VIPA System 100V

EM | Manual

HB100E_EM | RE_123-4Ex | Rev. 13/04

January 2013

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Note

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Conformity is indicated by the CE marking affixed to the product.

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EMail: support@vipa.de

Contents

About this Manual

This manual describes the digital expansion modules EM 123 of the System 100V from VIPA.

Here you may find every information for commissioning and operation.

Overview

Chapter 1: Basics

These basics include recommendations on the handling of the modules of the VIPA System 100V as central resp. decentral automation system.

Besides a system overview you will find general information of the System 100V like assembly dimensions, installation and environmental conditions.

The chapter is finished by the installation guidelines to ensure the EMC during installation.

Chapter 2: Hardware description and deployment

This chapter contains every information for the deployment of the digital expansion modules of the System 100V.

Every Micro-PLC CPU has an interface for backplane bus connectors. This allows to connect System 100V expansion modules and modules of the System 200V family.

Objective and contents

This manual describes the System 100V Expansion modules EM 123 from VIPA. It contains a description of the construction, project implementation and usage.

This manual is part of the documentation package with order number HB100E_EM and relevant for:

Product	Order number	as of state: HW
EM 123	VIPA 123-4Ex	01

Target audience

The manual is targeted at users who have a background in automation technology.

Structure of the manual

The manual consists of chapters. Every chapter provides a self-contained description of a specific topic.

Guide to the document

The following guides are available in the manual:

- an overall table of contents at the beginning of the manual
- an overview of the topics for every chapter

Availability

The manual is available in:

- printed form, on paper
- in electronic form as PDF-file (Adobe Acrobat Reader)

Icons Headings

Important passages in the text are highlighted by following icons and headings:

Danger!
Immediate or likely danger.
Personal injury is possible.

Attention!
Damages to property is likely if these warnings are not heeded.

Note!
Supplementary information and useful tips.

Safety information

Applications conforming with specifications

The System 100V is constructed and manufactured for

- communication and process control
- general control and automation applications
- industrial applications
- operation within the environmental conditions specified in the technical data
- installation into a cubicle

Danger!

This device is not certified for applications in

- in explosive environments (EX-zone)

Documentation

The manual must be available to all personnel in the

- project design department
- installation department
- commissioning
- operation

The following conditions must be met before using or commissioning the components described in this manual:

- Hardware modifications to the process control system should only be carried out when the system has been disconnected from power!
- Installation and hardware modification only by properly trained personnel.
- The national rules and regulations of the respective country must be satisfied (installation, safety, EMC ...)

Disposal

National rules and regulations apply to the disposal of the unit!

Chapter 1 Basics

Overview

These basics include recommendations on the handling of the modules of the VIPA System 100V as central resp. decentral automation system.

Besides a system overview you will find general information of the System 100V like assembly dimensions, installation and environmental conditions.

The chapter is finished by the installation guidelines to ensure the EMC during installation.

Content

Safety information for Users

Handling of electrostatic sensitive modules

VIPA modules make use of highly integrated components in MOS-technology. These components are extremely sensitive to over-voltages that can occur during electrostatic discharges.

The following symbol is attached to modules that can be destroyed by electrostatic discharges:

The symbol is located on the module, the module rack or on packing material and it indicates the presence of electrostatic sensitive equipment.

It is possible that electrostatic sensitive equipment is destroyed by energies and voltages that are far less than the human threshold of perception. These voltages can occur where persons do not discharge themselves before handling electrostatic sensitive modules and they can damage components thereby, causing the module to become inoperable or unusable. Modules that have been damaged by electrostatic discharges may fail after a temperature change, mechanical shock or changes in the electrical load.

Only the consequent implementation of protection devices and meticulous attention to the applicable rules and regulations for handling the respective equipment can prevent failures of electrostatic sensitive modules.

Shipping of electrostatic sensitive modules

Modules have to be shipped in the original packing material.

Measurements and alterations on electrostatic sensitive modules

When you are conducting measurements on electrostatic sensitive modules you should take the following precautions:

- Floating instruments must be discharged before use.
- Instruments must be grounded.

Modifying electrostatic sensitive modules you should only use soldering irons with grounded tips.

Attention!

Personnel and instruments should be grounded when working on electrostatic sensitive modules.

Overview System 100V

General

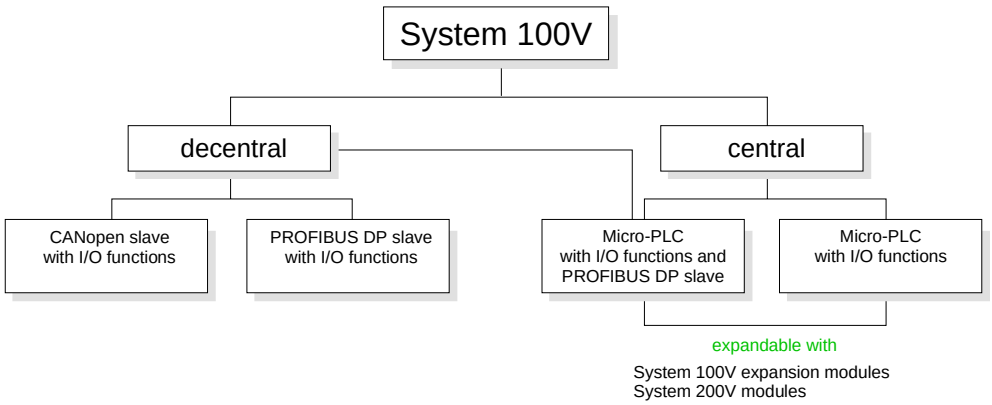
The System 100V from VIPA is a compact central and decentral usable automation system from VIPA. The system is recommended for lower and middle performance needs.

At a System 100V module, CPU res. bus coupler are integrated together with in-/output functions in one case.

System 100V modules are installed directly to a 35mm norm profile rail.

You may expand the number of I/Os of the Micro-PLC by means of expansion modules res. connect System 200V modules via bus couplers.

The following picture shows the performance range of the System 100V:



Central system

The central system is built of one CPU and integrated I/O-functions. The CPU is instruction compatible to the S7-300 from Siemens and may be programmed and projected by means of S7 programming tools from Siemens and VIPA via MPI.

By means of bus couplers you may connect modules of the System 200V family res. enlarge the number of I/Os by installing System 100V expansion modules.

The CPUs are available in different variants.

Central system with DP slave

At the central system besides the CPU and I/O functions, a PROFIBUS DP slave is included that acknowledges itself within the address range of the CPU.

Decentral system

This system contains a PROFIBUS DP res. CANopen slave with I/O functions instead of the CPU. The system is not expandable.

