv	STX-Variable	STX-Typ	Name des PDO	PDO-Index	Name des PDO-Eintrags	Datentyp	Adresse
☒	oFirstModuleOutput01	bool	Outputs	0x1600	DO 01	BOOL	0x7000.1
☒	oFirstModuleOutput02	bool	Outputs	0x1600	DO 02	BOOL	0x7000.2
☒	oFirstModuleOutput03	bool	Outputs	0x1600	DO 03	BOOL	0x7000.3
☒	oFirstModuleOutput04	bool	Outputs	0x1600	DO 04	BOOL	0x7000.4
☒	oFirstModuleOutput05	bool	Outputs	0x1600	DO 05	BOOL	0x7000.5
☒	oFirstModuleOutput06	bool	Outputs	0x1600	DO 06	BOOL	0x7000.6
☒	oFirstModuleOutput07	bool	Outputs	0x1600	DO 07	BOOL	0x7000.7
☒	oFirstModuleOutput08	bool	Outputs	0x1600	DO 08	BOOL	0x7000.8
☒	oFirstModuleOutput09	bool	Outputs	0x1600	DO 09	BOOL	0x7000.9
☒	oFirstModuleOutput10	bool	Outputs	0x1600	DO 10	BOOL	0x7000.10
☒	oFirstModuleOutput11	bool	Outputs	0x1600	DO 11	BOOL	0x7000.11
☒	oFirstModuleOutput12	bool	Outputs	0x1600	DO 12	BOOL	0x7000.12
☒	oFirstModuleOutput13	bool	Outputs	0x1600	DO 13	BOOL	0x7000.13
☒	oFirstModuleOutput14	bool	Outputs	0x1600	DO 14	BOOL	0x7000.14
☒	oFirstModuleOutput15	bool	Outputs	0x1600	DO 15	BOOL	0x7000.15
☒	oFirstModuleOutput16	bool	Outputs	0x1600	DO 16	BOOL	0x7000.16
☒	iFirstModuleInput01	bool	Inputs	0x1a00	DI 01	BOOL	0x6000.1
☒	iFirstModuleInput02	bool	Inputs	0x1a00	DI 02	BOOL	0x6000.2
☒	iFirstModuleInput03	bool	Inputs	0x1a00	DI 03	BOOL	0x6000.3
☒	iFirstModuleInput04	bool	Inputs	0x1a00	DI 04	BOOL	0x6000.4
☒	iFirstModuleInput05	bool	Inputs	0x1a00	DI 05	BOOL	0x6000.5
☒	iFirstModuleInput06	bool	Inputs	0x1a00	DI 06	BOOL	0x6000.6
☒	iFirstModuleInput07	bool	Inputs	0x1a00	DI 07	BOOL	0x6000.7
☒	iFirstModuleInput08	bool	Inputs	0x1a00	DI 08	BOOL	0x6000.8
☒	iFirstModuleInput09	bool	Inputs	0x1a00	DI 09	BOOL	0x6000.9
☒	iFirstModuleInput10	bool	Inputs	0x1a00	DI 10	BOOL	0x6000.10
☒	iFirstModuleInput11	bool	Inputs	0x1a00	DI 11	BOOL	0x6000.11
☒	iFirstModuleInput12	bool	Inputs	0x1a00	DI 12	BOOL	0x6000.12
☒	iFirstModuleInput13	bool	Inputs	0x1a00	DI 13	BOOL	0x6000.13
☒	iFirstModuleInput14	bool	Inputs	0x1a00	DI 14	BOOL	0x6000.14
☒	iFirstModuleInput15	bool	Inputs	0x1a00	DI 15	BOOL	0x6000.15
☒	iFirstModuleInput16	bool	Inputs	0x1a00	DI 16	BOOL	0x6000.16