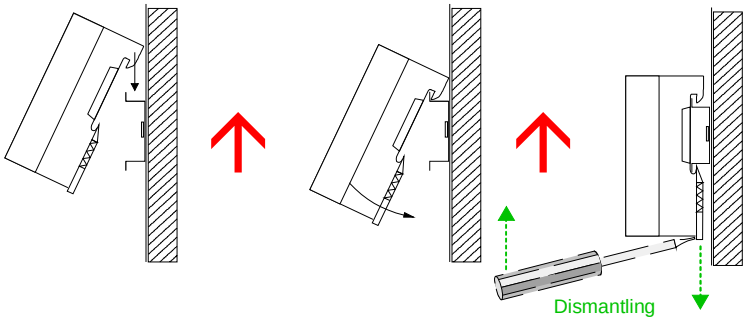
General Description of the System 100V

Structure and dimensions

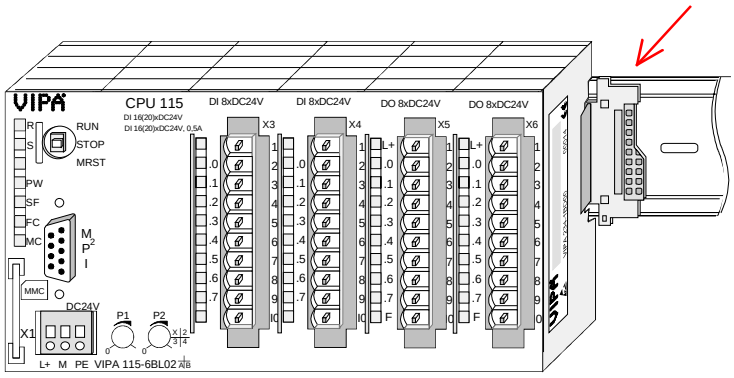
- Norm profile head rail 35mm
- Dimensions basic module:
  4tier width: (WxHxD) in mm: 101.6x76x48 / in inches: 4x3x1.9
  6tier width: (WxHxD) in mm: 152.4x76x48 / in Inches: 6x3x1.9

Installation

The installation of a System 100V module works via snapping on a norm profile head rail.



When using expansion modules, you have to clip the included 1tier bus connector at the right side to the module from behind before the installation.



Operation security

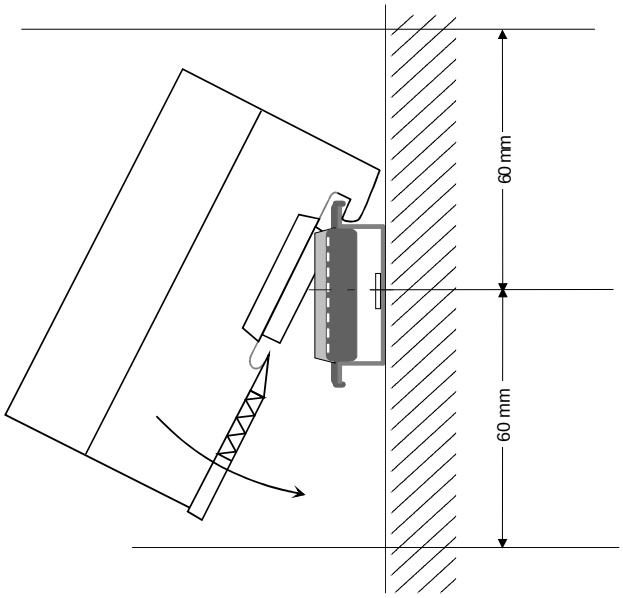
- Plug in via CageClamps, core cross-section 0.08...2.5mm^2
- Total isolation of the cables during module changes
- EMV resistance ESD/Burst acc. IEC 61000-4-2 / IEC 61000-4-4 (to level 3)
- Shock resistance acc. IEC 60068-2-6 / IEC 60068-2-27 (1G/12G)

Environmental conditions

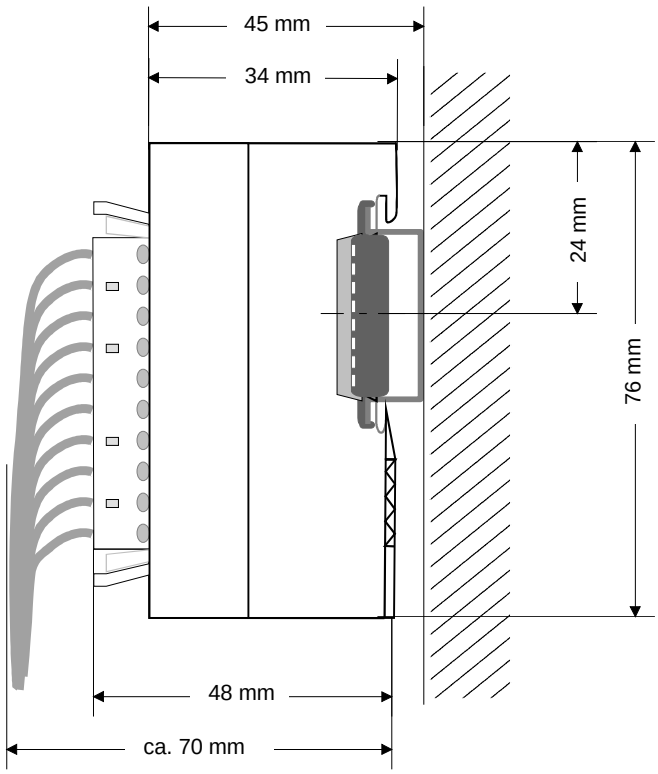
- Operating temperature: 0... + 60°C
- Storage temperature: -25... + 70°C
- Relative humidity: 5 ... 95% without condensation
- fan-less operation

Assembly dimensions

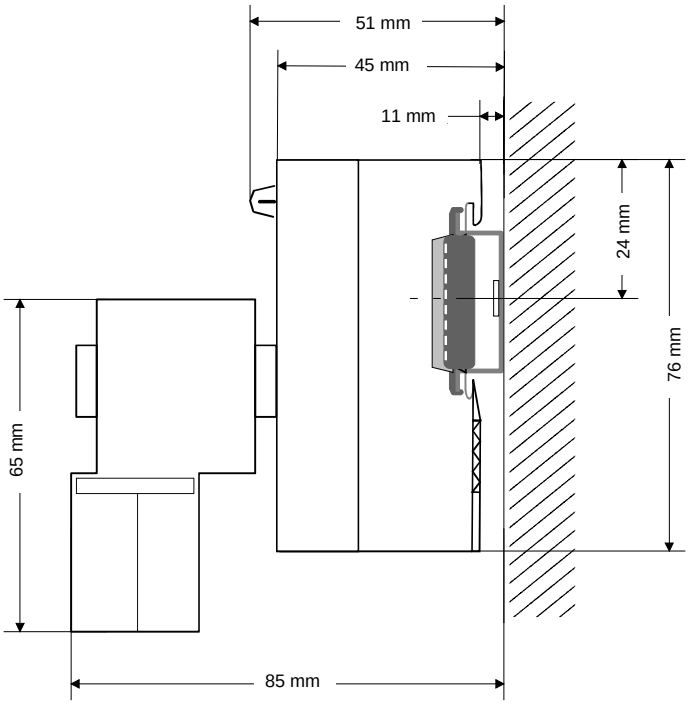
Installation dimensions



Installed and wired dimensions



CPU 11x with EasyConn from VIPA



Installation guidelines

General

The installation guidelines contain information about the interference free deployment of System 100V. There is the description of the ways, interference may occur in your control, how you can make sure the electromagnetic digestibility (EMC), and how you manage the isolation.

What means EMC?

Electromagnetic digestibility (EMC) means the ability of an electrical device, to function error free in an electromagnetic environment without being interferenced res. without interferencing the environment.

All System 100V components are developed for the deployment in industrial environments and fulfill high demands on the EMC. Nevertheless you should project an EMC planning before installing the components and take conceivable interference causes into account.

Possible interference causes

Electromagnetic interferences may interfere your control via different ways:

- Electromagnetic fields (RF coupling)
- Magnetic fields with power frequency
- I/O signal conductors
- Bus system
- Current supply
- Protected earth conductor

Depending on the spreading medium (lead bound or lead free) and the distance to the interference cause, interferences to your control occur by means of different coupling mechanisms.

One differs:

- galvanic coupling
- capacitive coupling
- inductive coupling
- radiant coupling

Basic rules for EMC

In the most times it is enough to take care of some elementary rules to guarantee the EMC. Please regard the following basic rules when installing your PLC.

- Take care of a correct area-wide grounding of the inactive metal parts when installing your components.
  - Install a central connection between the ground and the protected earth conductor system.
  - Connect all inactive metal extensive and impedance-low.
  - Please try not to use aluminum parts. Aluminum is easily oxidizing and is therefore less suitable for grounding.
- When cabling, take care of the correct line routing.
  - Organize your cabling in line groups (high voltage, current supply, signal and data lines).
  - Always lay your high voltage lines and signal res. data lines in separate channels or bundles.
  - Route the signal and data lines as near as possible beside ground areas (e.g. suspension bars, metal rails, tin cabinet).
- Proof the correct fixing of the lead isolation.
  - Data lines must be laid isolated (for details see below).
  - Analog lines must be laid isolated. When transmitting signals with small amplitudes the one sided laying of the isolation may be favorable.
  - Lay the line isolation extensively on an isolation/protected earth conductor rail directly after the cabinet entry and fix the isolation with cable clamps.
  - Make sure that the isolation/protected earth conductor rail is connected impedance-low with the cabinet.
  - Use metallic or metalized plug cases for isolated data lines.
- In special use cases you should appoint special EMC actions.
  - Wire all inductivities with erase links, which are not addressed by the System 100V modules.
  - For lightening cabinets you should avoid luminescent lamps.
- Create a homogeneous reference potential and ground all electrical operating supplies when possible.
  - Please take care for the targeted employment of the grounding actions. The grounding of the PLC is a protection and functionality activity.
  - Connect installation parts and cabinets with the System 100V in star topology with the isolation/protected earth conductor system. So you avoid ground loops.
  - If potential differences between installation parts and cabinets occur, lay sufficiently dimensioned potential compensation lines.

Isolation of conductors

Electrical, magnetically and electromagnetic interference fields are weakened by means of an isolation, one talks of absorption.

Via the isolation rail, that is connected conductive with the rack, interference currents are shunt via cable isolation to the ground. Hereby you have to make sure, that the connection to the protected earth conductor is impedance-low, because otherwise the interference currents may appear as interference cause.

When isolating cables you have to regard the following:

- If possible, use only cables with isolation tangle.
- The hiding power of the isolation should be higher than 80%.
- Normally you should always lay the isolation of cables on both sides. Only by means of the both-sided connection of the isolation you achieve high quality interference suppression in the higher frequency area.

  Only as exception you may also lay the isolation one-sided. Then you only achieve the absorption of the lower frequencies. A one-sided isolation connection may be convenient, if:
  - the conduction of a potential compensating line is not possible
  - analog signals (some mV res. µA) are transferred
  - foil isolations (static isolations) are used.
- With data lines always use metallic or metalized plugs for serial couplings. Fix the isolation of the data line at the plug rack.
- At stationary operation it is convenient to strip the insulated cable interruption free and lay it on the isolation/protected earth conductor line.
- To fix the isolation tangles use cable clamps out of metal. The clamps must clasp the isolation extensively and have well contact.
- Lay the isolation on an isolation rail directly after the entry of the cable in the cabinet. Lead the isolation further on to the module and **don't** lay it on there again!

Please regard at installation!

At potential differences between the grounding points, there may be a compensation current via the isolation connected at both sides.

Remedy: Potential compensation line

Chapter 2 Hardware description and deployment

Overview

This chapter contains every information for the deployment of the digital expansion modules of the System 100V.

Every Micro-PLC CPU has an interface for backplane bus connectors. This allows to connect System 100V expansion modules and modules of the System 200V family.

Content

Topic **Page**

System overview

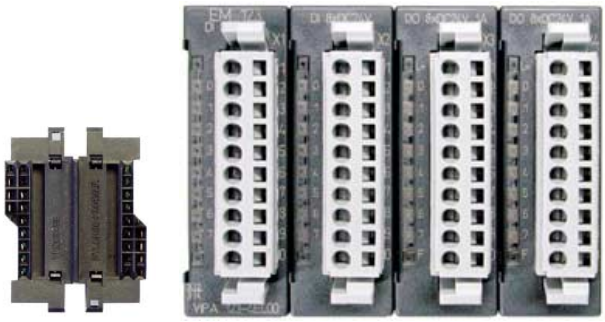
Properties

- For expansion of the I/O periphery of the CPU 11x
- Coupling of up to 4 modules (max 7 modules at VIPA 115-6BL72)
- Combination of System 100V expansion and System 200V modules is possible, the limit you may connect are max. 4 respectively 7 modules.
- Voltage supply via backplane bus

System 100V expansion modules

With the help of the expansion modules you have the possibility to enlarge the I/O areas of your CPU 114/115. Expansion modules may exclusively be coupled with System 100V CPUs.

The coupling takes place at the I/O components of the CPU by means of the included 1tier bus coupler.



Order number	Type	Description
VIPA 123-4EH01	EM123	DI 8xDC 24V / DO 8xDC 24V 0.5A
VIPA 123-4EJ01	EM123	DI 16xDC 24V / DO 8xDC 24V 0.5A
VIPA 123-4EJ11	EM123	DI 16xDC 24V / DO 8xRelay
VIPA 123-4EJ20	EM123	DI 16xAC/DC 60...230V / DO 8xRelay
VIPA 123-4EL01	EM123	DI 16xDC 24V / DO 16xDC 24V 0.5A

Note!

The distributed block periphery of the System 100V is not expandable.

Possibility to combine

The 1tier bus coupler is identical with the bus coupler of the System 200V family.

For expanding your Micro-PLC you may connect up to 4 expansion modules. You may also connect up to 4 modules of the System 200V family. A combination of expansion and System 200V modules, which results to the sum 4, is likewise possible.

At the Micro-SPS CPU with order-no. VIPA 115-6BL72 maximum 7 modules may be connected.