Fig. 21: Complete list of channel addresses

```

23
24 var
25 // inputs of Modul1 as PDOs
26 iFirstModuleInput01 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 01';
27 iFirstModuleInput02 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 02';
28 iFirstModuleInput03 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 03';
29 iFirstModuleInput04 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 04';
30 iFirstModuleInput05 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 05';
31 iFirstModuleInput06 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 06';
32 iFirstModuleInput07 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 07';
33 iFirstModuleInput08 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 08';
34 iFirstModuleInput09 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 09';
35 iFirstModuleInput10 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 10';
36 iFirstModuleInput11 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 11';
37 iFirstModuleInput12 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 12';
38 iFirstModuleInput13 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 13';
39 iFirstModuleInput14 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 14';
40 iFirstModuleInput15 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 15';
41 iFirstModuleInput16 : bool at SubDev_001.Mod_001.'Inputs'. 'DI 16';
42 // outputs of Modul1 as PDOs
43 oFirstModuleOutput01 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 01';
44 oFirstModuleOutput02 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 02';
45 oFirstModuleOutput03 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 03';
46 oFirstModuleOutput04 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 04';
47 oFirstModuleOutput05 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 05';
48 oFirstModuleOutput06 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 06';
49 oFirstModuleOutput07 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 07';
50 oFirstModuleOutput08 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 08';
51 oFirstModuleOutput09 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 09';
52 oFirstModuleOutput10 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 10';
53 oFirstModuleOutput11 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 11';
54 oFirstModuleOutput12 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 12';
55 oFirstModuleOutput13 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 13';
56 oFirstModuleOutput14 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 14';
57 oFirstModuleOutput15 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 15';
58 oFirstModuleOutput16 : bool at SubDev_001.Mod_001.'Outputs'. 'DO 16';
59
60 end_var
61

```

4. For each channel, enter the corresponding code as described above.

5. Double-click again on the module you just configured.

⇒ The Configuration>I/O mapping submenu lists the addresses of all channels. (See above figure *Complete list of channel addresses*)

```

196
197 // now we can use the inputs and outputs
198 // the first output of Mod1 is connected to the first input of Mod1 in this sample
199 loop
200   oFirstModuleOutput01 := !iFirstModuleInput01;
201   when oFirstModuleOutput01 == iFirstModuleInput01| continue;
202 end_loop;
203

```

⇒ The inputs and outputs are ready to be used as usual.

9 Maintenance

This product is maintenance-free. The operation of the product does not require inspection or maintenance efforts.

9.1 Repairs

Defective components can cause dangerous malfunctions and compromise safety.

Only the manufacturer is authorized to perform repair work.

It is forbidden to open the product.

Product modifications

Modifications and alterations to the product and its functions are not allowed. The manufacturer exempts from liability for any modifications made to the product.

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

The manufacturer exempts from liability for any damage resulting from the use of non-original parts and equipment is excluded.

9.2 Storage and Shipment

Storage

When storing the product, observe the environmental conditions given in chapter "Technical specifications".

Shipment and packaging

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

To protect the product from impact or shock, it must be shipped in its original packaging, or in an appropriate protective ESD packaging.

If the packaging is damaged, inspect the device for any visible damage, and immediately inform your freight forwarder and Bucher Automation AG of the damage caused during shipment. It is strictly forbidden to use a product that has been damaged or dropped.

9.3 Return and Disposal

The WEEE icon (crossed-out wheeled bin) says that end users must not dispose of waste electrical and electronic equipment together with household waste, but separately in an appropriate way. Applicable local environmental directives and regulations must be complied with.

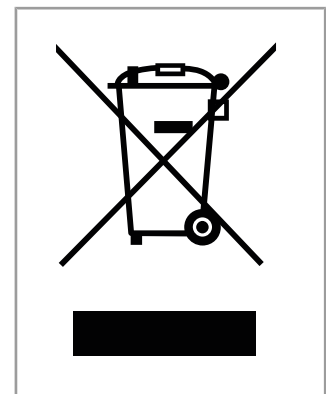


Fig. 22: WEEE icon – crossed out wheeled bin

Disposal options

To do so, you may either resort to professional disposal service providers or return waste electronics to Bucher Automation AG.

Find detailed information along with the required Return Delivery Form on our [website](#).

Batteries

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

Personal data

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

Packaging material

The product's packaging materials must not be disposed of together with household waste. Find detailed information on how to return packaging material to Bucher Automation AG on our [website](#).

10 Service

10.1 Technical Support

If you have any questions, suggestions, or problems, our technical support team is here to assist you with their expertise. You can reach them by phone or through the contact form on our website:

[Technical Support | www.bucherautomation.com](https://www.bucherautomation.com/Technical-Support)

Or send us an email:

support@bucherautomation.com

Technical Support needs the following information:

- Hardware Revision and Serial Number
You can find the serial number and hardware revision of your product on the nameplate.

11 Replacement Parts and Accessories

NOTICE



Inadequate accessories might cause damage to the product

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

- Only use accessories recommended by Bucher Automation AG.

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Bucher Automation AG

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



www.bucherautomation.com