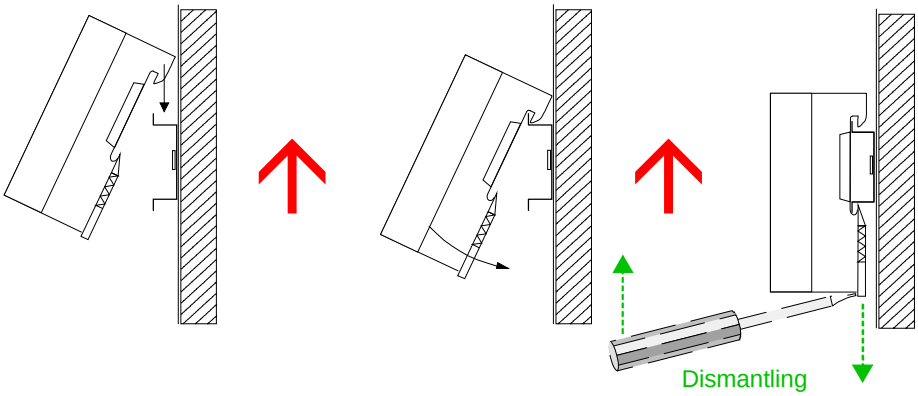
Please consider the maximum current of the expansion slot may amount to maximally 0.9A!

Assembly

General things to assembly and dismantling

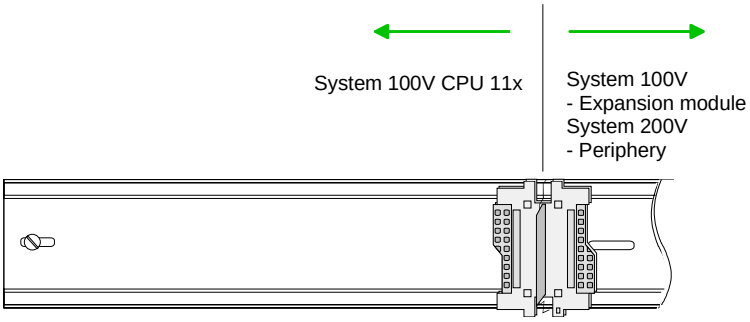
System 100V modules are clipped at a 35mm standard norm profile rail.

For dismantling, you have to pull the locker downwards with a screwdriver and lift the module up from the head rail.

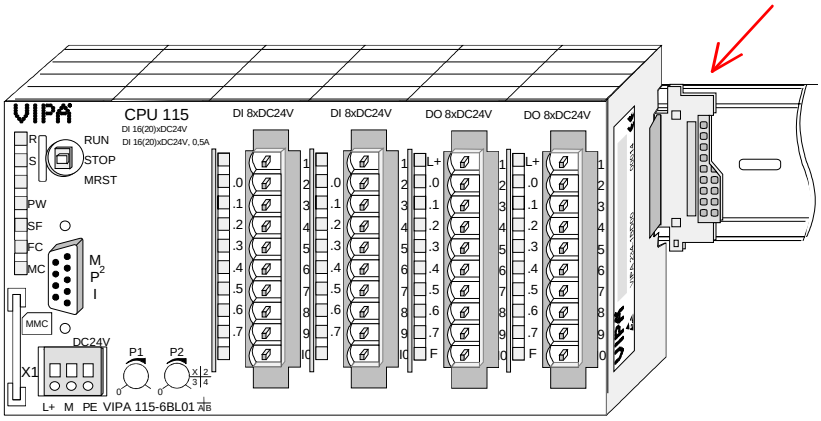


Assembly of expansion modules

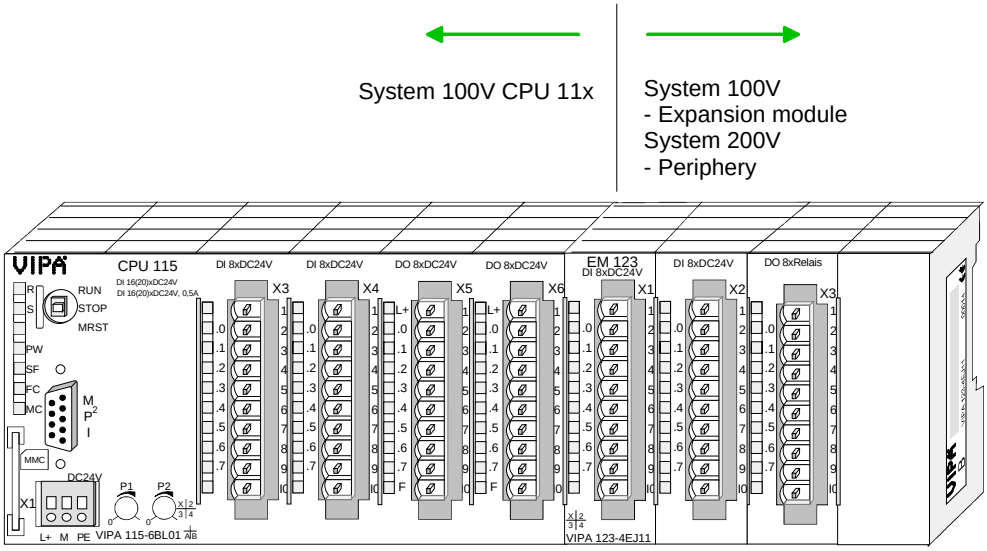
At deployment of expansion modules you have to fix the delivered bus coupler at the head rail before the assembly.



Plug in your System 100V CPU 11x until it snaps into position at the right side of the bus coupler.



Now you plug your System 100V expansion modules res. your peripheral modules of the System 200V family to the left side.

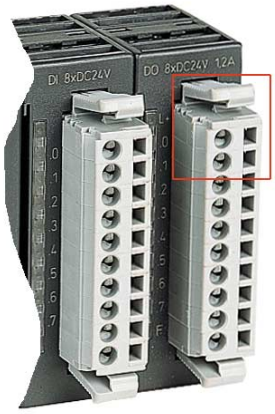


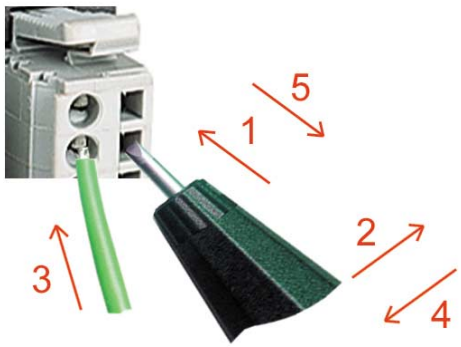
Repeat this procedure with further expansion modules by connecting them via a bus coupler to the right side.

Cabling

Take a fitting screwdriver and push the cage clamp in the rectangular opening to the back, then insert the cable into the round opening.

The cage clamp locks securely by removing the screwdriver.

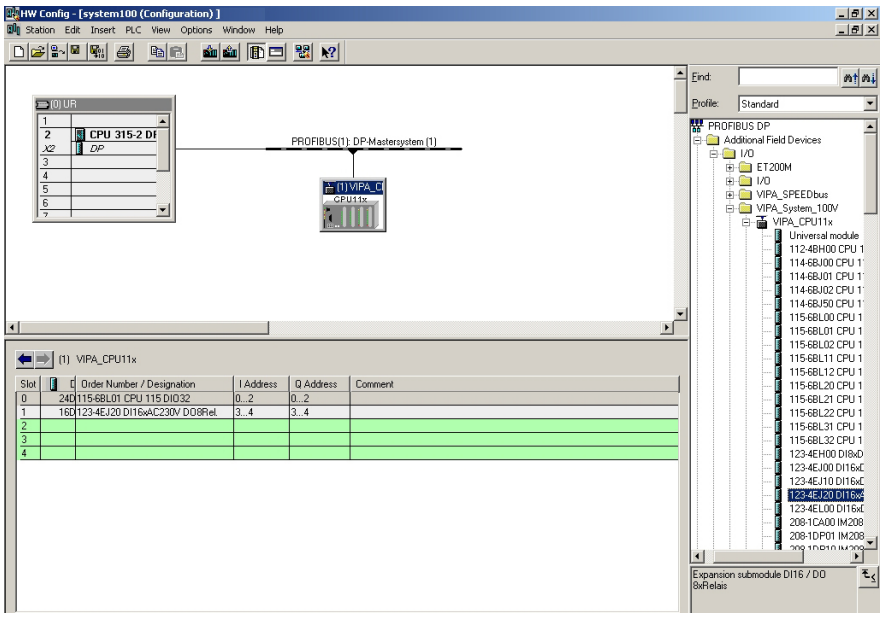




Project engineering

Approach

The project engineering of the expansion modules takes place in the hardware configurator from Siemens by means of choosing the according expansion module from the hardware catalog and dropping it on the slot below the CPU.

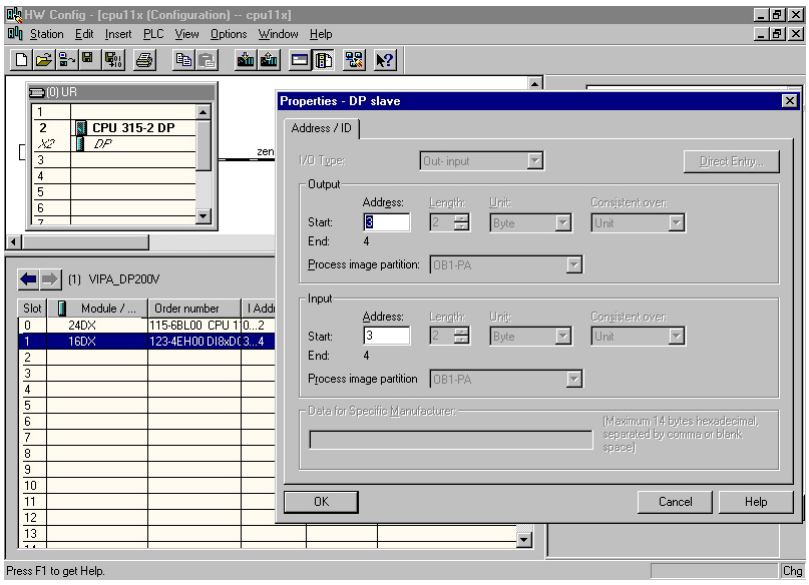


Note!

Every expansion module occupies one slot! Maximum 4 expansion modules may be connected (max 7 modules at VIPA 115-6BL72).

Addressing

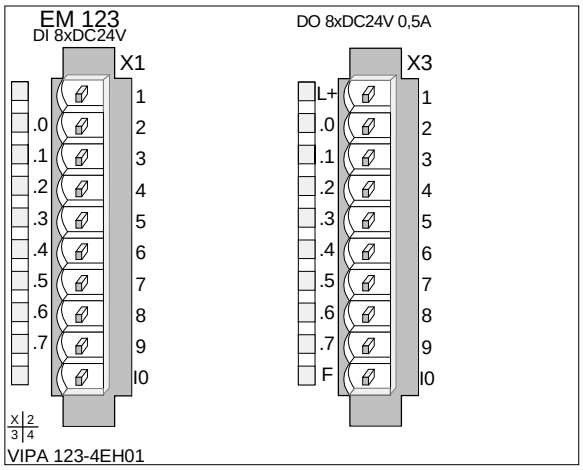
The addressing is accessible via double click on the expansion module. Here you predefine start addresses for each module.



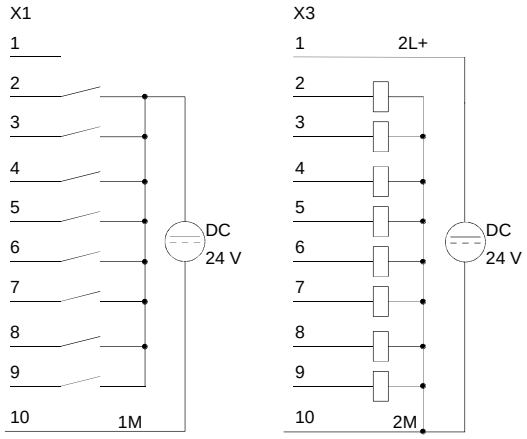
123-4EH01 - DI 8xDC 24V / DO 8xDC 24V 0.5A

Structure

Position X1	Position X2	Position X3	Position X4
DI 8xDC 24V	not used	DO 8xDC 24V 0.5A	not used

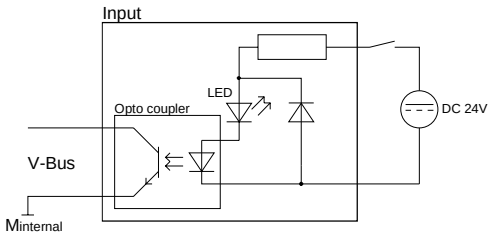


Circuit diagram

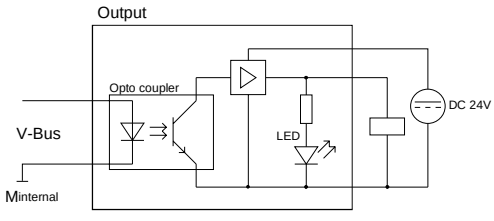


Schematic diagram

Input section



Output section



Technical data

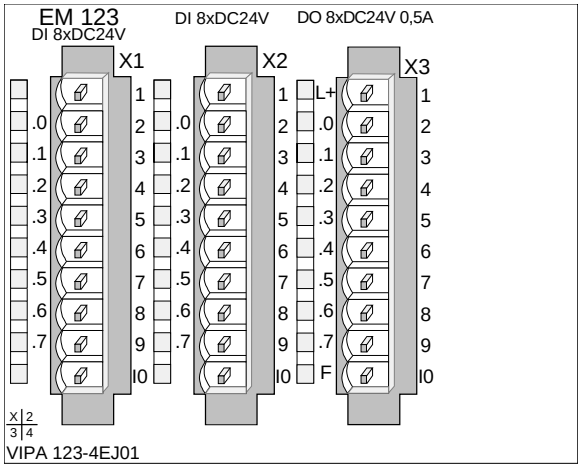
Order number	123-4EH01
Type	EM 123
Current consumption/power loss	
Current consumption from backplane bus	60 mA
Power loss	3 W
Technical data digital inputs	
Number of inputs	8
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	-
Current consumption from load voltage L+ (without load)	-
Rated value	DC 24 V
Input voltage for signal "0"	DC 0...5 V
Input voltage for signal "1"	DC 15...28.8 V
Input voltage hysteresis	-
Frequency range	-
Input resistance	-
Input current for signal "1"	7 mA
Connection of Two-Wire-BEROs possible	✓
Max. permissible BERO quiescent current	1.5 mA
Input delay of "0" to "1"	3 ms
Input delay of "1" to "0"	3 ms
Number of simultaneously utilizable inputs horizontal configuration	8
Number of simultaneously utilizable inputs vertical configuration	8
Input characteristic curve	IEC 61131-2, type 1
Initial data size	1 Byte
Technical data digital outputs	
Number of outputs	8
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 24 V
Reverse polarity protection of rated load voltage	-
Current consumption from load voltage L+ (without load)	20 mA
Output current at signal "1", rated value	0.5 A
Output delay of "0" to "1"	max. 100 µs
Output delay of "1" to "0"	max. 350 µs
Minimum load current	-
Lamp load	-
Parallel switching of outputs for redundant control of a load	-
Parallel switching of outputs for increased power	-
Actuation of digital input	-
Switching frequency with resistive load	max. 1000 Hz
Switching frequency with inductive load	max. 0.5 Hz
Switching frequency on lamp load	max. 10 Hz
Internal limitation of inductive shut-off voltage	L+ (-52 V)
Short-circuit protection of output	yes, electronic
Trigger level	1 A
Number of operating cycle of relay outputs	-
Switching capacity of contacts	-
Output data size	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no

Order number	123-4EH01
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	8
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	2
Output bytes	2
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	101.6 x 76 x 48 mm
Weight	222 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

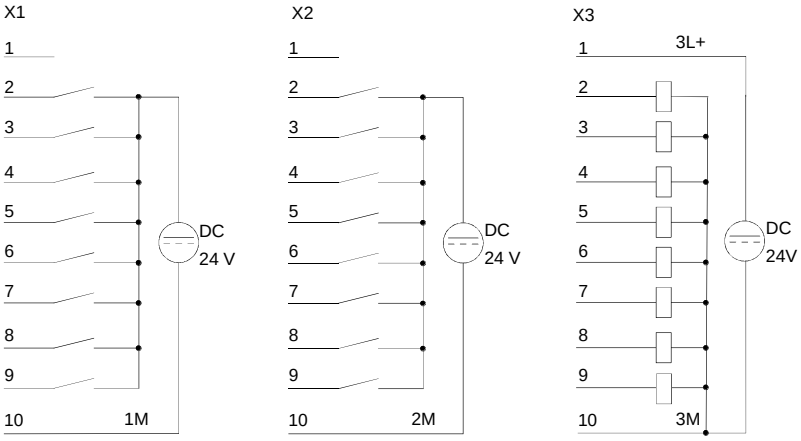
123-4EJ01 - DI 16xDC 24V / DO 8xDC 24V 0.5A

Structure

Position X1	Position X2	Position X3	Position X4
DI 8xDC 24V	DI 8xDC 24V	DO 8xDC 24V 0.5A	not used

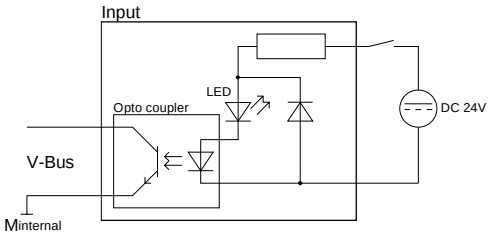


Circuit diagram

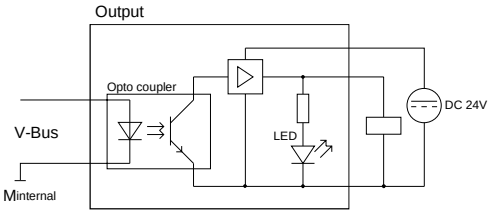


Schematic diagram

Input section



Output section



Technical data

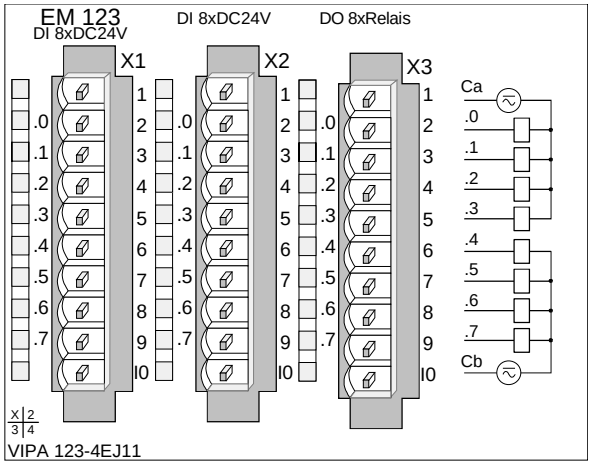
Order number	123-4EJ01
Type	EM 123
Current consumption/power loss	
Current consumption from backplane bus	70 mA
Power loss	4.5 W
Technical data digital inputs	
Number of inputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	-
Current consumption from load voltage L+ (without load)	-
Rated value	DC 24 V
Input voltage for signal "0"	DC 0...5 V
Input voltage for signal "1"	DC 15...28.8 V
Input voltage hysteresis	-
Frequency range	-
Input resistance	-
Input current for signal "1"	7 mA
Connection of Two-Wire-BEROs possible	✓
Max. permissible BERO quiescent current	1.5 mA
Input delay of "0" to "1"	3 ms
Input delay of "1" to "0"	3 ms
Number of simultaneously utilizable inputs horizontal configuration	16
Number of simultaneously utilizable inputs vertical configuration	16
Input characteristic curve	IEC 61131-2, type 1
Initial data size	2 Byte
Technical data digital outputs	
Number of outputs	8
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 24 V
Reverse polarity protection of rated load voltage	-
Current consumption from load voltage L+ (without load)	20 mA
Output current at signal "1", rated value	0.5 A
Output delay of "0" to "1"	max. 100 µs
Output delay of "1" to "0"	max. 350 µs
Minimum load current	-
Lamp load	-
Parallel switching of outputs for redundant control of a load	-
Parallel switching of outputs for increased power	-
Actuation of digital input	-
Switching frequency with resistive load	max. 1000 Hz
Switching frequency with inductive load	max. 0.5 Hz
Switching frequency on lamp load	max. 10 Hz
Internal limitation of inductive shut-off voltage	L+ (-52 V)
Short-circuit protection of output	yes, electronic
Trigger level	1 A
Number of operating cycle of relay outputs	-
Switching capacity of contacts	-
Output data size	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no

Order number	123-4EJ01
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	8
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	2
Output bytes	2
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	101.6 x 76 x 48 mm
Weight	226 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

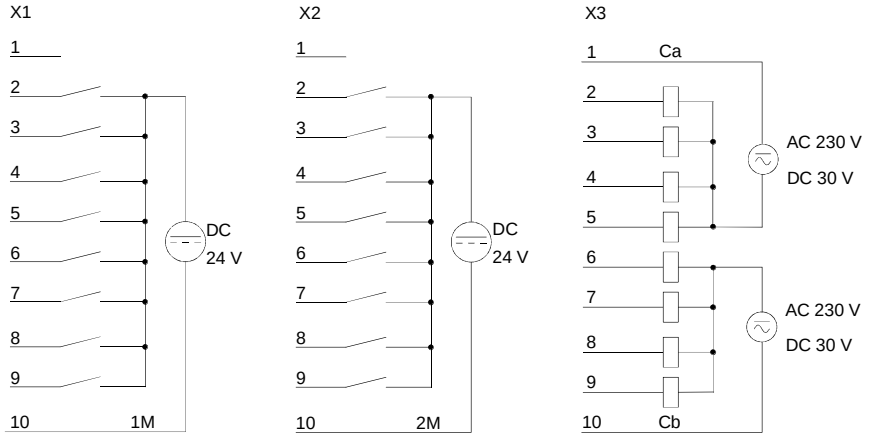
123-4EJ11 - DI 16xDC 24V / DO 8xRelay

Structure

Position X1	Position X2	Position X3	Position X4
DI 8xDC 24V	DI 8xDC 24V	DO 8xRelay	not used

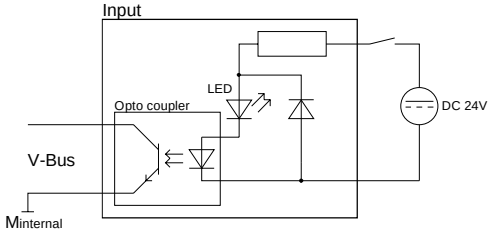


Circuit diagram

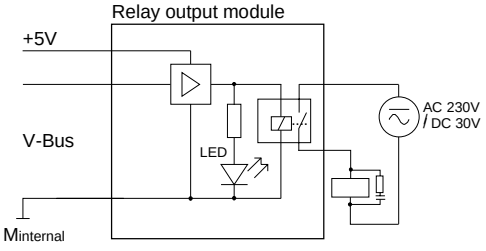


Schematic diagram

Input section



Relay output section



Note: When using inductive load please take an suitable protector (i.e. RC combination).

Technical data

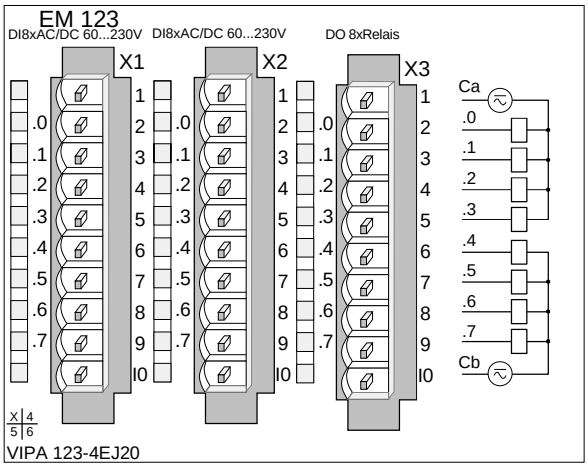
Order number	123-4EJ11
Type	EM 123
Current consumption/power loss	
Current consumption from backplane bus	300 mA
Power loss	4.5 W
Technical data digital inputs	
Number of inputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	-
Current consumption from load voltage L+ (without load)	-
Rated value	DC 24 V
Input voltage for signal "0"	DC 0...5 V
Input voltage for signal "1"	DC 15...28.8 V
Input voltage hysteresis	-
Frequency range	-
Input resistance	-
Input current for signal "1"	7 mA
Connection of Two-Wire-BEROs possible	✓
Max. permissible BERO quiescent current	1.5 mA
Input delay of "0" to "1"	3 ms
Input delay of "1" to "0"	3 ms
Number of simultaneously utilizable inputs horizontal configuration	16
Number of simultaneously utilizable inputs vertical configuration	16
Input characteristic curve	IEC 61131-2, type 1
Initial data size	2 Byte
Technical data digital outputs	
Number of outputs	8
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 30 V/ AC 230 V
Reverse polarity protection of rated load voltage	-
Current consumption from load voltage L+ (without load)	-
Output current at signal "1", rated value	5 A
Output delay of "0" to "1"	10 ms
Output delay of "1" to "0"	5 ms
Minimum load current	-
Lamp load	-
Parallel switching of outputs for redundant control of a load	not possible
Parallel switching of outputs for increased power	not possible
Actuation of digital input	-
Switching frequency with resistive load	max. 10 Hz
Switching frequency with inductive load	-
Switching frequency on lamp load	-
Internal limitation of inductive shut-off voltage	-
Short-circuit protection of output	-
Trigger level	-
Number of operating cycle of relay outputs	-
Switching capacity of contacts	-
Output data size	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no

Order number	123-4EJ11
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	8
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	2
Output bytes	2
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	101.6 x 76 x 48 mm
Weight	250 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

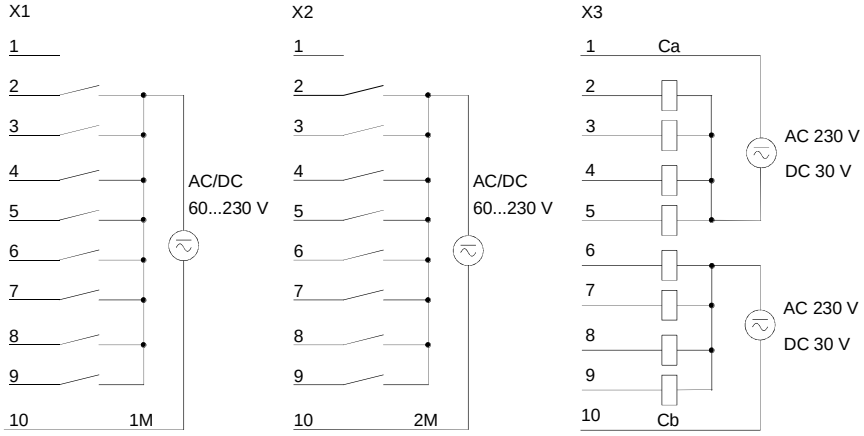
123-4EJ20 - DI 16xAC/DC 60...230V / DO 8xRelay

Structure

Position X1	Position X2	Position X3	Position X4
DI 8xAC/DC 60...230V	DI 8xAC/DC 60...230V	DO 8xRelay	not used

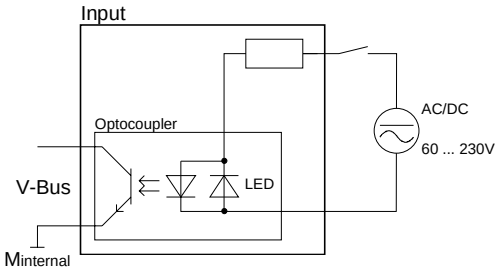


Circuit diagram

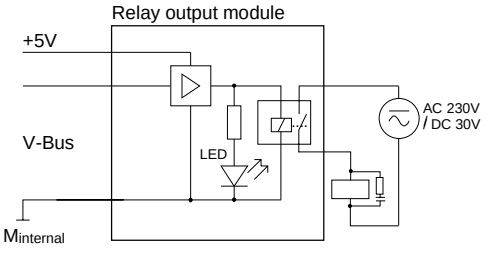


Schematic diagram

Input section



Relay output section



Note: When using inductive load please take an suitable protector (i.e. RC combination).

Technical data

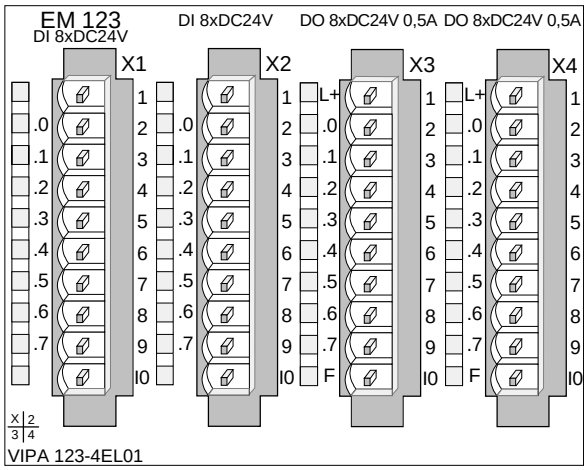
Order number	123-4EJ20
Type	EM 123
Current consumption/power loss	
Current consumption from backplane bus	320 mA
Power loss	4.6 W
Technical data digital inputs	
Number of inputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	-
Current consumption from load voltage L+ (without load)	-
Rated value	AC/DC 60...230 V
Input voltage for signal "0"	AC/DC 0...35 V
Input voltage for signal "1"	AC/DC 60...230 V
Input voltage hysteresis	-
Frequency range	-
Input resistance	-
Input current for signal "1"	7 mA
Connection of Two-Wire-BEROs possible	-
Max. permissible BERO quiescent current	-
Input delay of "0" to "1"	25 ms
Input delay of "1" to "0"	25 ms
Number of simultaneously utilizable inputs horizontal configuration	16
Number of simultaneously utilizable inputs vertical configuration	16
Input characteristic curve	-
Initial data size	2 Byte
Technical data digital outputs	
Number of outputs	8
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 30 V/ AC 230 V
Reverse polarity protection of rated load voltage	-
Current consumption from load voltage L+ (without load)	-
Output current at signal "1", rated value	5 A
Output delay of "0" to "1"	6 ms
Output delay of "1" to "0"	3 ms
Minimum load current	-
Lamp load	-
Parallel switching of outputs for redundant control of a load	not possible
Parallel switching of outputs for increased power	not possible
Actuation of digital input	-
Switching frequency with resistive load	max. 10 Hz
Switching frequency with inductive load	-
Switching frequency on lamp load	-
Internal limitation of inductive shut-off voltage	-
Short-circuit protection of output	-
Trigger level	-
Number of operating cycle of relay outputs	-
Switching capacity of contacts	-
Output data size	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no

Order number	123-4EJ20
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	8
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	2
Output bytes	2
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	101.6 x 76 x 48 mm
Weight	244 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

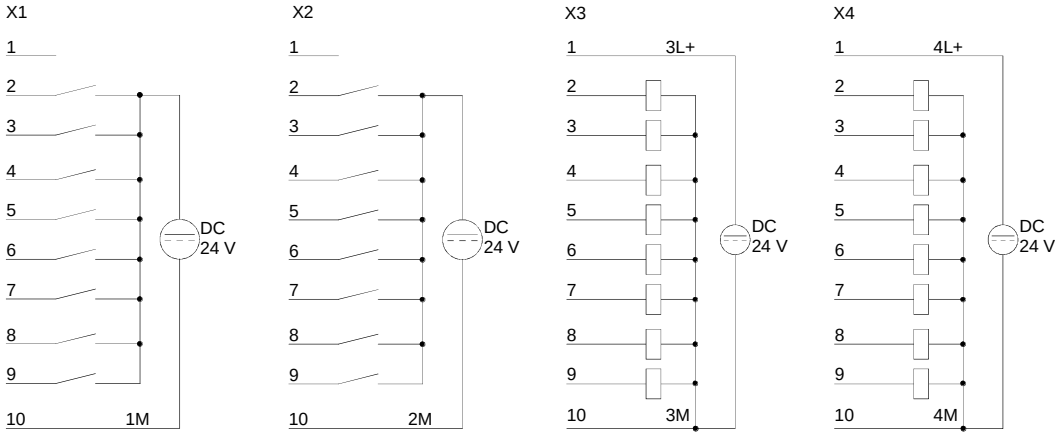
123-4EL01 - DI 16xDC 24V / DO 16xDC 24V 0.5A

Structure

Position X1	Position X2	Position X3	Position X4
DI 8xDC 24V	DI 8xDC 24V	DO 8xDC 24V 0.5A	DO 8xDC 24V 0.5A

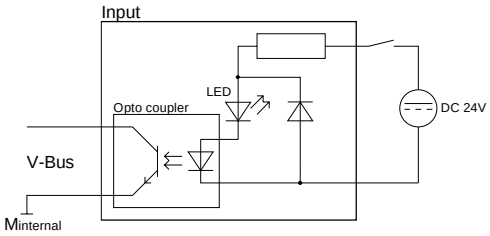


Circuit diagram

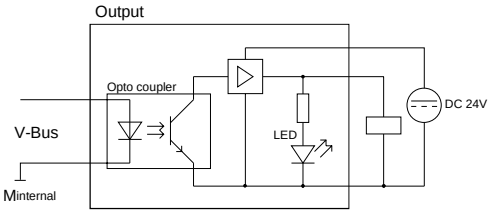


Schematic diagram

Input section



Output section



Technical data

Order number	123-4EL01
Type	EM 123
Current consumption/power loss	
Current consumption from backplane bus	110 mA
Power loss	6 W
Technical data digital inputs	
Number of inputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	-
Current consumption from load voltage L+ (without load)	-
Rated value	DC 24 V
Input voltage for signal "0"	DC 0...5 V
Input voltage for signal "1"	DC 15...28.8 V
Input voltage hysteresis	-
Frequency range	-
Input resistance	-
Input current for signal "1"	7 mA
Connection of Two-Wire-BEROs possible	✓
Max. permissible BERO quiescent current	1.5 mA
Input delay of "0" to "1"	3 ms
Input delay of "1" to "0"	3 ms
Number of simultaneously utilizable inputs horizontal configuration	16
Number of simultaneously utilizable inputs vertical configuration	16
Input characteristic curve	IEC 61131-2, type 1
Initial data size	2 Byte
Technical data digital outputs	
Number of outputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 24 V
Reverse polarity protection of rated load voltage	-
Current consumption from load voltage L+ (without load)	30 mA
Output current at signal "1", rated value	0.5 A
Output delay of "0" to "1"	max. 100 µs
Output delay of "1" to "0"	max. 350 µs
Minimum load current	-
Lamp load	5 W
Parallel switching of outputs for redundant control of a load	not possible
Parallel switching of outputs for increased power	not possible
Actuation of digital input	-
Switching frequency with resistive load	max. 1000 Hz
Switching frequency with inductive load	max. 0.5 Hz
Switching frequency on lamp load	max. 10 Hz
Internal limitation of inductive shut-off voltage	L+ (-52 V)
Short-circuit protection of output	yes, electronic
Trigger level	1 A
Number of operating cycle of relay outputs	-
Switching capacity of contacts	-
Output data size	2 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no

Order number	123-4EL01
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	8
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	2
Output bytes	2
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	101.6 x 76 x 48 mm
Weight	271 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes