YASKAWA

VIPA System 200V

SM-DIO | Manual

HB97E_SM-DIO | Rev. 17/19

VIPA CONTROLS

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Note

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Hereby, VIPA GmbH declares that the products and systems are in compliance with the essential requirements and other relevant provisions.

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

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Contents

About this manual

This manual describes the digital signal modules (SM) of the System 200V from VIPA. In addition to the product summary it contains detailed descriptions of the different modules. You are provided with information on the connection and the utilization of the System 200V SM modules.

Overview

Chapter 1: Assembly and installation guidelines

The focus of this chapter is on the introduction of the VIPA System 200V. Here you will find the information required to assemble and wire a controller system consisting of System 200V components.

Besides the dimensions the general technical data of System 200V will be found.

Chapter 2: Digital input modules

This chapter contains a description of the construction and the operating of the VIPA digital input modules.

Chapter 3: Digital output modules

This chapter contains a description of the construction and the operation of the VIPA digital output modules.

Chapter 4: Digital input/output modules

This chapter contains a description of the construction and the operation of the VIPA digital input/output modules.

Objective and contents

This manual describes the digital signal modules (SM) of the System 200V. It contains a description of the construction, project implementation and the technical data.

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 200V is constructed and produced for:

- all VIPA System 200V components
- 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:

- Modification to the process control system should only be carried out when the system has been disconnected from power!
- Installation and modifications 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 and Assembly

Overview

The focus of this chapter is on the introduction of the VIPA System 200V. Here you will find the information required to assemble and wire a controller system consisting of System 200V components.

Besides the dimensions the general technical data of System 200V will be found.

Contents

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 can 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 must 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.

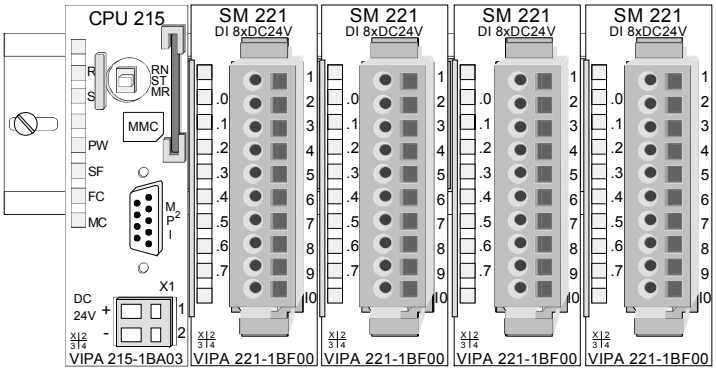
Attention!

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

System conception

Overview

The System 200V is a modular automation system for assembly on a 35mm profile rail. By means of the peripheral modules with 4, 8 and 16 channels this system may properly be adapted matching to your automation tasks.

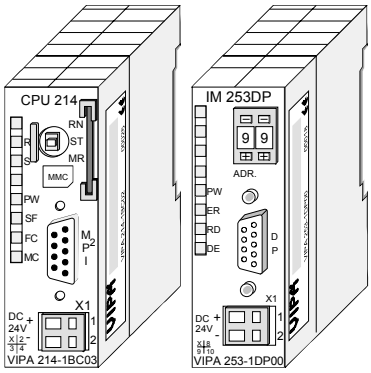


Components

The System 200V consists of the following components:

- *Head modules* like CPU and bus coupler
- *Periphery modules* like I/O, function und communication modules
- *Power supplies*
- *Extension modules*

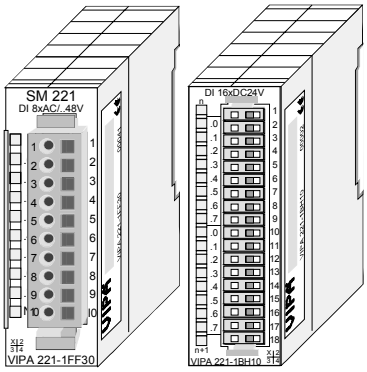
Head modules



With a head module CPU respectively bus interface and DC 24V power supply are integrated to one casing.

Via the integrated power supply the CPU respectively bus interface is power supplied as well as the electronic of the connected periphery modules.

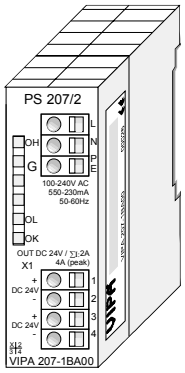
Periphery modules



The modules are direct installed on a 35mm profile rail and connected to the head module by a bus connector, which was mounted on the profile rail before.

Most of the periphery modules are equipped with a 10pin respectively 18pin connector. This connector provides the electrical interface for the signaling and supplies lines of the modules.

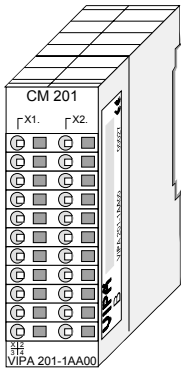
Power supplies



With the System 200V the DC 24V power supply can take place either externally or via a particularly for this developed power supply.

The power supply may be mounted on the profile rail together with the System 200V modules. It has no connector to the backplane bus.

Expansion modules



The expansion modules are complementary modules providing 2- or 3wire connection facilities.

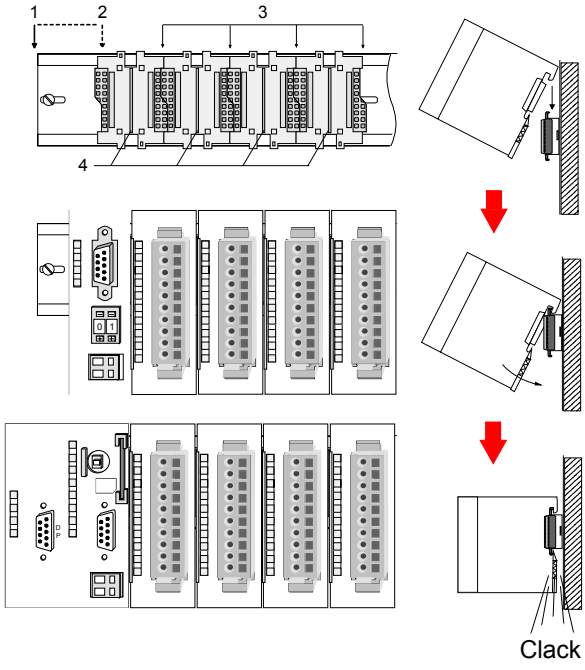
The modules are not connected to the backplane bus.

Structure/ dimensions

- Profile rail 35mm
- Dimensions of the basic enclosure:
  1tier width: (HxWxD) in mm: 76x25.4x74 in inches: 3x1x3
  2tier width: (HxWxD) in mm: 76x50.8x74 in inches: 3x2x3

Installation

Please note that you can only install head modules, like the CPU, the PC and couplers at slot 1 or 1 and 2 (for double width modules).



[1]	Head module (double width)
[2]	Head module (single width)
[3]	Periphery module
[4]	Guide rails

Note

Information about the max. number of pluggable modules and the max. current at the backplane bus can be found in the "Technical Data" of the according head module.

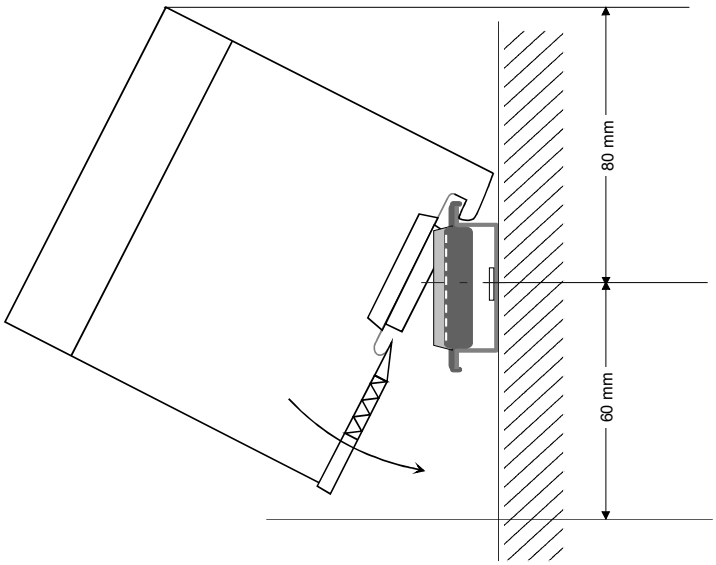
Please install modules with a high current consumption directly beside the head module.

Dimensions

Dimensions Basic enclosure

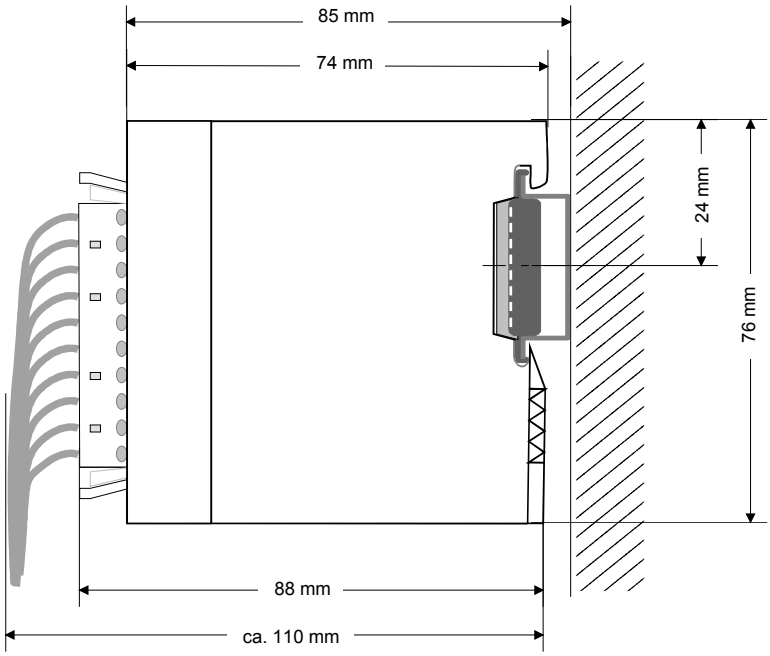
1tier width (HxWxD) in mm: 76 x 25.4 x 74
2tier width (HxWxD) in mm: 76 x 50.8 x 74

Installation dimensions

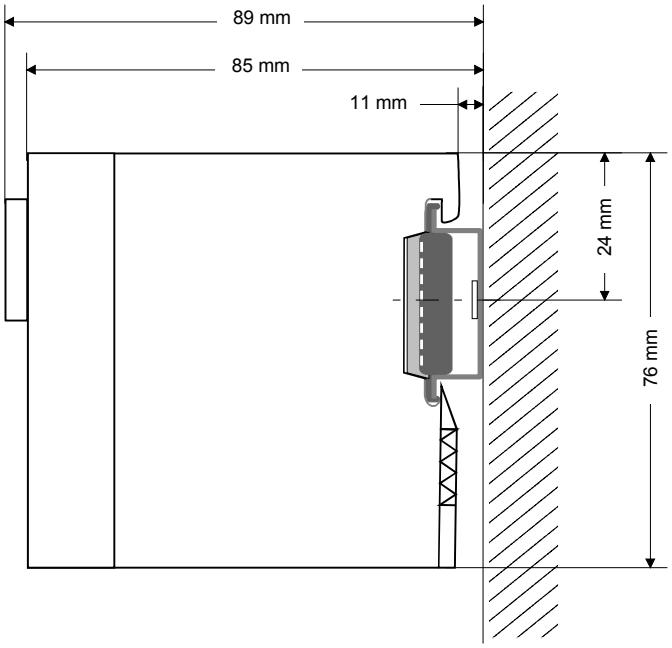


Installed and wired dimensions

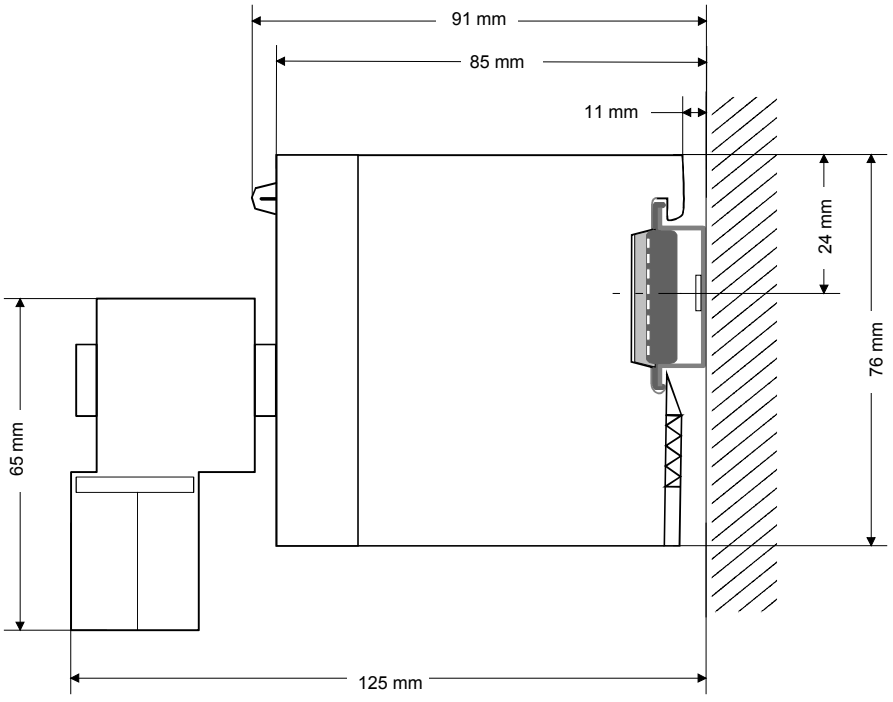
In- / Output modules



Function modules/
Extension modules



CPUs (here with
EasyConn from
VIPA)



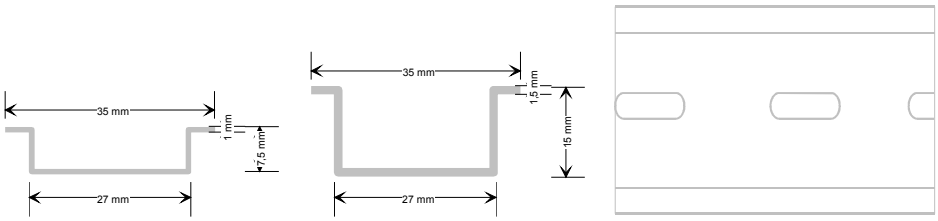
Installation

General

The modules are each installed on a 35mm profile rail and connected via a bus connector. Before installing the module the bus connector is to be placed on the profile rail before.

Profile rail

For installation the following 35mm profile rails may be used:

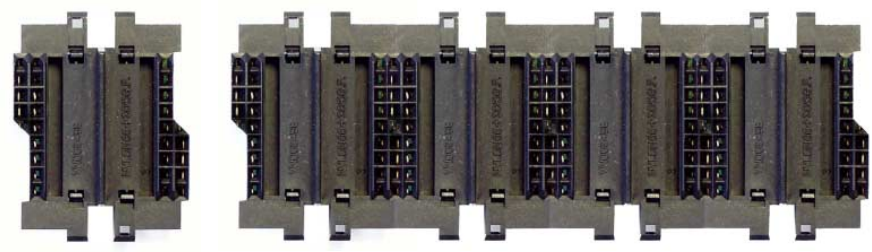


Order number	Label	Description
290-1AF00	35mm profile rail	Length 2000mm, height 15mm
290-1AF30	35mm profile rail	Length 530mm, height 15mm

Bus connector

System 200V modules communicate via a backplane bus connector. The backplane bus connector is isolated and available from VIPA in of 1-, 2-, 4- or 8tier width.

The following figure shows a 1tier connector and a 4tier connector bus:



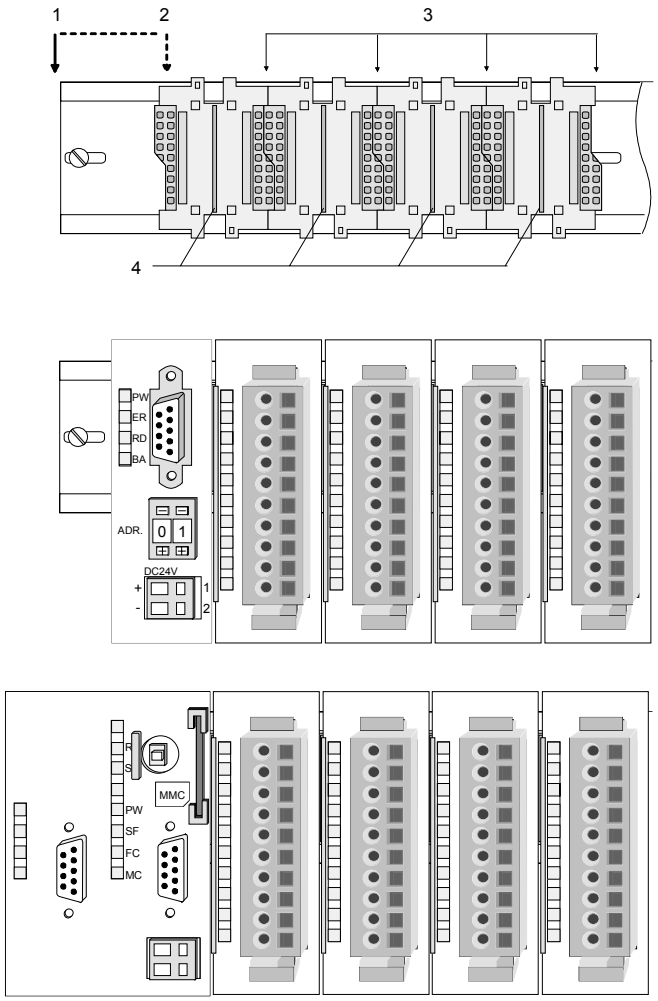
The bus connector is to be placed on the profile rail until it clips in its place and the bus connections look out from the profile rail.

Order number	Label	Description
290-0AA10	Bus connector	1tier
290-0AA20	Bus connector	2tier
290-0AA40	Bus connector	4tier
290-0AA80	Bus connector	8tier

Installation on a profile rail

The following figure shows the installation of a 4tier width bus connector in a profile rail and the slots for the modules.

The different slots are defined by guide rails.



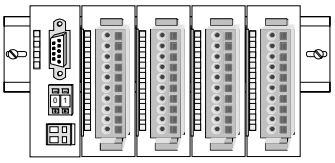
[1] Head module (double width)
[2] Head module (single width)
[3] Peripheral module
[4] Guide rails

Assembly regarding the current consumption

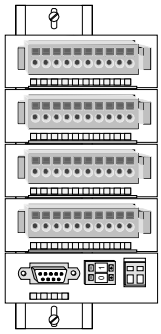
- Use bus connectors as long as possible.
- Sort the modules with a high current consumption right beside the head module. In the service area of www.vipa.com a list of current consumption of every System 200V module can be found.

Assembly possibilities

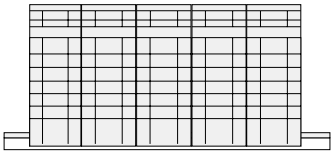
hoizontal assembly



vertical assembly



lying assembly

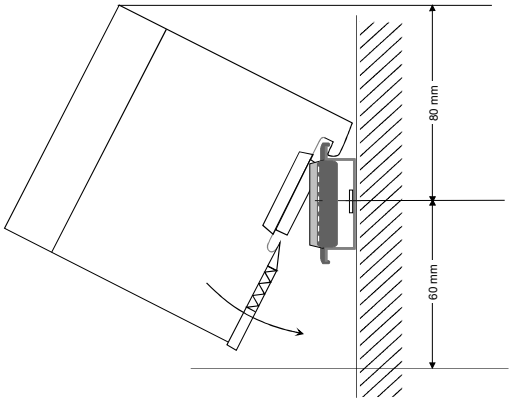


Please regard the allowed environmental temperatures:

- horizontal assembly: from 0 to 60°C
- vertical assembly: from 0 to 40°C
- lying assembly: from 0 to 40°C

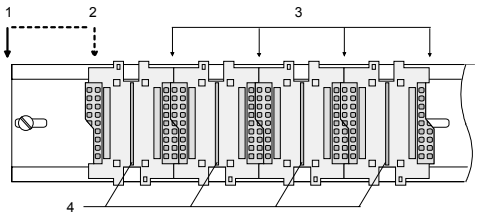
The horizontal assembly always starts at the left side with a head module, then you install the peripheral modules beside to the right.

You may install up to 32 peripheral modules.



Please follow these rules during the assembly!

- Turn off the power supply before you install or remove any modules!
- Make sure that a clearance of at least 60mm exists above and 80mm below the middle of the profile rail.



- Every row must be completed from left to right and it has to start with a head module.

  [1] Head module (double width)
  [2] Head module (single width)
  [3] Peripheral modules
  [4] Guide rails

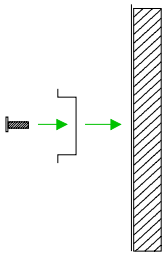
- Modules are to be installed side by side. Gaps are not permitted between the modules since this would interrupt the backplane bus.
- A module is only installed properly and connected electrically when it has clicked into place with an audible click.
- Slots after the last module may remain unoccupied.

Note!

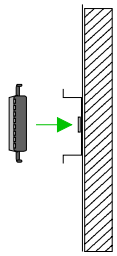
Information about the max. number of pluggable modules and the max. current at the backplane bus can be found in the "Technical Data" of the according head module.

Please install modules with a high current consumption directly beside the head module.

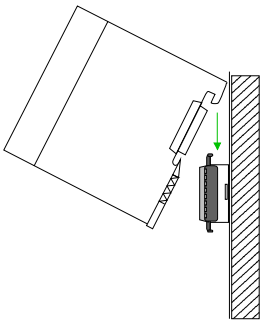
Assembly procedure



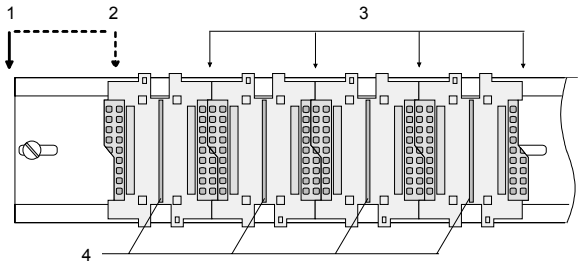
- Install the profile rail. Make sure that a clearance of at least 60mm exists above and 80mm below the middle of the profile rail.



- Press the bus connector into the profile rail until it clips securely into place and the bus-connectors look out from the profile rail. This provides the basis for the installation of your modules.



- Start at the outer left location with the installation of your head module and install the peripheral modules to the right of this.

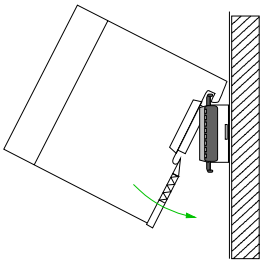


[1] Head module (double width)

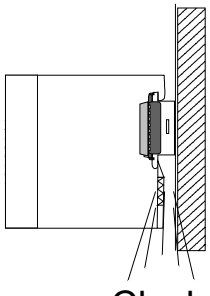
[2] Head module (single width)

[3] Peripheral module

[4] Guide rails



- Insert the module that you are installing into the profile rail at an angle of 45 degrees from the top and rotate the module into place until it clicks into the profile rail with an audible click. The proper connection to the backplane bus can only be guaranteed when the module has properly clicked into place.

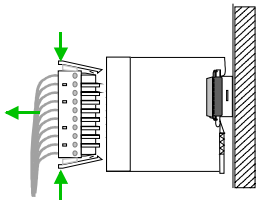


Attention!

Power must be turned off before modules are installed or removed!

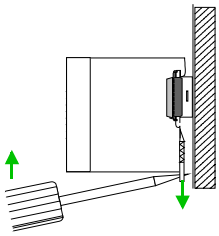
Demounting and module exchange

1



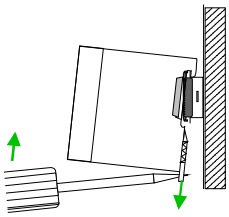
- Remove if exists the wiring to the module, by pressing both locking lever on the connector and pulling the connector.

2



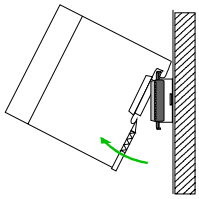
- The casing of the module has a spring loaded clip at the bottom by which the module can be removed.

3



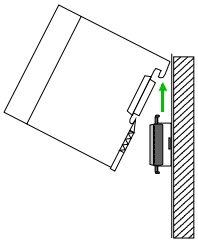
- The clip is unlocked by pressing the screwdriver in an upward direction.

4



- Withdraw the module with a slight rotation to the top.

5



Attention!

Power must be turned off before modules are installed or removed!

Please regard that the backplane bus is interrupted at the point where the module was removed!

Wiring

Overview

Most peripheral modules are equipped with a 10pole or a 18pole connector. This connector provides the electrical interface for the signaling and supply lines of the modules.

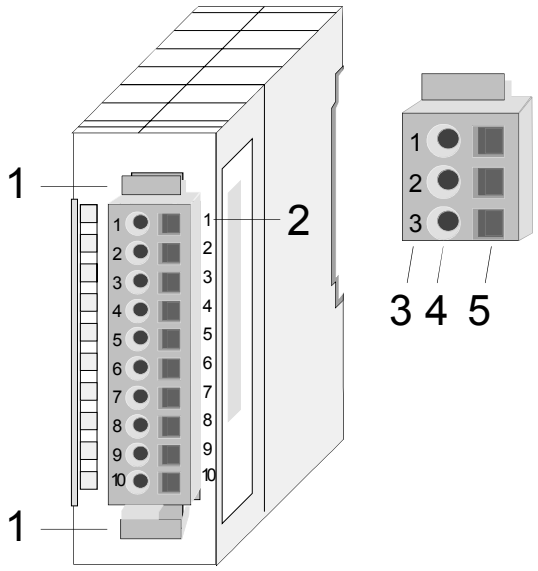
The modules carry spring-clip connectors for interconnections and wiring.

The spring-clip connector technology simplifies the wiring requirements for signaling and power cables.

In contrast to screw terminal connections, spring-clip wiring is vibration proof. The assignment of the terminals is contained in the description of the respective modules.

You may connect conductors with a diameter from 0.08mm^2 up to 2.5mm^2 (max. 1.5mm^2 for 18pole connectors).

The following figure shows a module with a 10pole connector.



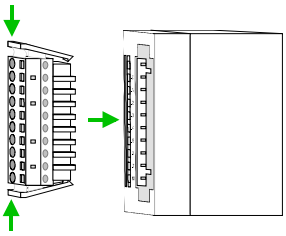
[1] Locking lever
[2] Pin no. at the module
[3] Pin no. at the connector
[4] Wiring port
[5] Opening for screwdriver

Note!

The spring-clip is destroyed if you push the screwdriver into the wire port!

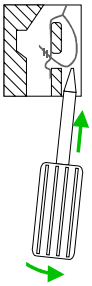
Make sure that you only insert the screwdriver into the square hole of the connector!

Wiring procedure

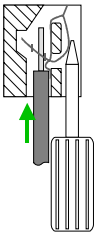


- Install the connector on the module until it locks with an audible click. For this purpose you press the two clips together as shown.
  The connector is now in a permanent position and can easily be wired.

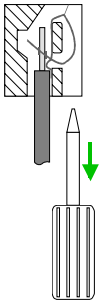
The following section shows the wiring procedure from top view.



- Insert a screwdriver at an angel into the square opening as shown.
- Press and hold the screwdriver in the opposite direction to open the contact spring.



- Insert the stripped end of the wire into the round opening. You can use wires with a diameter of 0.08mm^2 to 2.5mm^2 (1.5mm^2 for 18pole connectors).



- By removing the screwdriver the wire is connected safely with the plug connector via a spring.

Note!

Wire the power supply connections first followed by the signal cables (inputs and outputs).

Installation guidelines

General

The installation guidelines contain information about the interference free deployment of System 200V systems. 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 200V components are developed for the deployment in hard 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:

- Fields
- 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.
  - 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.
  - Please consider luminescent lamps can influence signal lines.
- 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 200V 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. Do not lay the isolation on the PIN 1 of the plug bar!
- 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 System 200V 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.

General data

Structure/ dimensions

- Profile rail 35mm
- Peripheral modules with recessed labelling
- Dimensions of the basic enclosure:
  1tier width: (HxWxD) in mm: 76x25.4x74 in inches: 3x1x3
  2tier width: (HxWxD) in mm: 76x50.8x74 in inches: 3x2x3

Reliability

- Wiring by means of spring pressure connections (CageClamps) at the front-facing connector, core cross-section 0.08 ... 2.5mm^2 or 1.5mm^2 (18pole plug)
- Complete isolation of the wiring when modules are exchanged
- Every module is isolated from the backplane bus

General data

Conformity and approval		
Conformity		
CE	2014/35/EU	Low-voltage directive
	2014/30/EU	EMC directive
Approval		
UL	-	See Technical data
others		
RoHS	2011/65/EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment

Protection of persons and device protection		
Type of protection	-	IP20
Electrical isolation		
to the field bus	-	electrically isolated
to the process level	-	electrically isolated
Insulation resistance	EN 61131-2	-
Insulation voltage to reference earth		
Inputs / outputs	-	AC / DC 50V, test voltage AC 500V
Protective measures	-	against short circuit

Environmental conditions to EN 61131-2		
Climatic		
Storage / transport	EN 60068-2-14	-25…+70°C
Operation		
Horizontal installation	EN 61131-2	0…+60°C
Vertical installation	EN 61131-2	0…+60°C
Air humidity	EN 60068-2-30	RH1 (without condensation, rel. humidity 10…95%)
Pollution	EN 61131-2	Degree of pollution 2
Mechanical		
Oscillation	EN 60068-2-6	1g, 9Hz ... 150Hz
Shock	EN 60068-2-27	15g, 11ms

Mounting conditions		
Mounting place	-	In the control cabinet
Mounting position	-	Horizontal and vertical

EMC	**Standard**		**Comment**
Emitted interference	EN 61000-6-4		Class A (Industrial area)
Noise immunity zone B	EN 61000-6-2		Industrial area
		EN 61000-4-2	ESD 8kV at air discharge (degree of severity 3), 4kV at contact discharge (degree of severity 2)
		EN 61000-4-3	HF field immunity (casing) 80MHz … 1000MHz, 10V/m, 80% AM (1kHz) 1.4GHz ... 2.0GHz, 3V/m, 80% AM (1kHz) 2GHz ... 2.7GHz, 1V/m, 80% AM (1kHz)
		EN 61000-4-6	HF conducted 150kHz … 80MHz, 10V, 80% AM (1kHz)
		EN 61000-4-4	Burst, degree of severity 3
		EN 61000-4-5	Surge, degree of severity 3 *)

*) Due to the high-energetic single pulses with Surge an appropriate external protective circuit with lightning protection elements like conductors for lightning and overvoltage is necessary.

Chapter 2 Digital input modules

Overview

This chapter contains a description of the construction and the operating of the VIPA digital input modules.

Content

221-1BF00 - DI 8xDC 24V

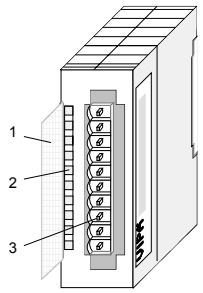
Order data DI 8xDC 24V VIPA 221-1BF00

Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system. The module has 8 channels, each one with a light emitting diode to indicate the status of the channel.

Properties

- 8 floating inputs, isolated from the backplane bus
- DC 24V nominal input voltage
- Suitable for standard switches and proximity switches
- Status indicator for each channel by means of an LED

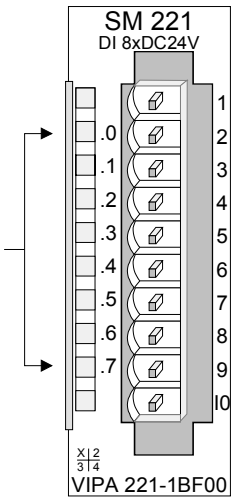
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Connector edge

Status indicator pin assignment

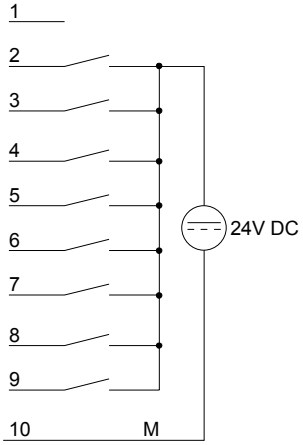
LED	Description
.0... .7	LEDs (green) I+0.0 to I+0.7 A "1" signal level is recognized as of app. 15V and the respective LED is turned on



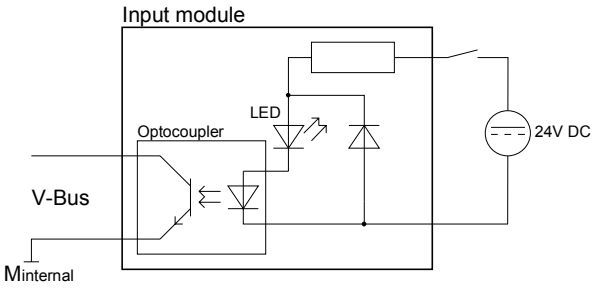
Pin	Assignment
1	not connected
2	Input I+0.0
3	Input I+0.1
4	Input I+0.2
5	Input I+0.3
6	Input I+0.4
7	Input I+0.5
8	Input I+0.6
9	Input I+0.7
10	Ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	**221-1BF00**
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	25 mA
Power loss	2 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 20.4...28.8 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
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none

Order no.	221-1BF00
Isolation	
Between channels	-
Between channels of groups to	8
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	1
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	60 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1BF10 - DI 8xDC 24V 0.2ms

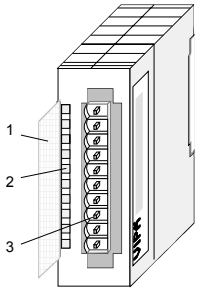
Order data DI 8xDC 24V 0.2ms VIPA 221-1BF10

Description The digital input module accepts binary control signals from the process level and provides an electrically isolated interface to the central bus system. The module has 8 channels, each one with a light emitting diode to indicate the status of the channel.

Properties

- 8 floating inputs, isolated from the backplane bus
- Delay time 0.2ms
- DC 24V nominal input voltage
- Suitable for standard switches and proximity switches
- Status indicator for each channel by means of an LED

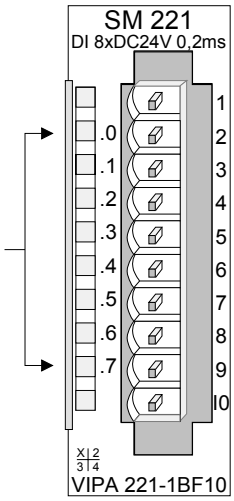
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

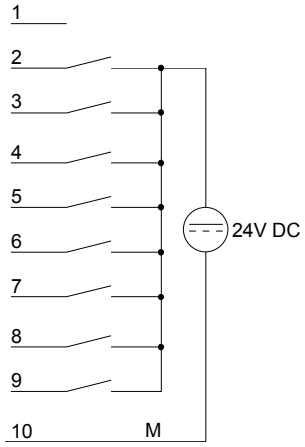
LED	Description
.0... .7	LEDs (green) I+0.0 to I+0.7 A "1" signal level is recognized as of app. 15V and the respective LED is turned on



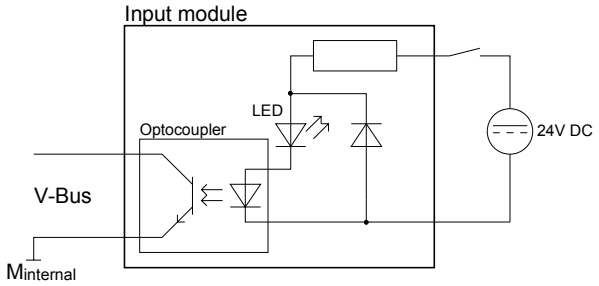
Pin	Assignment
1	not connected
2	Input I+0.0
3	Input I+0.1
4	Input I+0.2
5	Input I+0.3
6	Input I+0.4
7	Input I+0.5
8	Input I+0.6
9	Input I+0.7
10	Ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	221-1BF10
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	25 mA
Power loss	2 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 20.4...28.8 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"	0.2 ms
Input delay of "1" to "0"	0.2 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
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none

Order no.	**221-1BF10**
Isolation	
Between channels	-
Between channels of groups to	8
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	1
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1BF21 - DIa 8xDC 24V 0.2ms

Order data DIa 8xDC 24V 0.2ms VIPA 221-1BF21

Description

The digital input module accepts the binary control signals from the process level and provides an electrically isolated interface to the central bus system.

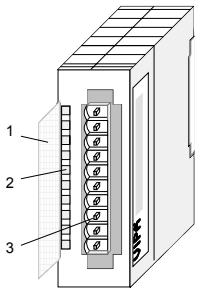
All inputs are configurable as alarms. With the rising edge of the input, the alarm is activated. The alarm calls the OB 40 in the CPU. If this OB isn't available, the OB 85 is called. If this OB is also not programmed, the CPU switches to STOP.

The module has 8 channels, each one with a light emitting diode to indicate the status of the channel.

Properties

- 8 alarm inputs, isolated from the backplane bus
- nominal input voltage DC 24V
- suited for urgent signals (switches and proximity switches), delay time 0.2ms
- Status indicator for each channel by means of an LED

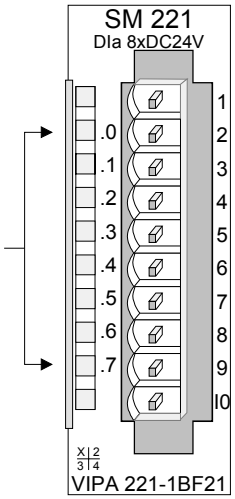
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

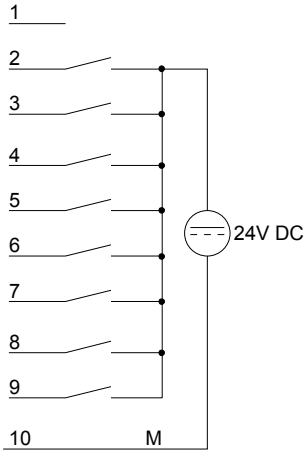
LED	Description
.0... .7	LEDs (green) I+0.0 to I+0.7 A "1" signal level is recognized as of app. 15V and the respective LED is turned on



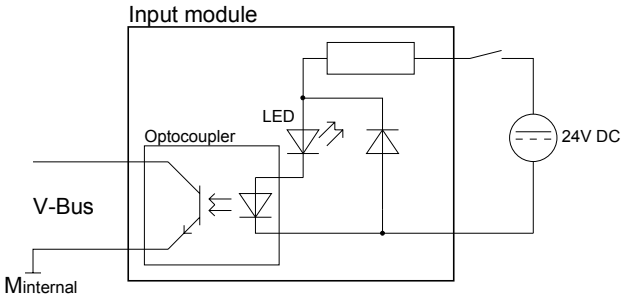
Pin	Assignment
1	not connected
2	Input I+0.0
3	Input I+0.1
4	Input I+0.2
5	Input I+0.3
6	Input I+0.4
7	Input I+0.5
8	Input I+0.6
9	Input I+0.7
10	Ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Note!

The module may be deployed in the System 200V starting from CPU firmware versions:

CPU 21x: Version 2.2.1
CPU 24x: Version 3.0.6

The deployment with lower firmware versions causes error messages and a CPU switch to STOP!

Technical data

Order no.	**221-1BF21**
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	25 mA
Power loss	2 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 20.4...28.8 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"	0.2 ms
Input delay of "1" to "0"	0.2 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

Order no.	**221-1BF21**
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
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	1
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1BF30 - DI 8xDC 24V - ECO

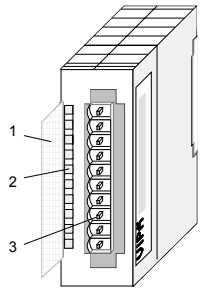
Order data DI 8xDC 24V VIPA 221-1BF30

Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system. The module has 8 channels, each one with a light emitting diode to indicate the status of the channel.

Properties

- 8 floating inputs, isolated from the backplane bus
- DC 24V nominal input voltage
- Suitable for standard switches and proximity switches
- Status indicator for each channel by means of an LED

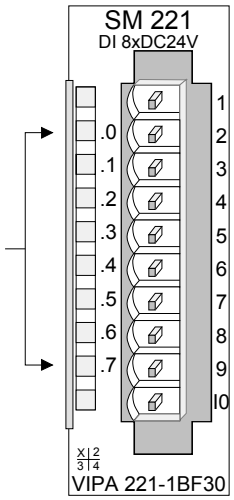
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Connector edge

Status indicator pin assignment

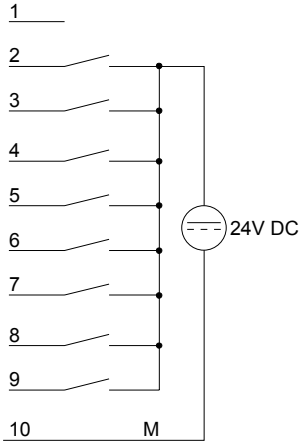
LED	Description
.0... .7	LEDs (green) I+0.0 to I+0.7 A "1" signal level is recognized as of app. 15V and the respective LED is turned on



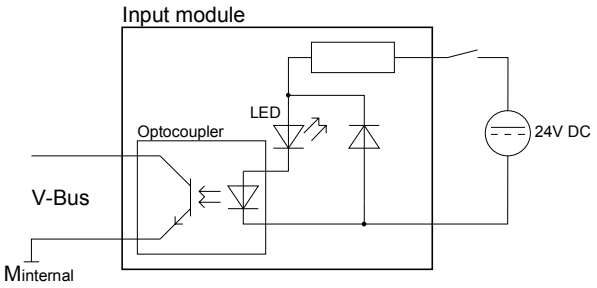
Pin	Assignment
1	not connected
2	Input I+0.0
3	Input I+0.1
4	Input I+0.2
5	Input I+0.3
6	Input I+0.4
7	Input I+0.5
8	Input I+0.6
9	Input I+0.7
10	Ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	221-1BF30
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	25 mA
Power loss	2 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 20.4...28.8 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
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none

Order no.	**221-1BF30**
Isolation	
Between channels	-
Between channels of groups to	8
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	1
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1BF40 - DI 8xDC 24V 0.2ms

Order data DI 8xDC 24V 0.2ms VIPA 221-1BF40

Description

The digital input module accepts the binary control signals from the process level and provides an electrically isolated interface to the central bus system. This module is only suited for central deployment together with a CPU. Here the module detects and stores the rising edges of input pulses with a duration > 0.2ms.

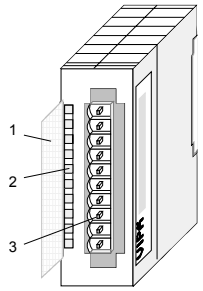
At the cycle control point the status information of the module is transferred to the process image and then reset in the module again by the CPU.

Since the status information exist over one cycle, a cyclically processing is necessary. Here the module must always be mapped to an address within the process image. The module has 8 input channels. The status of the input signals is indicated by light emitting diodes.

Properties

- 8 inputs, isolated from the backplane bus
- nominal input voltage DC 24V
- Suitable for fast, short signals (pulse)
- Status indicator for each channel by means of an LED

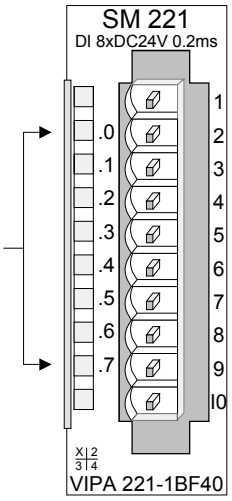
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

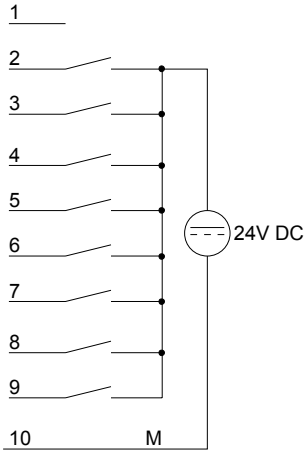
LED	Description
.0... .7	LEDs (green) I+0.0 to I+0.7 A "1" signal level is recognized as of app. 15V and the respective LED is turned on



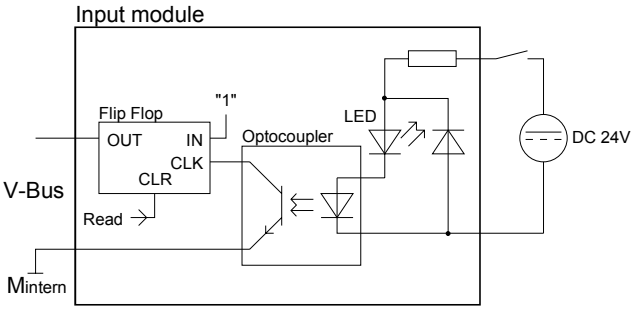
Pin	Assignment
1	not connected
2	Input I+0.0
3	Input I+0.1
4	Input I+0.2
5	Input I+0.3
6	Input I+0.4
7	Input I+0.5
8	Input I+0.6
9	Input I+0.7
10	Ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Note!

System dependent the module should only be used in a central system! The module is always to be mapped to an address within the process image.

Technical data

Order number	**221-1BF40**
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	25 mA
Power loss	2 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 20.4...28.8 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"	0.2 ms
Input delay of "1" to "0"	0.2 ms
Number of simultaneously utilizable inputs horizontal configuration	8
Number of simultaneously utilizable inputs vertical configuration	8
Input characteristic curve	IEC 61131, type 1
Initial data size	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no

Order number	221-1BF40
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	1
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	-

221-1BF50 - DI 8xDC 24V NPN

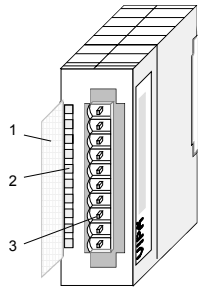
Order data DI 8xDC 24V NPN VIPA 221-1BF50

Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system. The module has 8 channels, each one with a light emitting diode to indicate the status of the channel. The input becomes active when it is connected to ground.

Properties

- 8 floating inputs, isolated from the backplane bus
- Active low input (signal level "1" when input is at ground)
- DC 24V nominal input voltage
- Suitable for standard switches and proximity switches
- Status indicator for each channel by means of an LED

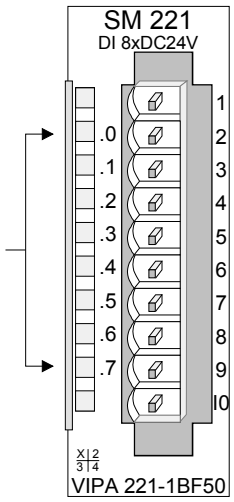
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator
pin assignment

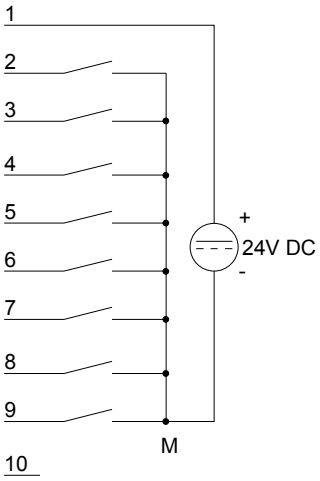
LED	Description
.0... .7	LEDs (green) I+0.0 to I+0.7 when an input is at ground a "1" is detected and the respective LED is turned on



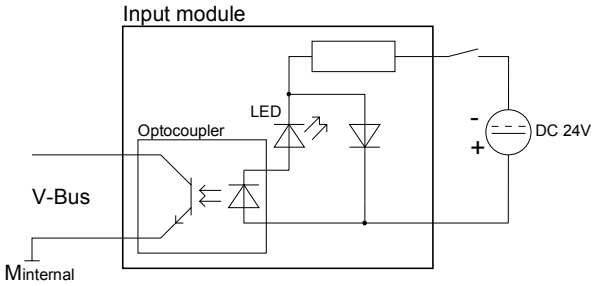
Pin	Assignment
1	+DC 24V
2	Input I+0.0
3	Input I+0.1
4	Input I+0.2
5	Input I+0.3
6	Input I+0.4
7	Input I+0.5
8	Input I+0.6
9	Input I+0.7
10	reserved

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	221-1BF50
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	10 mA
Power loss	2 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 20.4...28.8 V
Input voltage for signal "0"	DC 15...28.8 V
Input voltage for signal "1"	DC 0...5 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	-
Initial data size	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none

Order no.	**221-1BF50**
Isolation	
Between channels	-
Between channels of groups to	8
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	1
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	100 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1FD00 - DI 4xAC/DC 90...230V

Order data DI 4xAC/DC 90...230V VIPA 221-1FD00

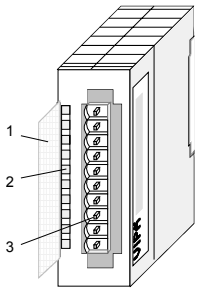
Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system.

The module has 4 channels and the respective status is displayed by means of LEDs.

Properties

- 4 floating inputs, isolated from the backplane bus and from each other
- Status indicator for each channel by means of an LED
- Nominal input voltage 90 ... 230V AC/DC

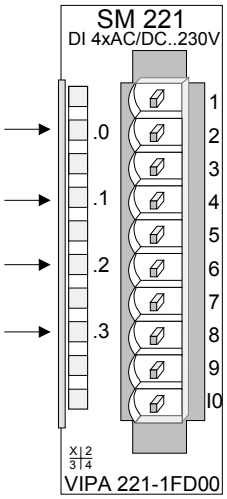
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

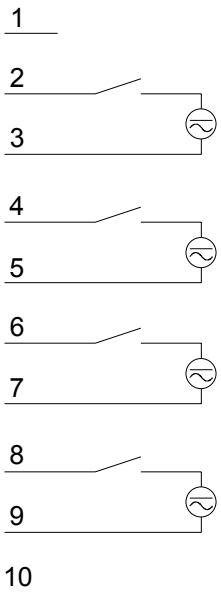
LED	Description
.0	LEDs (green)
.1	I+0.0 to I+0.3
.2	from app. DC 80V or AC
.3	65V (50Hz) a signal "1" is detected and the respective LED is turned on



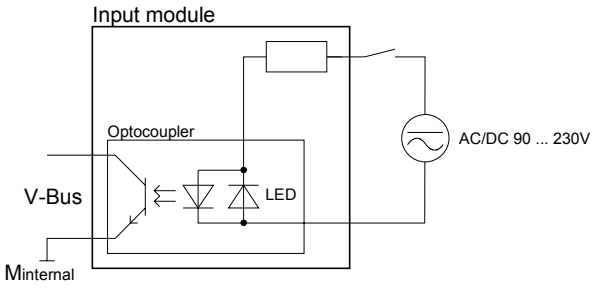
Pin	Assignment
1	not connected
2	I+0.0
3	Neutral conductor I+0.0
4	I+0.1
5	Neutral conductor I+0.1
6	I+0.2
7	Neutral conductor I+0.2
8	I+0.3
9	Neutral conductor I+0.3
10	not connected

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	**221-1FD00**
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	40 mA
Power loss	2 W
Technical data digital inputs	
Number of inputs	4
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 90...230 V
Input voltage for signal "0"	AC/DC 0...35 V
Input voltage for signal "1"	AC/DC 90...230 V
Input voltage hysteresis	-
Frequency range	50...60 Hz
Input resistance	136 kΩ
Input current for signal "1"	-
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	4
Number of simultaneously utilizable inputs vertical configuration	4
Input characteristic curve	-
Initial data size	4 Bit
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no

Order no.	**221-1FD00**
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	1
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	1
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1FF20 - DI 8xAC/DC 60...230V

Order data DI 8xAC/DC 60...230V VIPA 221-1FF20

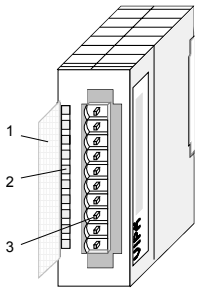
Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system.

The module has 8 channels, each one with a light emitting diode to indicate the status of the channel.

Properties

- 8 inputs, isolated from the backplane bus
- Nominal input voltage 60 ... 230V AC/DC
- Status indicator for each channel by means of an LED

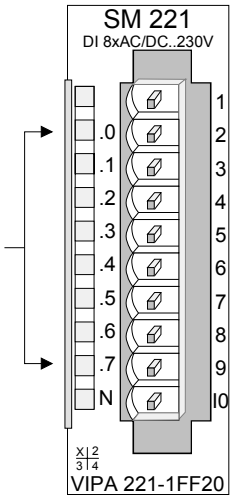
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

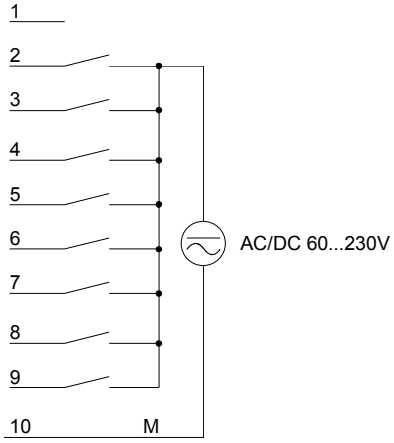
LED	Description
.0... .7	LEDs (green) I+0.0 to I+0.7 from app. DC 55V or AC 45V (50Hz) a signal "1" is detected and the respective LED is turned on



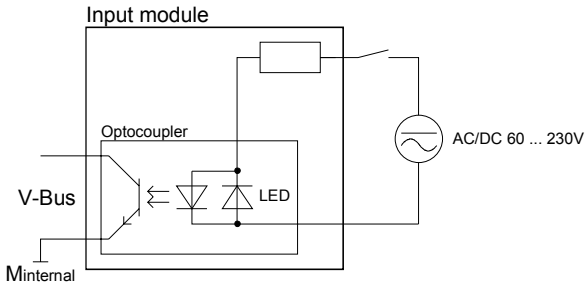
Pin	Assignment
1	not connected
2	Input I+0.0
3	Input I+0.1
4	Input I+0.2
5	Input I+0.3
6	Input I+0.4
7	Input I+0.5
8	Input I+0.6
9	Input I+0.7
10	Neutral conductor

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	221-1FF20
Type	SM 221
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	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	50...60 Hz
Input resistance	136 kΩ
Input current for signal "1"	-
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	8
Number of simultaneously utilizable inputs vertical configuration	8
Input characteristic curve	-
Initial data size	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none

Order no.	**221-1FF20**
Isolation	
Between channels	-
Between channels of groups to	8
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	1
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	100 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1FF30 - DI 8xAC/DC 24...48V

Order data DI 8xAC/DC 24...48V VIPA 221-1FF30

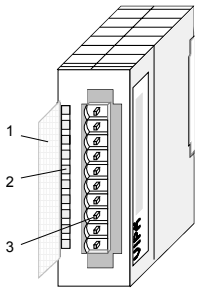
Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system.

The module has 8 channels, each one with a light emitting diode to indicate the status of the channel.

Properties

- 8 floating inputs, isolated from the backplane bus
- Nominal input voltage AC/DC 24 ... 48V
- Status indicator for each channel by means of an LED

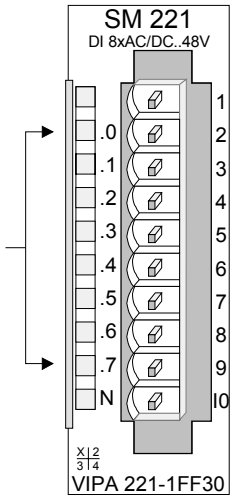
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

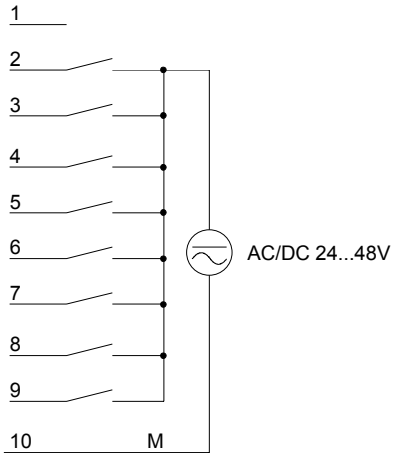
LED	Description
.0... .7	LEDs (green) I+0.0 to I+0.7 from app. DC 14V or AC 12V (50Hz) a signal "1" is detected and the respective LED is turned on



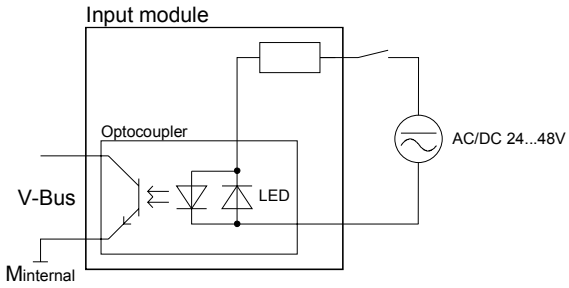
Pin	Assignment
1	not connected
2	Input I+0.0
3	Input I+0.1
4	Input I+0.2
5	Input I+0.3
6	Input I+0.4
7	Input I+0.5
8	Input I+0.6
9	Input I+0.7
10	Neutral conductor

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	**221-1FF30**
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	60 mA
Power loss	2 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	AC/DC 24...48 V
Input voltage for signal "0"	AC/DC 0...8 V
Input voltage for signal "1"	AC/DC 18...48 V
Input voltage hysteresis	-
Frequency range	50...60 Hz
Input resistance	16.4 kΩ
Input current for signal "1"	-
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	8
Number of simultaneously utilizable inputs vertical configuration	8
Input characteristic curve	-
Initial data size	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none

Order no.	221-1FF30
Isolation	
Between channels	-
Between channels of groups to	8
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	1
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1FF40 - DI 8xAC 240V

Order data DI 8xAC 240V VIPA 221-1FF40

Description

The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system.

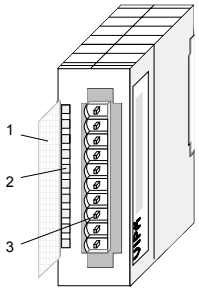
The module has 8 channels, each one with a light emitting diode to indicate the status of the channel.

In a defined voltage range, the signal state of the respective input is not modified (Hysterese).

Properties

- 8 floating inputs, isolated from the backplane bus
- Nominal input voltage AC 240V
- Status indicator for each channel by means of an LED
- Hysterese
- Current consumption 20mA per channel

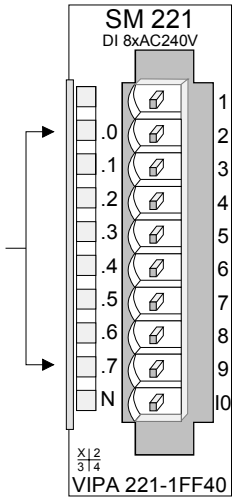
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

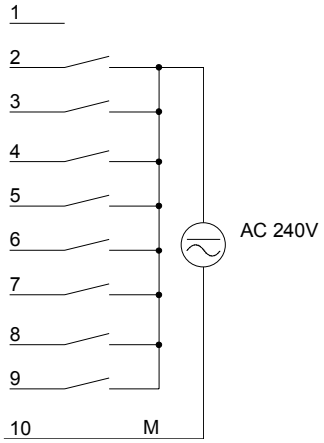
LED	Description
.0... .7	LEDs (green) I+0.0 to I+0.7 from app. AC 190 V (50Hz) the signal "1" is detected and the respective LED is turned on



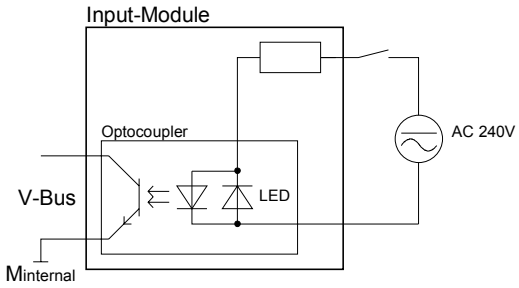
Pin	Assignment
1	not connected
2	Input I+0.0
3	Input I+0.1
4	Input I+0.2
5	Input I+0.3
6	Input I+0.4
7	Input I+0.5
8	Input I+0.6
9	Input I+0.7
10	Neutral conductor

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Note!

This module is specified for voltages of max. AC 260V.

If inductive loads occur on the network, this load has to be filtered either directly at the module or at the according device, for example by using a snubber network.

Technical data

Order number	221-1FF40
Type	SM 221
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	AC 230 V
Input voltage for signal "0"	AC 0...70 V
Input voltage for signal "1"	AC 190...260 V
Input voltage hysteresis	AC 90...160 V
Frequency range	50 Hz
Input resistance	136 kΩ
Input current for signal "1"	-
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	8
Number of simultaneously utilizable inputs vertical configuration	8
Input characteristic curve	-
Initial data size	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no

Order number	**221-1FF40**
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	1
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	100 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1FF50 - DI 8xAC/DC 180...265V

Order data DI 8xAC/DC 180...265V VIPA 221-1FF50

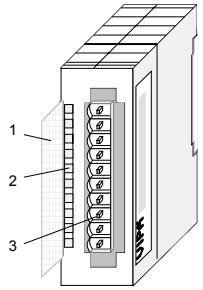
Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system.

The module has 8 channels, each one with a light emitting diode to indicate the status of the channel.

Properties

- 8 floating inputs, isolated from the backplane bus
- Nominal input voltage AC/DC 180...265V
- Status indicator for each channel by means of an LED

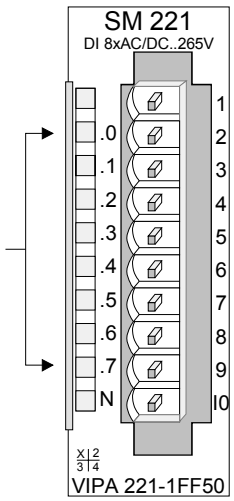
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator
pin assignment

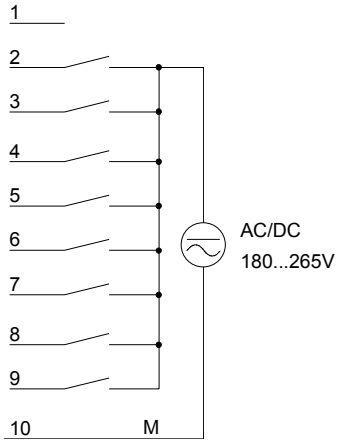
LED	Description
.0... .7	LEDs (green) I+0.0 to I+0.7 from app. DC 150V resp. AC 170V (50Hz) the signal "1" is detected and the respective LED is turned on



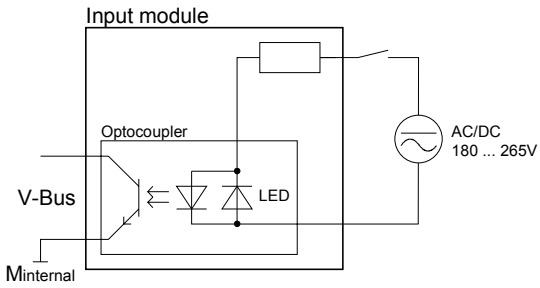
Pin	Assignment
1	not connected
2	Input I+0.0
3	Input I+0.1
4	Input I+0.2
5	Input I+0.3
6	Input I+0.4
7	Input I+0.5
8	Input I+0.6
9	Input I+0.7
10	Neutral conductor

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	**221-1FF50**
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	80 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	AC/DC 180...265 V
Input voltage for signal "0"	AC/DC 0...150 V
Input voltage for signal "1"	AC/DC 180...265 V
Input voltage hysteresis	-
Frequency range	50...60 Hz
Input resistance	136 kΩ
Input current for signal "1"	-
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	8
Number of simultaneously utilizable inputs vertical configuration	8
Input characteristic curve	-
Initial data size	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none

Order no.	221-1FF50
Isolation	
Between channels	-
Between channels of groups to	8
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	1
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1BH00 - DI 16xDC 24V with UB4x

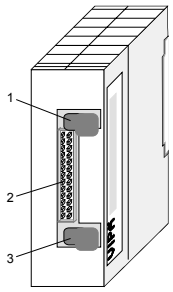
Order data DI 16xDC 24V VIPA 221-1BH00

Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system. This module requires an UB4x-converter. It has 16 channels that indicate the respective status via LEDs on the UB4x. The module has to be connected to the converter module (DEA-UB4x) by means of a flattened round cable (DEA-KB91C).

Properties

- 16 inputs, isolated from the backplane bus
- DC 24V nominal input voltage
- Suitable for standard switches and proximity switches
- Status indicator for each channel by means of a LED located on the conversion module UB4x

Construction

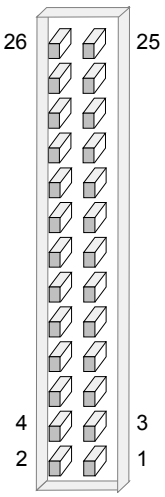


[1] Clip
[2] Recessed connector for the interface to a conversion module UB4x via the flattened round cable
[3] Clip

Status indicator on UB4x

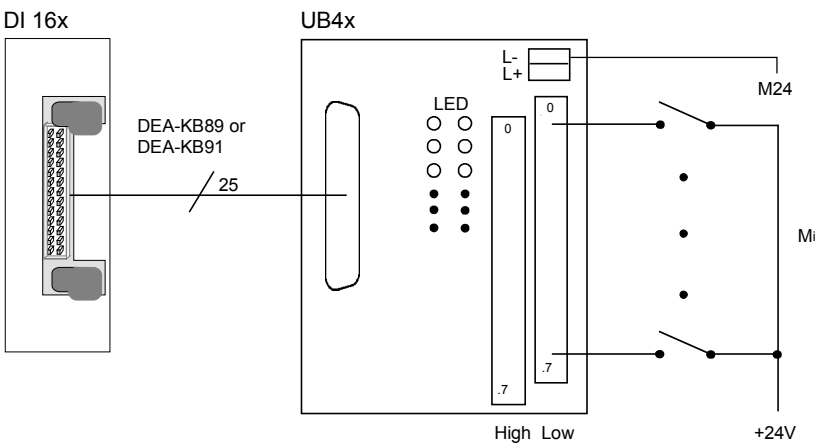
LED	Description
.0... .15	LEDs (yellow) I+0.0 to I+0.7 High I+0.0 to I+0.7 Low A "1" signal level is recognized as of app. 15V and the respective LED is turned on
L+ L-	LED (green) Supply voltage available

Pin assignment module

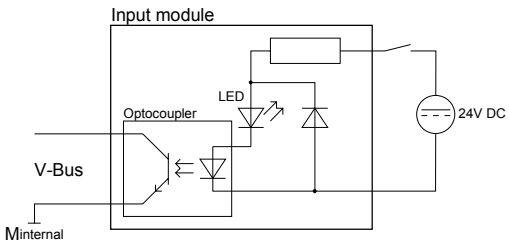


Connector	Pin	Assignment
	23...26	Supply voltage +DC 24V
	22	Input I+0.0
	.	.
	.	.
	.	.
	15	Input I+0.7
	14	Input I+1.0
	.	.
	.	.
	.	.
	7	Input I+1.7
	1...6	Supply voltage Ground

Interface to UB4x



Schematic diagram module



Technical data

Order no.	**KSD221-1BH00**
Type	SM 221, Set
Current consumption/power loss	
Current consumption from backplane bus	35 mA
Power loss	3.5 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 20.4...28.8 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
Status information, alarms, diagnostics	
Status display	none
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none

Order no.	**KSD221-1BH00**
Isolation	
Between channels	-
Between channels of groups to	16
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	2
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	70 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1BH10 - DI 16xDC 24V

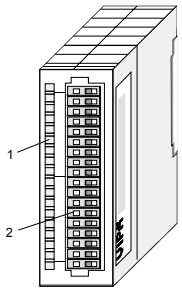
Order data DI 16xDC 24V VIPA 221-1BH10

Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system. It has 16 channels that indicate the respective status by means of LEDs.

Properties

- 16 inputs, isolated from the backplane bus
- DC 24V nominal input voltage
- Suitable for standard switches and proximity switches
- Status indicator for each channel by means of an LED

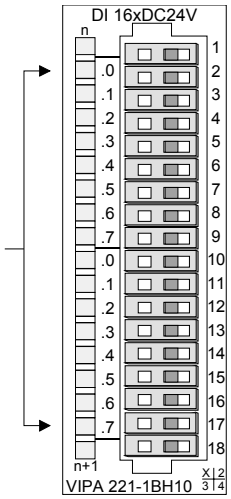
Construction



[1] LED status indicator
[2] Edge connector

Status indicator pin assignment

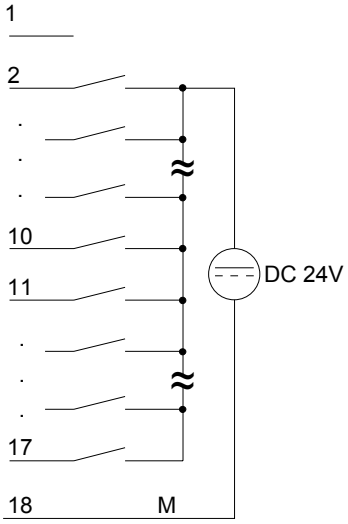
LED	Description
.0... .7	LEDs (green) I+0.0 to I+0.7 A "1" signal level is recognized as of app. 15V and the respective LED is turned on



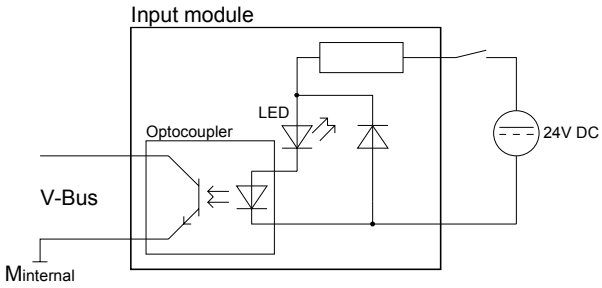
Pin	Assignment
1	not connected
2	Input I+0.0
3	Input I+0.1
.	.
.	.
.	.
9	Input I+0.7
10	Input I+1.0
.	.
.	.
.	.
16	Input I+1.6
17	Input I+1.7
18	Ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	**221-1BH10**
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	40 mA
Power loss	3.5 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 20.4...28.8 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
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none

Order no.	221-1BH10
Supply voltage display	none
Group error display	none
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	16
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	2
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1BH20 - DI 16xDC24V/1C

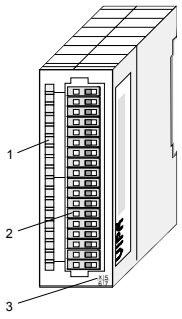
Order data DI 16xDC24V/1C VIPA 221-1BH20

Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system. It has 16 channels that indicate the respective status by means of LEDs. Additionally, the first two channels may head for counters.

Properties

- 16 inputs, isolated from the backplane bus
- 2 inputs (I+0.0 and I+0.01) are configurable as one counter, frequency or period measurement
- Pull up abbr. pull down resistors are inside, so sensors with positive and negative logic can be connected
- Suitable for standard switches and proximity switches
- Status indicator for each channel by means of an LED

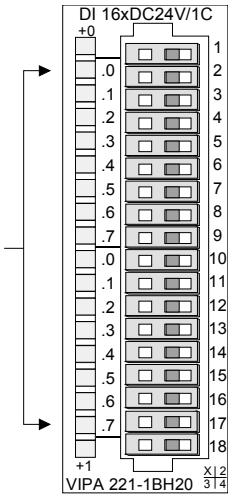
Construction



[1] LED status indicator
[2] Edge connector
[3] Hardware version

Status indicator pin assignment

LED	Description
.0.. .7	LEDs (green) I+0.0 to I+1.7 A "1" signal level is recognized as of app. 15V and the respective LED is turned on

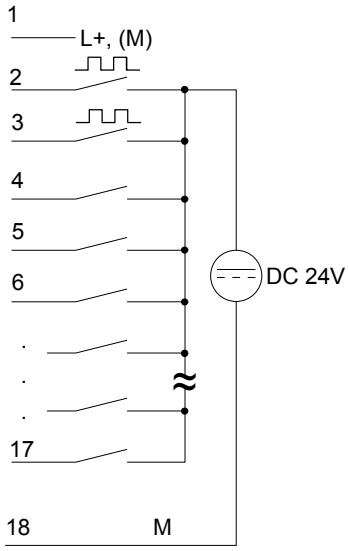


Pin	Assignment
1	L+ DC 24V or Ground*)
2	Input I+0.0 / Counter (A)
3	Input I+0.1 / Counter (B)
4	Input I+0.2
.	.
.	.
.	.
9	Input I+0.7
10	Input I+1.0
.	.
.	.
.	.
17	Input I+1.7
18	Ground

*) DC 24V or Ground to connect sensors with positive or negative logic at I+0.0 or I+0.1

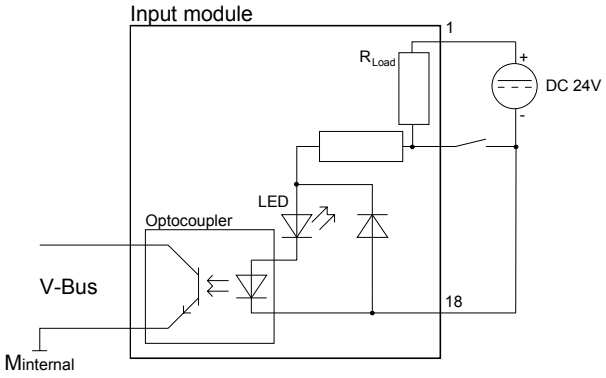
Circuit and schematic diagram

Wiring diagram

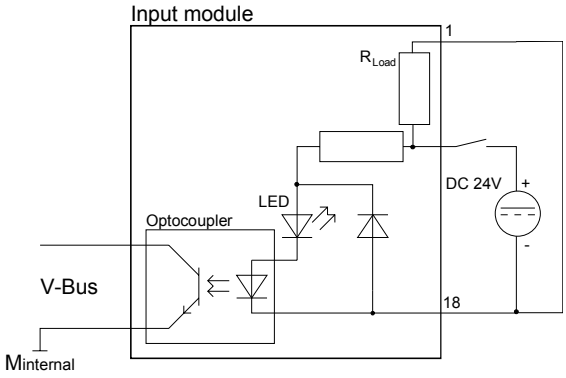


Schematic diagram

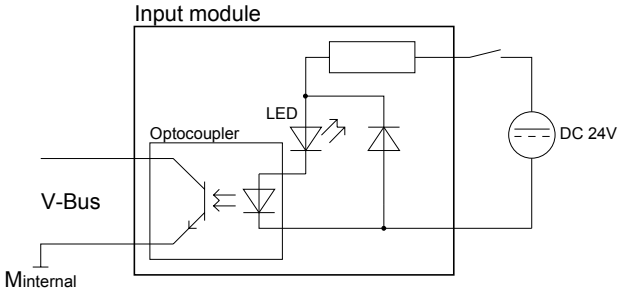
Input I+0.0, I+0.1 (negative logic)



Input I+0.0, I+0.1 (positive logic)



Input I+0.2 … I+1.5



Attention!

Please consider that as of hardware version 4 due to the hardware with the usage of this module, the maximum number of modules on the backplane bus is limited to 16! Else if there are more than 16 modules on the backplane bus, this could cause a malfunction of the system.

Note!

The inputs I+0.0 and I+0.1 have also internal pull up (-down) resistors, which lead to pin 1 of the connector strip.

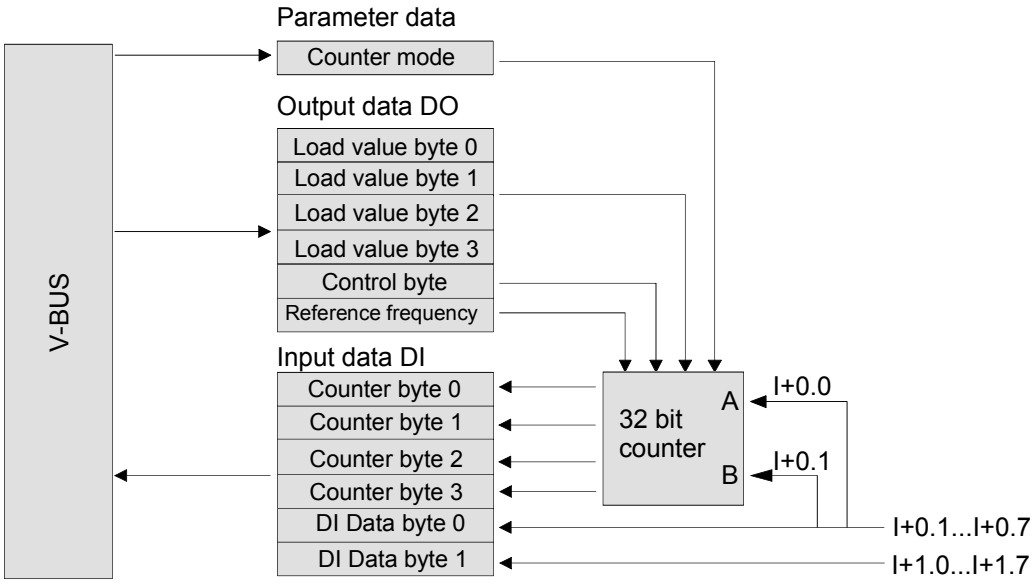
You can connect the sensors with negative logic output directly to the inputs I+0.0 and I+0.1. Here you have to supply pin 1 with DC 24V.

Connect pin 1 to Ground (bridge to pin 18) when I+0.0 and I+0.1 are used as "normal" inputs with positive logic.

Overview

The module is a 16bit digital input module for System 200V combined with a one-channel 32bit counter.

Inputs I+0.0 and I+0.1 are used as 'normal' process inputs and as counter inputs (signal A and signal B) simultaneously.



By writing *output data DO* to the module, you may preset a counter value with a *load value* as well as a *reference frequency*. The activation of this values takes place by means of the *control byte*.

With a read access on the *input data DI* you obtain the current counter value.

The counting is started res. stopped via the *control byte* (software gate).

There are 5 counter functions supported. The appropriate counter function is set by parameterization.

Counter activation via software gate

Many applications require that the count can be started or stopped at a defined time depending on other events. This starting and stopping of the count process is done via a software gate function. If the gate is opened, count pulses can reach the counter and the count is started. If the gate is closed, count pulses can no longer reach the counter and the count is stopped.

The software gate is controlled via the bits START and STOP in the Control Byte. Setting the bit START will open the software gate whereas setting the bit STOP will close the software gate.

Count range / Limit values

The counter module can count up and down. The count value is 32Bit wide and is to be interpreted as of type unsigned integer. Therefore the count limits are given as:

Lower count limit	Upper count limit
0	+ 4.294.967.295 ($2^{32} - 1$)

Load value

It is possible to specify a load value for the counter. After loading the counter starts counting up res. down from this new value to the upper res. lower limit value. After receiving a new counting pulse, the counter jumps to the lower (counting up) res. upper limit (counting down) and starts the counting again.

In the operation mode "Frequency Measurement" the load value is used to define the time window of the measurement.

The load mechanism is controlled via the bit LOAD in the control byte.

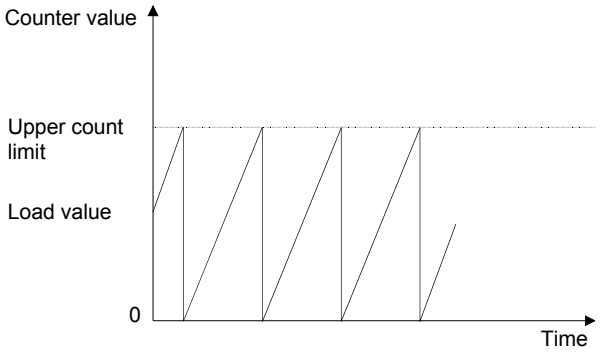
Continuous counting

In all counter modes, a continuous counter function is used as described in the following paragraphs and as shown in figure.

If the counter reaches the upper count limit when counting up and a further count pulse is received, the counter jumps to the lower count limit and starts to add the count pulses again, meaning it counts continuously.

If the counter reaches the lower count limit when counting down and a further count pulse is received, the counter jumps to the upper count limit and continues to count down from there.

The count range in all modes is 0 to +4.294.967.295 and cannot be changed. The counter starts to count at 0 when a complete restart (Power-On Reset or VBUS-Reset) is executed on the module or the counter is cleared by setting bit CLEAR in the control byte.



Maximum counter frequency

At the designation of maximum counter frequency, two types of indication are distinguished:

- *Maximum impulse frequency*
  The maximum impulse frequency is the maximum frequency the adjacent signal may have, i.e. the maximum frequency at witch the impulses arrive at the module. At this module the maximum impulse frequency is 100Hz.
- *Maximum counter frequency*
  The maximum counter frequency is the frequency at witch can be internally counted to the maximum. At this module the maximum impulse frequency is 400Hz.

Module access

For input and output data, the module occupies each 6byte in the address area. For setting the counter mode there are 1byte parameter data at disposal.

Loading the counter res. presetting of a reference frequency is via a control byte by typing the wanted value into the output address area and setting the bit 2 of the control byte to activate the counter.

You may see the counter value and the state of the inputs in the input address area. Also during count operation you may call all input channels.

Input data
DI data bytes

Input bytes 0 to 3 are assigned to the 32bit counter value whereas bytes 4 and 5 are assigned to the 16Bit digital inputs.

Byte	Bit 7 ... Bit 0
0	Counter value byte 0
1	Counter value byte 1
2	Counter value byte 2
3	Counter value byte 3
4	DI Data byte 0 (I+0.7 ... I+0.0)
5	DI Data byte 1 (I+1.7 ... I+1.0)

Output data
DO data bytes

Byte 0 to 3 are assigned to a load value according to the selected counter mode. Byte 4 is used as control byte for the counter. Byte 5 selects a reference frequency for the counter modes "Frequency Measurement" and "Period Measurement".

Byte	Bit 7 ... Bit 0
0	Load value byte 0
1	Load value byte 1
2	Load value byte 2
3	Load value byte 3
4	Control byte
5	Reference Frequency

Control byte

Bit	Function
0	1 = START counter (the software gate is open)
1	1 = STOP counter (the software gate is closed)
2	1 = LOAD counter
3	1 = CLEAR counter
7 ... 4	reserved

Reference frequency

Value	Reference frequency
00h	16 MHz
01h	8 MHz
02h	4 MHz
03h	1 MHz
04h	100 kHz
05h	10 kHz
06h	1 kHz
07h	100 Hz
others	not allowed

Parameter data

The module has 3byte parameter data for selecting the counter mode and configuring the digital input filters.

Byte	Bit 7 ... Bit 0
0	Counter function 00h: Quadruple Pulse Evaluation 01h: Pulse and Direction Evaluation 02h: Clock Up / Clock Down Evaluation 03h: Frequency Measurement 04h: Period Measurement others: not allowed
1	Filter (Divider 0) value: 0 ... 255
2	Filter (Divider 1) value: 0 ... 255

Counter function

A description of the counter functions can be found at the next page.

Filter

The counter inputs are debounced by means of digital filters, which can be adjusted via parameter Filter (Divider 0 and Divider 1).

So that an pulse can be evaluated as a counting pulse, this must be present longer than the parameterized filter value. Shorter pulses are not evaluated.

For calculation of the pulse time the following formula is to be used:

$T_{Pulse} \geq$ *(Divider 0* +1)*(*Divider 1* +1)*2.5µs

Example:

Divider 0 = 3, *Divider 1* = 0

$T_{Pulse} \geq (3+1)*1*2.5\mu s = 10\mu s$

In this way filter for a pulse time of 2.5 ... 163840µs can be parameterized.

Example (default:)

Divider 0 = 0, *Divider 1* = 0

$T_{Pulse} \geq 1*1*2.5\mu s = 2.5\mu s$

By default (after Reset) a filter width of 2.5µs is used.

Counter functions

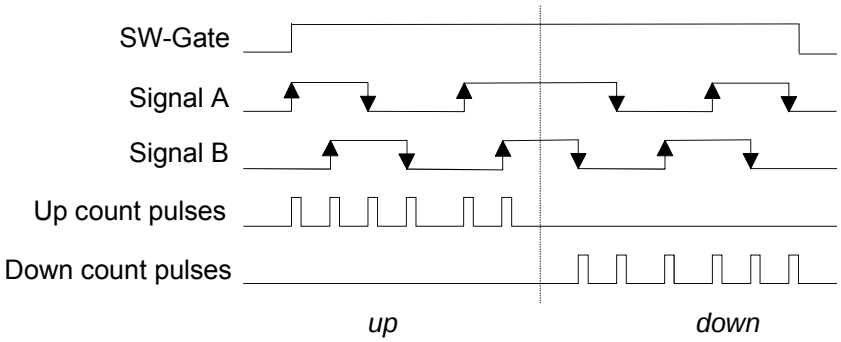
Quadruple Pulse Evaluation (00h)

Quadruple evaluation means that the rising and falling edges of A and B are evaluated; whether up or down count pulses are generated depends on which channel hurries first.

In this counting mode I+0.0 and I+0.1 have the following function:

I+0.0 as channel A: If channel A hurries in front, the counter counts up.

I+0.1 as channel B: If channel B hurries in front, the counter counts down.



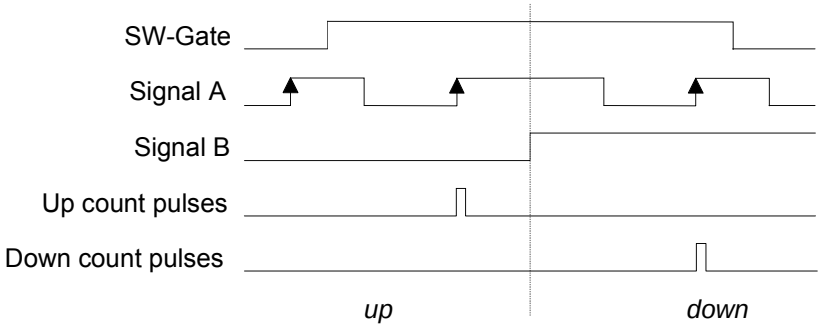
Pulse and Direction Evaluation (01h)

Every rising edge of A is evaluated. Channel B defines the counter direction.

In this counting mode I+0.0 and I+0.1 have the following function:

I+0.0 as channel A: Clock pulse for the counter at rising edge.

I+0.1 as channel B: Defines the counter direction (0 = up, 1 = down)



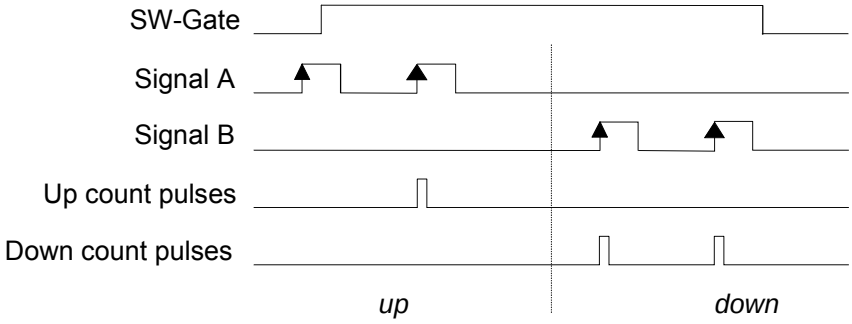
Clock Up / Clock Down Evaluation (02h)

The rising edges of channel A and B are evaluated. The counter is incremented with every rising edge of A and decremented with every rising edge of B.

In this counting mode I+0.0 and I+0.1 have the following function:

I+0.0 as channel A: Clock up pulse for the counter at rising edge.

I+0.1 as channel B: Clock down pulse for the counter at rising edge.



Frequency measurement (03h)

In frequency measurement mode, the module counts the number of rising edges of channel A received within a specified time window.

Channel B is not used in this mode.

The time window T_W is specified indirectly by selecting a *reference frequency* with DO byte 5 and defining a *load value* in DO bytes 0 to 3:

$$T_W = \frac{1}{\text{Reference Frequency}} * Load\ Value$$

By setting the Bit 2 of the *control byte*, the time window is transferred. When the counter is enabled (software gate is open), the reference counter is started with the first rising edge of channel A and is incremented with every rising edge of the reference clock.

When the reference counter reaches the load value (time T_W has expired), the current counter value is copied to DI byte 0 to 3 and can be read.

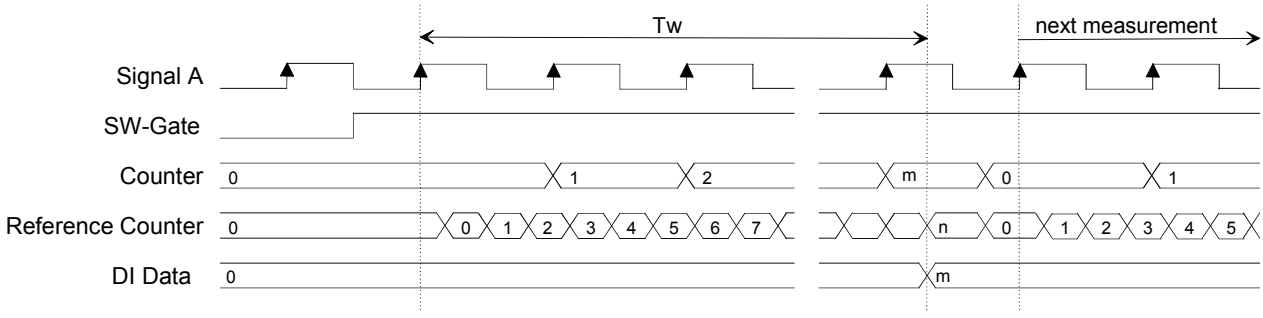
Then the counter and the reference counter are cleared automatically and the next frequency measurement is started with the next rising edge of channel A. If there aren't at least two rising edges of channel A within the time window T_W , the counter value will be read as 0 for this measurement.

Frequency measurement is started and ended by using the software gate that is as long as the software gate is open, the frequency of channel A is measured.

The counter can be cleared at any time by CLEAR='1' in the *control byte* while the *load value* stays valid until a new value is loaded or a Reset is detected.

The recent frequency can be computed by using the following formula:

$$Frequency = \text{Reference Frequency} * \frac{Counter\ Value}{Load\ Value}$$



Example:

Reference Frequency :	1 MHz
Load Value (n) :	1.000.000
Counter Value (m) :	10.000

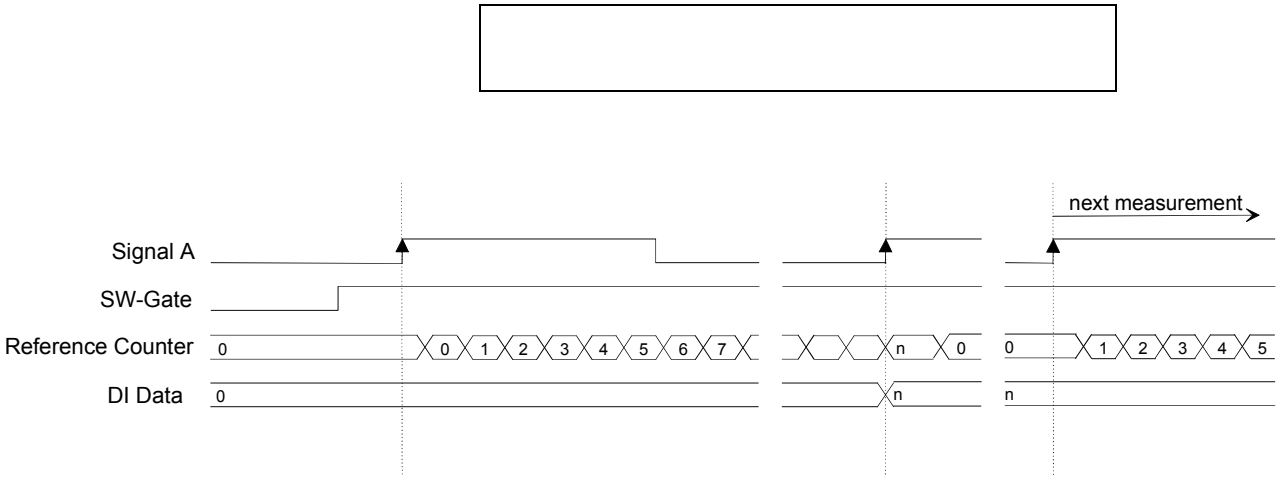
$$Frequency = 1\ MHz * \frac{10.000}{1.000.000} = 10\ kHz$$

Period measurement (04h)

With very small frequencies, it is convenient to measure the period instead of the frequency. In the operating mode "Period Measurement", the time between two rising edges of channel A is measured by counting the number of rising edges of the selected reference clock occurring between two rising edges of channel A. Channel B is not used in this mode.

Period measurement is started and ended by using the software gate, that is: as long as the software gate is open the period of channel A is measured continuously. The counter can be cleared at any time by CLEAR="1" in the *control byte*. The period measurement will then start again with the next rising edge of channel A.

The recent signal period can be computed by using the following formula:



Example: Reference Frequency : 1 MHz
Counter Value (n) : 10.000

$$Period = \frac{1}{1\,\mathrm{MHz}} * 10.000 = 10\,ms$$

Note!

The counter value stays valid until the next measurement is completed or the counter is cleared.

If the next measurement is never completed (e.g. because the second rising edge of channel A never occurs), you will always see the "old" counter value and not the current value of the Reference Counter.

Technical data

Order no.	221-1BH20
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	85 mA
Power loss	3.5 W
Technical data digital inputs	
Number of inputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	-
Reverse polarity protection of rated load voltage	-
Current consumption from load voltage L+ (without load)	-
Rated value	DC 20.4...28.8 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	6 Byte
Technical data counters	
Number of counters	1
Counter width	32 Bit
Maximum input frequency	100 kHz
Maximum count frequency	400 kHz
Mode incremental encoder	✓
Mode pulse / direction	✓
Mode pulse	✓
Mode frequency counter	✓
Mode period measurement	✓
Gate input available	-
Latch input available	-
Reset input available	-
Counter output available	-
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
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	16

Order no.	**221-1BH20**
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	6
Output bytes	6
Parameter bytes	5
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1BH30 - DI 16xDC 24V - ECO

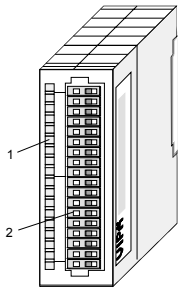
Order data DI 16xDC 24V VIPA 221-1BH30

Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system. It has 16 channels that indicate the respective status by means of LEDs.

Properties

- 16 inputs, isolated from the backplane bus
- DC 24V nominal input voltage
- Suitable for standard switches and proximity switches
- Status indicator for each channel by means of an LED

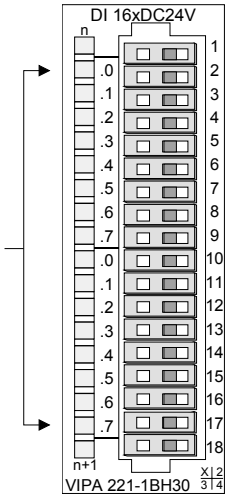
Construction



[1] LED status indicator
[2] Edge connector

Status indicator pin assignment

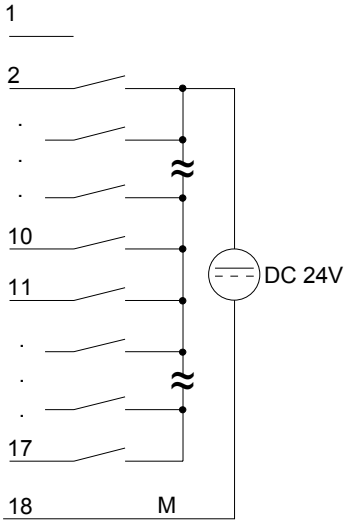
LED	Description
.0... .7	LEDs (green) I+0.0 to I+1.7 A "1" signal level is recognized as of app. 15V and the respective LED is turned on



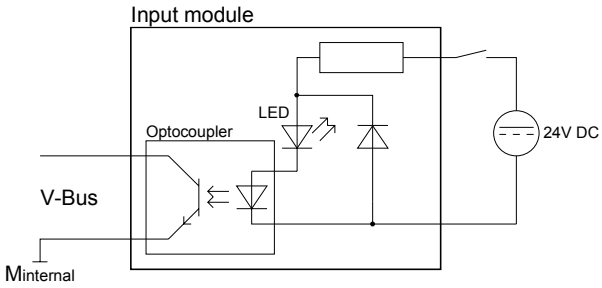
Pin	Assignment
1	Not connected
2	Input I+0.0
3	Input I+0.1
.	.
.	.
.	.
9	Input I+0.7
10	Input I+1.0
.	.
.	.
.	.
17	Input I+1.7
18	Ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	**221-1BH30**
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	45 mA
Power loss	3.5 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 20.4...28.8 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
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none

Order no.	221-1BH30
Supply voltage display	none
Group error display	none
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	16
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	2
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1BH50 - DI 16xDC 24V NPN with UB4x

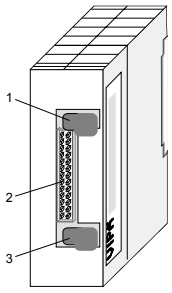
Order data DI 16xDC 24V NPN VIPA 221-1BH50

Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system. The input becomes active when it is connected to ground.
This module requires an UB4x-converter. It has 16 channels that indicate the respective status via LEDs on the UB4x. The module has to be connected to the converter module (DEA-UB4x) by means of a flattened round cable (DEA-KB91C).

Properties

- 16 inputs, isolated from the backplane bus
- Active low input (signal level "1" when input is at ground)
- DC 24V nominal input voltage
- Suitable for standard switches and proximity switches
- Status indicator for each channel by means of a LED located on the conversion module UB4x

Construction



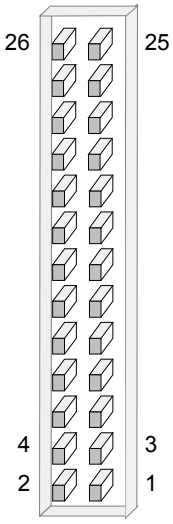
[1] Clip
[2] Recessed connector for the interface to a conversion module UB4x via the flattened round cable
[3] Clip

Status indicator on UB4x

LED	Description
.0... .15	LEDs (yellow) I+0.0 to I+0.7 High I+0.0 to I+0.7 Low A "1" signal level is recognized as of app. 15V and the respective LED is turned on
L+ L-	LED (green) Supply voltage available

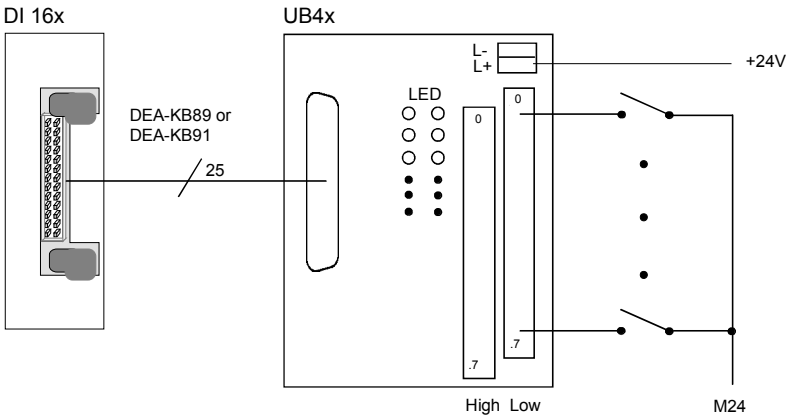
Pin assignment module

Connector

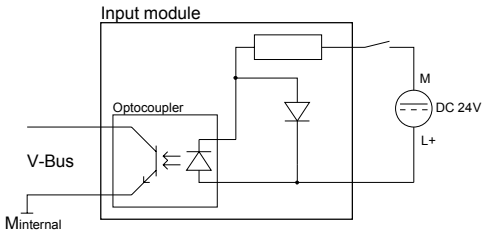


Pin	Assignment
23...26	Supply voltage +DC 24V
22	Input I+0.0
.	.
.	.
.	.
15	Input I+0.7
14	Input I+1.0
.	.
.	.
.	.
7	Input I+1.7
1...6	Supply voltage Ground

Interface to UB4x



Schematic diagram module



Technical data

Order no.	**221-1BH50**
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	40 mA
Power loss	3.5 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 20.4...28.8 V
Input voltage for signal "0"	DC 15...28.8 V
Input voltage for signal "1"	DC 0...5 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	-
Initial data size	2 Byte
Status information, alarms, diagnostics	
Status display	none
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	none
Group error display	none
Channel error display	none

Order no.	**221-1BH50**
Isolation	
Between channels	-
Between channels of groups to	16
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	2
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	70 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-1BH51 - DI 16xDC 24V NPN

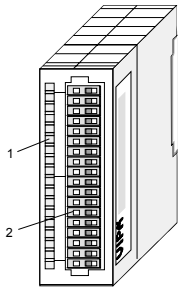
Order data DI 16xDC 24V NPN VIPA 221-1BH51

Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system. It has 16 channels that indicate the respective status by means of LEDs. The input becomes active when it is connected to ground.

Properties

- 16 inputs, isolated from the backplane bus
- Active low input (signal level "1" when input is at ground)
- DC 24V nominal input voltage
- Suitable for standard switches and proximity switches
- Status indicator for each channel by means of an LED

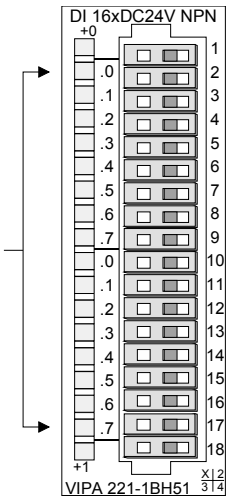
Construction



[1] LED status indicator
[2] Edge connector

Status indicator pin assignment

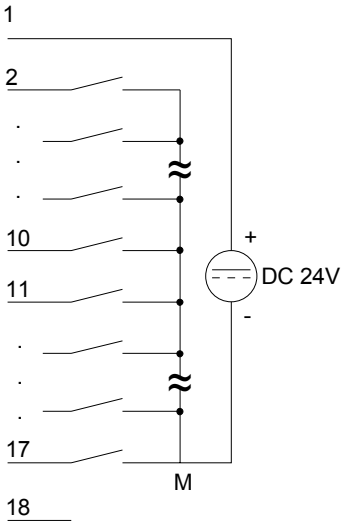
LED	Description
.0... .7	LEDs (green) I+0.0 to I+1.7 A "1" signal level is recognized as of app. ground and the respective LED is turned on



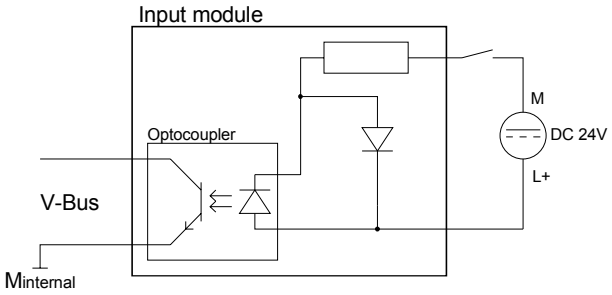
Pin	Assignment
1	+DC 24V
2	Input I+0.0
3	Input I+0.1
.	.
.	.
.	.
9	Input I+0.7
10	Input I+1.0
.	.
.	.
.	.
17	Input I+1.7
18	Not connected

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	**221-1BH51**
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	20 mA
Power loss	3.5 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 20.4...28.8 V
Input voltage for signal "0"	DC 15...28.8 V
Input voltage for signal "1"	DC 0...5 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	-
Initial data size	2 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none

Order no.	221-1BH51
Supply voltage display	none
Group error display	none
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	16
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	2
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

221-2BL10 - DI 32xDC 24V

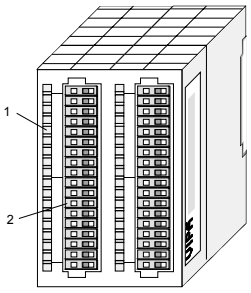
Order data DI 32xDC 24V VIPA 221-2BL10

Description The digital input module accepts binary control signals from the process and provides an electrically isolated interface to the central bus system It has 32 channels that indicate the respective status by means of LEDs.

Properties

- 32 inputs, isolated from the backplane bus
- DC 24V nominal input voltage
- Suitable for standard switches and proximity switches
- Status indicator for each channel by means of an LED

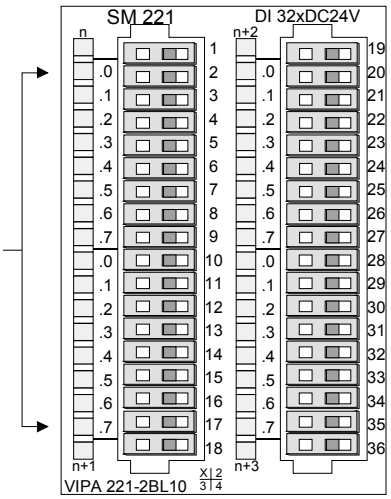
Construction



[1] LED status indicator
[2] Edge connector

Status indicator pin assignment

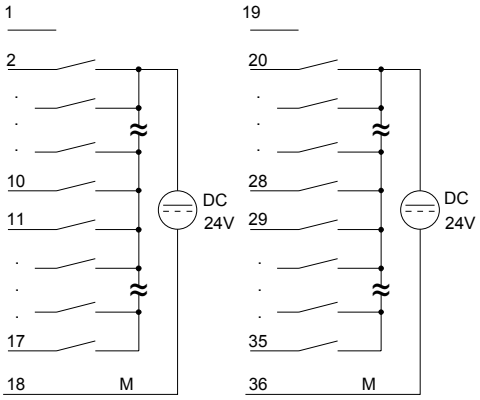
LED	Description
.0... .7	LEDs (green) I+0.0 to I+3.7 A "1" signal level is recognized as of app. 15V and the respective LED is turned on



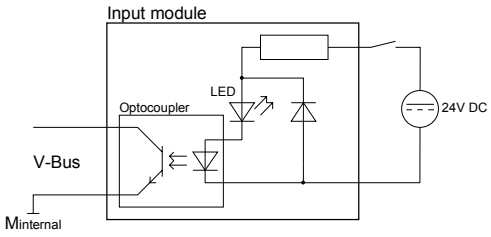
Pin	Assignment
1	Not connected
2 ... 17	Input I+0.0...I+1.7
.	.
.	.
.	.
18	Ground
19	Not connected
.	.
.	.
.	.
20 ... 35	Input I+2.0...I+3.7
36	Ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	221-2BL10
Type	SM 221
Current consumption/power loss	
Current consumption from backplane bus	40 mA
Power loss	6.5 W
Technical data digital inputs	
Number of inputs	32
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	-
Current consumption from load voltage L+ (without load)	-
Rated value	DC 20.4...28.8 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	4 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
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	-

Order no.	**221-2BL10**
Between channels of groups to	16
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	4
Output bytes	0
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	50.8 x 76 x 88 mm
Weight	140 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

Chapter 3 Digital output modules

Overview

This chapter contains a description of the construction and the operation of the VIPA digital output modules.

Content

Topic **Page**

222-1BF00 - DO 8xDC 24V 1A

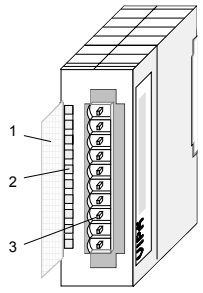
Order data DO 8xDC 24V 1A VIPA 222-1BF00

Description The digital output module accepts binary control signals from the central bus system and transfers them to the process level via outputs. The module requires a supply of DC 24V via the front-facing connector. It provides 8 channels and the status of each channel is displayed by means of an LED.

Properties

- 8 outputs, isolated from the backplane bus
- DC 24V supply voltage
- 1A output current
- Suitable for magnetic valves and DC contactors
- LEDs for supply voltage and error message
- Active channel indication by means of an LED

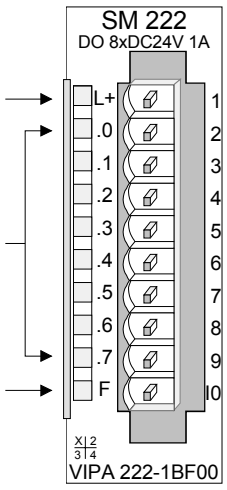
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

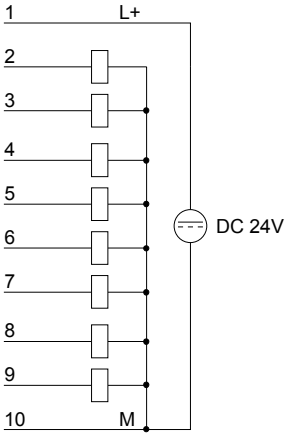
LED	Description
L+	LED (green) Supply voltage available
.0... .7	LEDs (green) Q+0.0 to Q+0.7 when an output is active the respective LED is turned on
F	LED (red) Overload, overheat or short circuit error



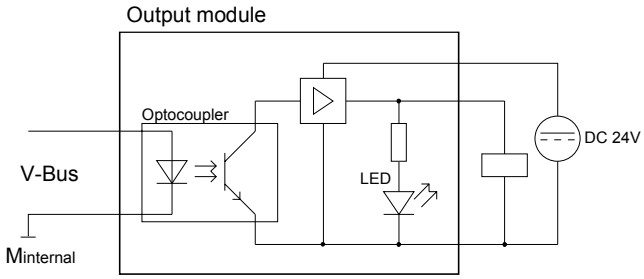
Pin	Assignment
1	DC 24V supply voltage
2	Output Q+0.0
3	Output Q+0.1
4	Output Q+0.2
5	Output Q+0.3
6	Output Q+0.4
7	Output Q+0.5
8	Output Q+0.6
9	Output Q+0.7
10	Supply ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	**222-1BF00**
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	70 mA
Power loss	2 W
Technical data digital outputs	
Number of outputs	8
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	10 mA
Total current per group, horizontal configuration, 40°C	8 A
Total current per group, horizontal configuration, 60°C	8 A
Total current per group, vertical configuration	8 A
Output current at signal "1", rated value	1 A
Output delay of "0" to "1"	150 µs
Output delay of "1" to "0"	100 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	1.5 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
Diagnostic interrupt	no

Order no.	222-1BF00
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	green LED per group
Group error display	red SF LED
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	0
Output bytes	1
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	100 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

222-1BF10 - DO 8xDC 24V 2A

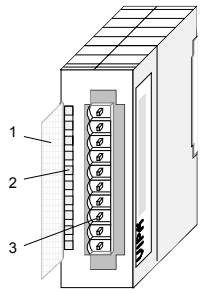
Order data DO 8xDC 24V 2A VIPA 222-1BF10

Description The digital output module accepts binary control signals from the central bus system and transfers them to the process level via outputs. The module requires a DC 24V supply via the connector located on the front. It provides 8 channels and the status of each channel is displayed by means of an LED. The maximum load current per output is 2A.

Properties

- 8 outputs, isolated from the backplane bus
- DC 24V supply voltage
- Output current 2A
- Suitable for magnetic valves and DC contactors
- LEDs for supply voltage and error message
- Active channel indication by means of an LED

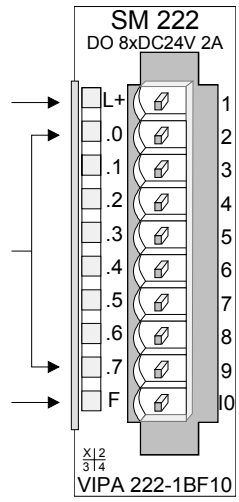
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

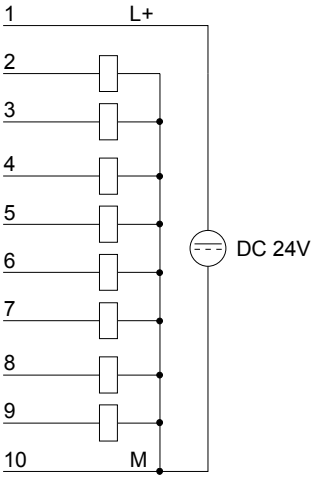
LED	Description
L+	LED (green) Supply voltage available
.0... .7	LEDs (green) Q+0.0 to Q+0.7 when an output becomes active the respective LED is turned on
F	LED (red) Overload, overheat, short circuit error



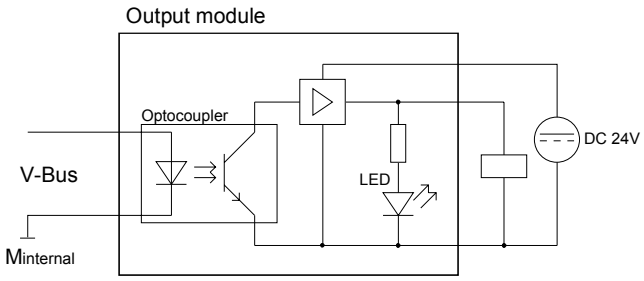
Pin	Assignment
1	DC 24V supply voltage
2	Output Q+0.0
3	Output Q+0.1
4	Output Q+0.2
5	Output Q+0.3
6	Output Q+0.4
7	Output Q+0.5
8	Output Q+0.6
9	Output Q+0.7
10	Supply ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	222-1BF10
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	70 mA
Power loss	3 W
Technical data digital outputs	
Number of outputs	8
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	10 mA
Total current per group, horizontal configuration, 40°C	10 A
Total current per group, horizontal configuration, 60°C	10 A
Total current per group, vertical configuration	10 A
Output current at signal "1", rated value	2 A
Output delay of "0" to "1"	150 µs
Output delay of "1" to "0"	100 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	3 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

Order no.	**222-1BF10**
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	green LED per group
Group error display	red SF LED
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	0
Output bytes	1
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	100 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

222-1BF20 - DO 8xDC 24V 2A separated 4 á 2

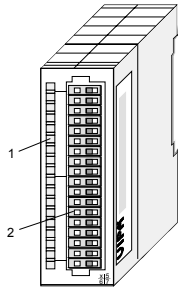
Order data DO 8xDC 24V 2A VIPA 222-1BF20

Description The digital output module accepts binary control signals from the central bus system and transfers them to the process level via outputs. The module requires a DC 24V supply via the connector located on the front. It provides 8 channels and the status of each channel is displayed by means of an LED. The maximum load current per output is 2A.

Properties

- 8 outputs, isolated from the backplane bus
- Potential separation in 4 groups á 2 outputs
- DC 24V supply voltage
- Output current 2A
- Suitable for magnetic valves and DC contactors
- LEDs for supply voltage and error message
- Active channel indication by means of an LED

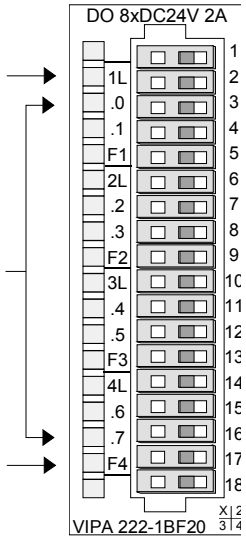
Construction



[1] LED status indicator
[2] Edge connector

Status indicator
pin assignment

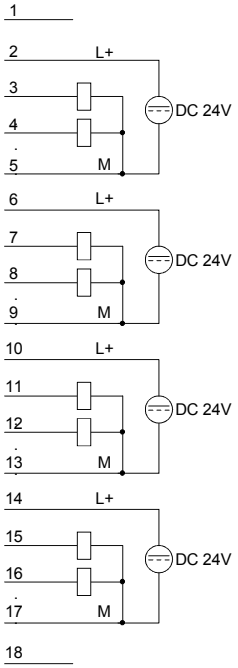
LED	Description
1L...4L	LED (green) Supply voltage available
.0... .7	LEDs (green) Q+0.0 to Q+0.7 (green) when an output becomes active the respective LED is turned on
F1...F4	LED (red) Overload, overheat, short circuit error



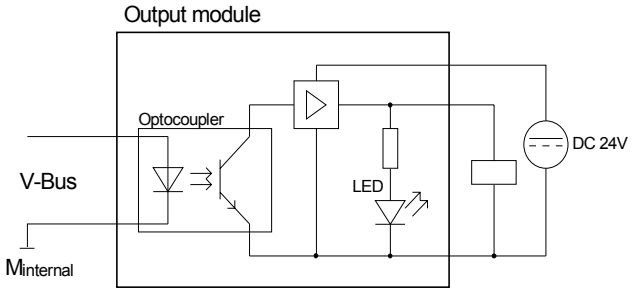
Pin	Assignment
1	not used
2	Supply voltage 1L+
3	Output Q+0.0
4	Output Q+0.1
5	Ground 1M
6	Supply voltage 2L+
7	Output Q+0.2
8	Output Q+0.3
9	Ground 2M
...	...
14	Supply voltage 4L+
15	Output Q+0.6
16	Output Q+0.7
17	Ground 4M
18	not used

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	**222-1BF20**
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	70 mA
Power loss	3 W
Technical data digital outputs	
Number of outputs	8
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	10 mA
Total current per group, horizontal configuration, 40°C	4 A
Total current per group, horizontal configuration, 60°C	4 A
Total current per group, vertical configuration	4 A
Output current at signal "1", rated value	2 A
Output delay of "0" to "1"	150 µs
Output delay of "1" to "0"	100 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	3 A
Number of operating cycle of relay outputs	-

Order no.	222-1BF20
Switching capacity of contacts	-
Output data size	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	green LED per group
Group error display	red LED per group
Channel error display	none
Isolation	
Between channels	✓
Between channels of groups to	2
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	0
Output bytes	1
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

222-1BF30 - DO 8xDC 24V 0.5A - ECO

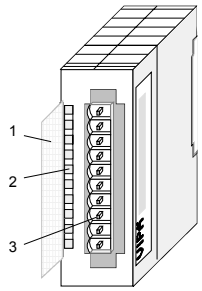
Order data DO 8xDC 24V 0.5A VIPA 222-1BF30

Description The digital output module accepts binary control signals from the central bus system and transfers them to the process level via outputs. The module requires a supply of DC 24V via the front-facing connector. It provides 8 channels and the status of each channel is displayed by means of an LED.

Properties

- 8 outputs, isolated from the backplane bus
- DC 24V supply voltage
- 0.5A output current
- Suitable for magnetic valves and DC contactors
- LEDs for supply voltage and error message
- Active channel indication by means of an LED

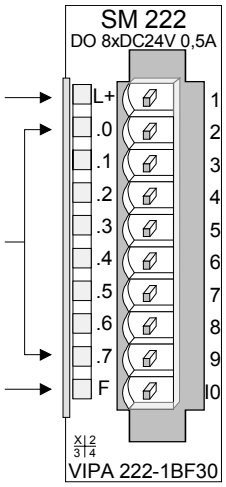
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

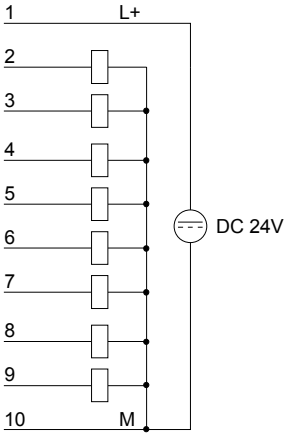
LED	Description
L+	LED (green) Supply voltage available
.0... .7	LEDs (green) Q+0.0 to Q+0.7 when an output is active the respective LED is turned on
F	LED (red) Overload, overheat or short circuit error



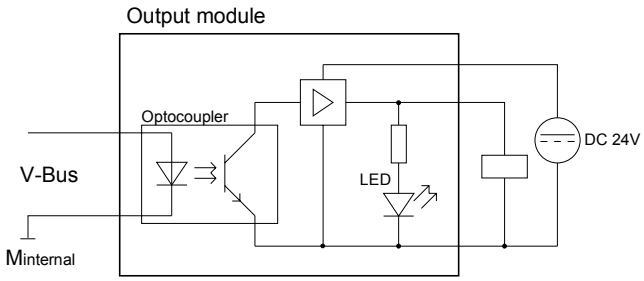
Pin	Assignment
1	DC 24V supply voltage
2	Output Q+0.0
3	Output Q+0.1
4	Output Q+0.2
5	Output Q+0.3
6	Output Q+0.4
7	Output Q+0.5
8	Output Q+0.6
9	Output Q+0.7
10	Supply ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	222-1BF30
Type	SM 222, ECO
Current consumption/power loss	
Current consumption from backplane bus	70 mA
Power loss	2 W
Technical data digital outputs	
Number of outputs	8
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	10 mA
Total current per group, horizontal configuration, 40°C	4 A
Total current per group, horizontal configuration, 60°C	4 A
Total current per group, vertical configuration	4 A
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	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no

Order no.	**222-1BF30**
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	green LED per group
Group error display	red SF LED
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	0
Output bytes	1
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

222-1BF50 - DO 8xDC 24V 0.5A NPN

Order data DO 8xDC 24V 0.5A NPN VIPA 222-1BF50

Description

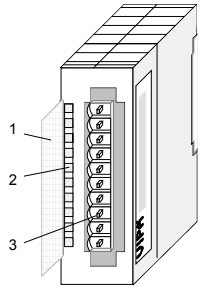
The digital output module accepts binary control signals from the central bus system and controls the connected loads at the process level via Misfit outputs. It provides 8 channels that operate as Low-Side switches and that are interconnected via the load voltage. Low-Side switches are suitable for the control of grounds. When a short circuit occurs between the switched line and ground the result is that the load is activated until the short circuit has been removed. Short circuits do not place an additional load on the supply voltage.

Due to the system an overload at a channel can lead to the fact that the other channels are switched off. The LEDs however are further on, since they indicate the specified condition of the channels.

Properties

- 8 Low-Side outputs
- Output current per channel 0.5A
- Suitable for small motors, lamps, magnetic valves and contactors

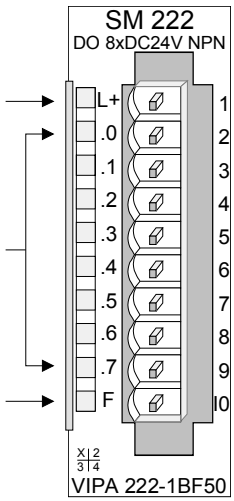
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

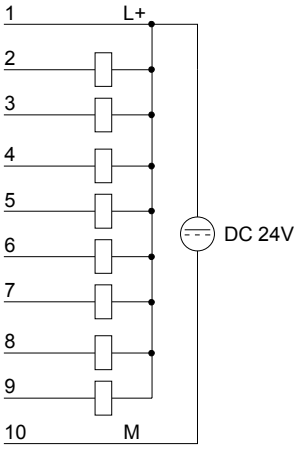
LED	Description
L+	LED (green) Supply voltage available LEDs (green)
.0... .7	Q+0.0 to Q+0.7 when an output is active the respective LED is turned on
F	LED (red) Overload, overheat or short circuit error



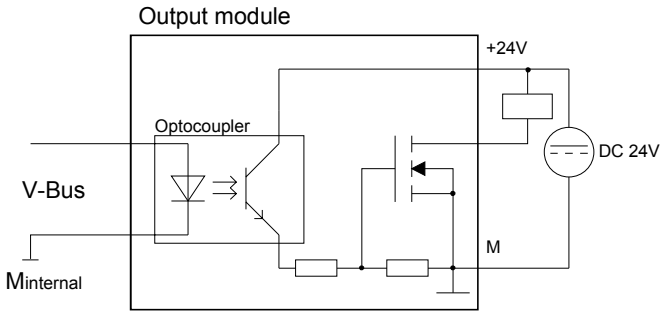
Pin	Assignment
1	DC 24V supply voltage
2	Output Q+0.0
3	Output Q+0.1
4	Output Q+0.2
5	Output Q+0.3
6	Output Q+0.4
7	Output Q+0.5
8	Output Q+0.6
9	Output Q+0.7
10	Supply ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	**222-1BF50**
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	50 mA
Power loss	1.5 W
Technical data digital outputs	
Number of outputs	8
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	15 mA
Total current per group, horizontal configuration, 40°C	4 A
Total current per group, horizontal configuration, 60°C	4 A
Total current per group, vertical configuration	4 A
Output current at signal "1", rated value	0.5 A
Output delay of "0" to "1"	30 µs
Output delay of "1" to "0"	100 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	+45 V
Short-circuit protection of output	yes, electronic
Trigger level	1.7 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
Diagnostic interrupt	no

Order no.	222-1BF50
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	green LED per group
Group error display	red SF LED
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	0
Output bytes	1
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

222-1BH00 - DO 16xDC 24V 0.5A with UB4x

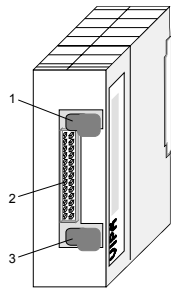
Order data DO 16xDC 24V 0.5A VIPA 222-1BH00

Description The digital output module accepts binary control signals from the central bus system and transfers them to the process level via outputs. The module requires 24V via the connector on the front. It has 16 channels and the status of each channel is displayed by means of an LED. This module requires a converter (DEA-UB4x). The module must be connected to the converter module by means of a flattened round cable (DEA-KB91C).

Properties

- 16 outputs, isolated from the backplane bus
- DC 24V supply voltage
- Output current 0.5A
- Suitable for magnetic valves and DC contactors
- LEDs for supply voltage and error message
- Active channel indication by means of a LED located on converter module UB4x

Construction

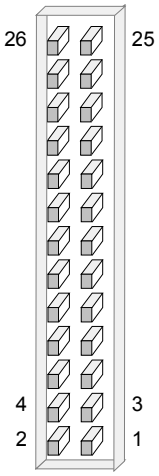


[1] Clip
[2] Recessed connector for the interface to a conversion module UB4x via the flattened round cable
[3] Clip

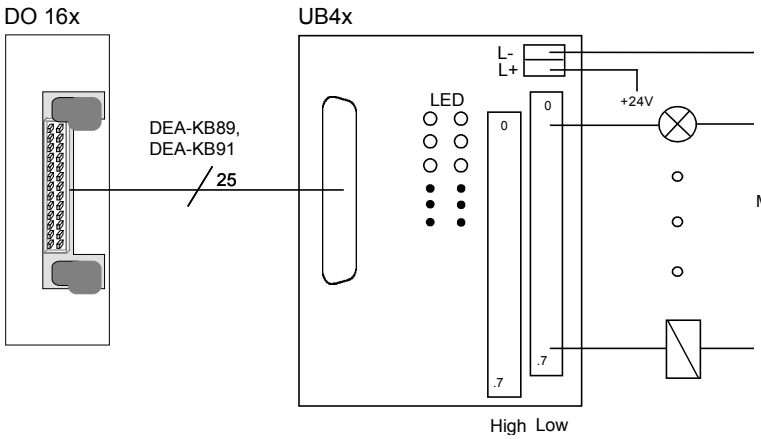
Status indicator on UB4x

LED	Description
0... .15	LEDs (yellow) Q+0.0 to Q+0.7 High Q+1.0 to Q+1.7 Low when an output is active the respective LED is turned on
L+ L-	LED (green) Supply voltage available

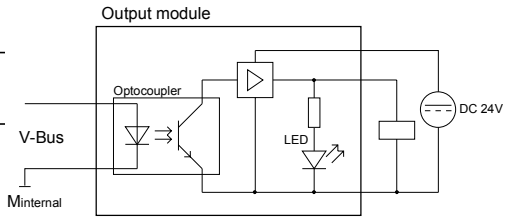
Pin assignment module

Connector	Pin	Assignment
	23...26	DC 24V supply voltage
	22	Output Q+0.0
	.	.
	.	.
	.	.
	15	Output Q+0.7
	14	Output Q+1.0
	.	.
	.	.
	.	.
	7	Output Q+1.7
	1...6	Supply ground

Interfacing of UB4x



Schematic diagram



Technical data

Order no.	**KSD222-1BH00**
Type	SM 222, Set
Current consumption/power loss	
Current consumption from backplane bus	120 mA
Power loss	3.5 W
Technical data digital outputs	
Number of outputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	10 mA
Total current per group, horizontal configuration, 40°C	8 A
Total current per group, horizontal configuration, 60°C	8 A
Total current per group, vertical configuration	8 A
Output current at signal "1", rated value	0.5 A
Output delay of "0" to "1"	150 µs
Output delay of "1" to "0"	100 µs
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. 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	1.5 A
Number of operating cycle of relay outputs	-
Switching capacity of contacts	-
Output data size	2 Byte
Status information, alarms, diagnostics	
Status display	none
Interrupts	no
Process alarm	no

Order no.	**KSD222-1BH00**
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	16
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	0
Output bytes	2
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	80 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

222-1BH10 - DO 16xDC 24V 1A

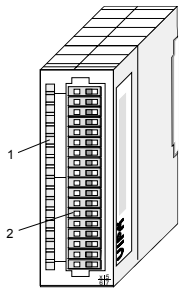
Order data DO 16xDC 24V 1A VIPA 222-1BH10

Description The digital output module accepts binary control signals from the central bus system and transfers them to the process level via outputs. The module requires 24V via the connector on the front. It has 16 channels and the status of each channel is displayed by means of an LED.

Properties

- 16 outputs, isolated from the backplane bus
- DC 24V supply voltage
- 1A output current rating
- Suitable for magnetic valves and DC contactors
- LEDs for supply voltage and error message
- Active channel indication by means of an LED

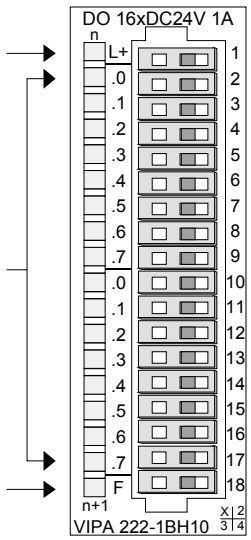
Construction



[1] LED status indicator
[2] Edge connector

Status indicator
pin assignment

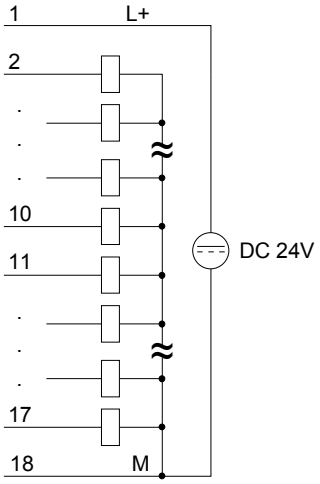
LED	Description
L+	LED (green) Supply voltage available
.0... .7	LEDs (green) Q+0.0 to Q+1.7 when an output is active the respective LED is turned on
F	LED (red) Overload, overheat or short circuit error



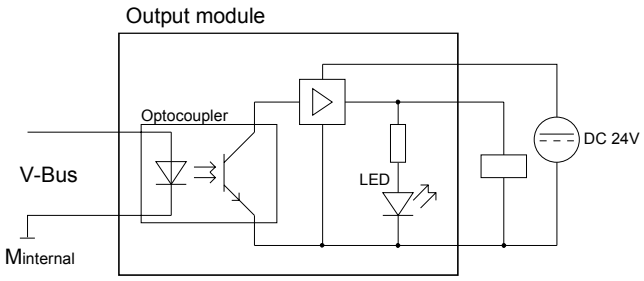
Pin	Assignment
1	DC 24V supply voltage
2	Output Q+0.0
3	Output Q+0.1
.	.
.	.
.	.
9	Output Q+0.7
10	Output Q+1.0
.	.
.	.
.	.
16	Output Q+1.6
17	Output Q+1.7
18	Supply ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	**222-1BH10**
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	120 mA
Power loss	3.5 W
Technical data digital outputs	
Number of outputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	10 mA
Total current per group, horizontal configuration, 40°C	10 A
Total current per group, horizontal configuration, 60°C	10 A
Total current per group, vertical configuration	10 A
Output current at signal "1", rated value	1 A
Output delay of "0" to "1"	150 µs
Output delay of "1" to "0"	100 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	1.5 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 no.	222-1BH10
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	green LED per group
Group error display	red SF LED
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	16
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	0
Output bytes	2
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

222-1BH20 - DO 16xDC 24V 2A

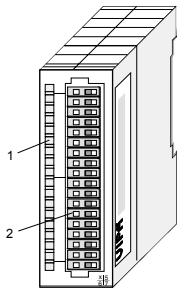
Order data DO 16xDC 24V 2A VIPA 222-1BH20

Description The digital output module accepts binary control signals from the central bus system and transfers them to the process level via outputs. The module requires 24V via the connector on the front. It has 16 channels and the status of each channel is displayed by means of an LED.

Properties

- 16 outputs, isolated from the backplane bus
- DC 24V supply voltage
- 2A output current rating
- Suitable for magnetic valves and DC contactors
- LEDs for supply voltage and error message
- Active channel indication by means of an LED

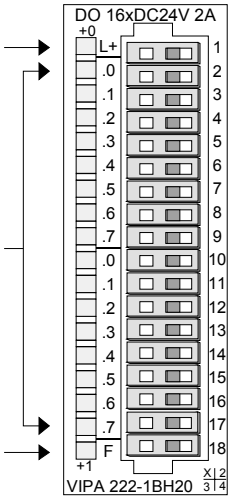
Construction



[1] LED status indicator
[2] Edge connector

Status indicator pin assignment

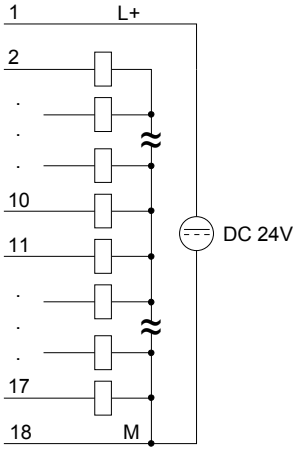
LED	Description
L+	LED (green) Supply voltage available
.0... .7	LEDs (green) Q+0.0 to Q+1.7 when an output is active the respective LED is turned on
F	LED (red) Overload, overheat or short circuit error



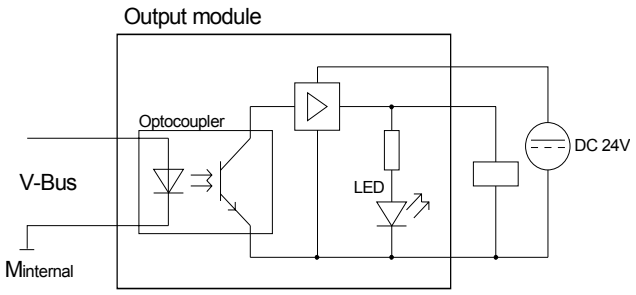
Pin	Assignment
1	DC 24V supply voltage
2	Output Q+0.0
.	.
.	.
.	.
9	Output Q+0.7
10	Output Q+1.0
.	.
.	.
.	.
17	Output Q+1.7
18	Supply ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	222-1BH20
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	120 mA
Power loss	3.5 W
Technical data digital outputs	
Number of outputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	10 mA
Total current per group, horizontal configuration, 40°C	10 A
Total current per group, horizontal configuration, 60°C	10 A
Total current per group, vertical configuration	10 A
Output current at signal "1", rated value	2 A
Output delay of "0" to "1"	150 µs
Output delay of "1" to "0"	100 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	3 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
Diagnostic interrupt	no

Order no.	**222-1BH20**
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	green LED per group
Group error display	red SF LED
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	16
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	0
Output bytes	2
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	100 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

222-1BH30 - DO 16xDC 24V 0.5A - ECO

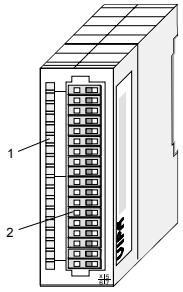
Order data DO 16xDC 24V 0.5A VIPA 222-1BH30

Description The digital output module accepts binary control signals from the central bus system and transfers them to the process level via outputs. The module requires 24V via the connector on the front. It has 16 channels and the status of each channel is displayed by means of an LED.

Properties

- 16 outputs, isolated from the backplane bus
- DC 24V supply voltage
- 0.5A output current rating
- Suitable for magnetic valves and DC contactors
- LEDs for supply voltage and error message
- Active channel indication by means of an LED

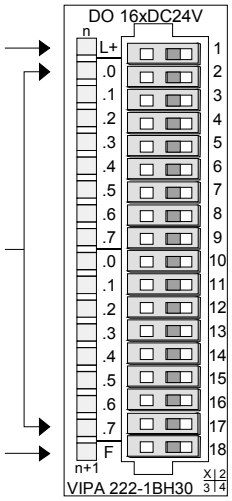
Construction



[1] LED status indicator
[2] Edge connector

Status indicator pin assignment

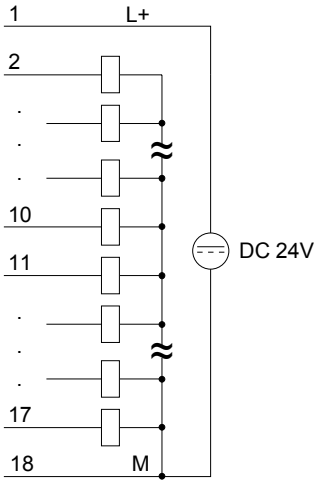
LED	Description
L+	LED (green) Supply voltage available
.0... .7	LEDs (green) Q+0.0 to Q+1.7 when an output is active the respective LED is turned on
F	LED (red) Overload, overheat or short circuit error



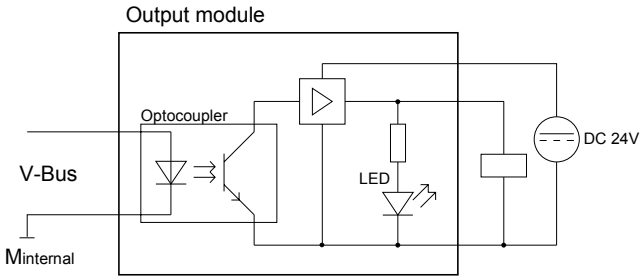
Pin	Assignment
1	DC 24V supply voltage
2	Output Q+0.0
.	.
.	.
.	.
9	Output Q+0.7
10	Output Q+1.0
.	.
.	.
.	.
17	Output Q+1.7
18	Supply ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	**222-1BH30**
Type	SM 222, ECO
Current consumption/power loss	
Current consumption from backplane bus	120 mA
Power loss	3.5 W
Technical data digital outputs	
Number of outputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	10 mA
Total current per group, horizontal configuration, 40°C	8 A
Total current per group, horizontal configuration, 60°C	8 A
Total current per group, vertical configuration	8 A
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 no.	222-1BH30
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	green LED per group
Group error display	red SF LED
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	16
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	0
Output bytes	2
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

222-1BH50 - DO 16xDC 24V 0.5A NPN

Order data DO 16xDC 24V 0.5A NPN VIPA 222-1BH50

Description

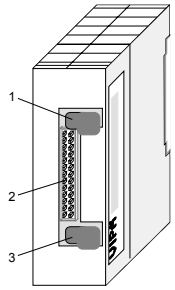
The digital output module accepts binary control signals from the central bus system and controls the connected loads at the process level via Misfit outputs. It provides 16 channels that operate as Low-Side switches and that are interconnected via the load voltage. Low-Side switches are suitable for the control of grounds. When a short circuit occurs between the switched line and ground the result is that the load is activated until the short circuit has been removed. Short circuits do not place an additional load on the supply voltage.

Due to the system an overload at a channel can lead to the fact that the other channels are switched off. The LEDs however are further on, since they indicate the specified condition of the channels.

Properties

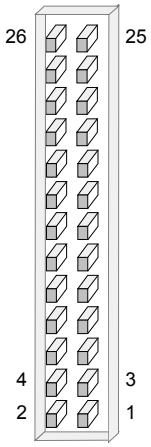
- 16 Low-Side outputs
- Output current per channel 0.5A
- Suitable for small motors, lamps, magnetic valves and contactors

Construction



[1] Clip
[2] Recessed connector for the interface to a output connection
[3] Clip

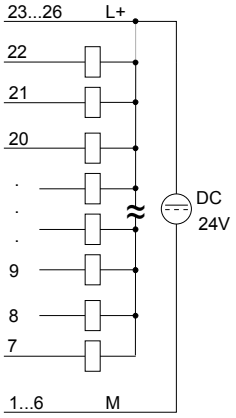
Pin assignment



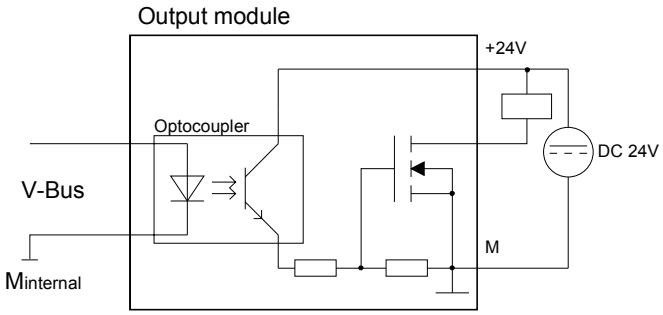
Connector	Pin	Assignment
	23...26	DC 24V supply voltage
	22	Output Q+0.0
	21	Output Q+0.1
	.	.
	.	.
	.	.
	8	Output Q+1.6
	7	Output Q+1.7
	1...6	Supply ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Attention!

This module is not deployable with UB4x from VIPA without technical intervention. For deploying the module with a converter module from VIPA, please call the VIPA Hotline.

Technical data

Order no.	222-1BH50
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	120 mA
Power loss	3.5 W
Technical data digital outputs	
Number of outputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	10 mA
Total current per group, horizontal configuration, 40°C	8 A
Total current per group, horizontal configuration, 60°C	8 A
Total current per group, vertical configuration	8 A
Output current at signal "1", rated value	0.5 A
Output delay of "0" to "1"	100 µs
Output delay of "1" to "0"	150 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	+45 V
Short-circuit protection of output	yes, electronic
Trigger level	1.5 A
Number of operating cycle of relay outputs	-
Switching capacity of contacts	-

Order no.	**222-1BH50**
Output data size	2 Byte
Status information, alarms, diagnostics	
Status display	none
Interrupts	no
Process alarm	no
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	16
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	0
Output bytes	2
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	80 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

222-1BH51 - DO 16xDC 24V 0.5A NPN

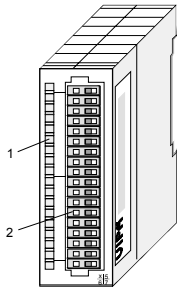
Order data DO 16xDC 24V 0.5A NPN VIPA 222-1BH51

Description The digital output module accepts binary control signals from the central bus system and controls the connected loads at the process level via Mosfet outputs. It provides 16 channels that operate as Low-Side switches and that are interconnected via the load voltage. Low-Side switches are suitable for the control of grounds. When a short circuit occurs between the switched line and ground the result is that the load is activated until the short circuit has been removed. Short circuits do not place an additional load on the supply voltage.

Properties

- 16 Low-Side outputs
- Output current per channel 0.5A
- Suitable for small motors, lamps, magnetic valves and contactors

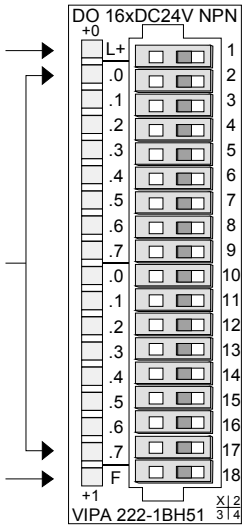
Construction



[1] LED status indicator
[2] Edge connector

Status indicator pin assignment

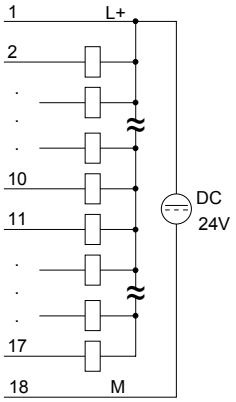
LED	Description
L+	LED (green) Supply voltage available
.0... .7	LEDs (green) Q+0.0 to Q+1.7 when an output is active the respective LED is turned on
F	LED (red) Overload, overheat or short circuit error



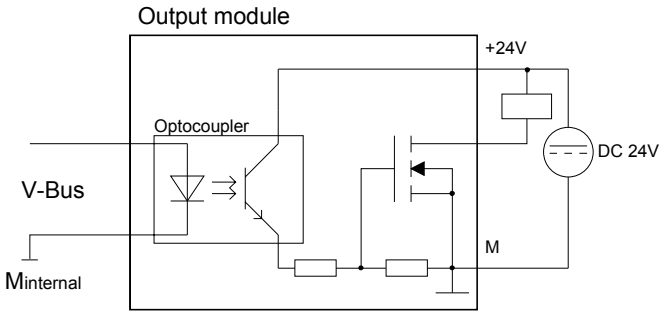
Pin	Assignment
1	DC 24V supply voltage
2	Output Q+0.0
.	.
.	.
.	.
9	Output Q+0.7
10	Output Q+1.0
.	.
.	.
.	.
17	Output Q+1.7
18	Supply ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	**222-1BH51**
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	90 mA
Power loss	2.5 W
Technical data digital outputs	
Number of outputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	25 mA
Total current per group, horizontal configuration, 40°C	8 A
Total current per group, horizontal configuration, 60°C	8 A
Total current per group, vertical configuration	8 A
Output current at signal "1", rated value	0.5 A
Output delay of "0" to "1"	30 µs
Output delay of "1" to "0"	100 µs
Minimum load current	-
Lamp load	5 W
Parallel switching of outputs for redundant control of a load	possible (only outputs group)
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	+45 V
Short-circuit protection of output	yes, electronic
Trigger level	1.7 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
Diagnostic interrupt	no
Diagnostic functions	no

Order no.	222-1BH51
Diagnostics information read-out	none
Supply voltage display	green LED per group
Group error display	red SF LED
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	16
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	0
Output bytes	2
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	90 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

222-2BL10 - DO 32xDC 24V 1A

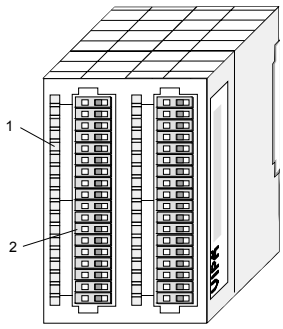
Order data DO 32xDC 24V 1A VIPA 222-2BL10

Description The digital output module accepts binary control signals from the central bus system and transfers them to the process level via outputs. The module requires 24V via the connector on the front. It provides 32 channels and the status of each channel is displayed by means of LEDs.

Properties

- 32 outputs, isolated from the backplane bus
- DC 24V supply voltage
- Output current per channel 1A
- Suitable for magnetic valves and DC contactors
- LEDs for supply voltage and error message
- Active channel indication by means of an LED

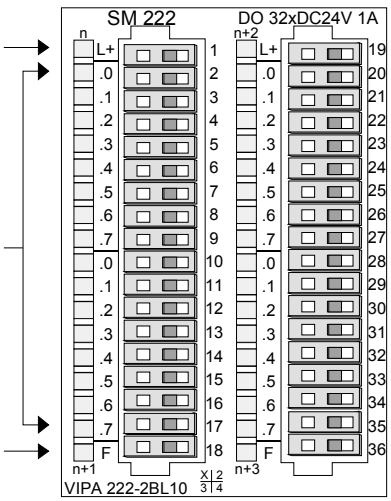
Construction



[1] LED status indicator
[2] Edge connector

Status indicator pin assignment

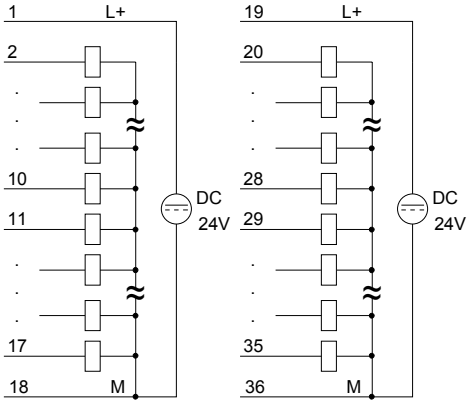
LED	Description
L+	LED (green) Supply voltage available
.0 7	LEDs (green) Q+0.1 to Q+1.7 when an output is active the respective LED is turned on
F	LED (red) Overload, overheat or short circuit error



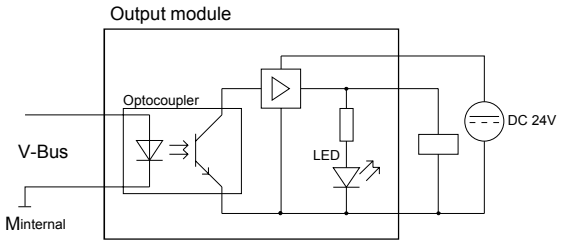
Pin	Assignment
1	DC 24V supply voltage
2	Output Q+0.0
3	Output Q +0.1
...	...
17	Output Q +1.7
18	supply ground
19	DC 24V supply voltage
20	Output Q +2.0
...	...
34	Output Q +3.6
35	Output Q +3.7
36	supply ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Technical data

Order no.	222-2BL10
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	180 mA
Power loss	6.5 W
Technical data digital outputs	
Number of outputs	32
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	15 mA
Total current per group, horizontal configuration, 40°C	10 A
Total current per group, horizontal configuration, 60°C	10 A
Total current per group, vertical configuration	10 A
Output current at signal "1", rated value	1 A
Output delay of "0" to "1"	150 µs
Output delay of "1" to "0"	100 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	1.5 A
Number of operating cycle of relay outputs	-
Switching capacity of contacts	-
Output data size	4 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no

Order no.	**222-2BL10**
Diagnostics information read-out	none
Supply voltage display	green LED per group
Group error display	red SF LED
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	16
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	0
Output bytes	4
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	50.8 x 76 x 88 mm
Weight	150 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

222-1DB00 - DO 2xAC 100...230V 2A

Order data DO 2xAC 100...230V 2A VIPA 222-1DB00

Description

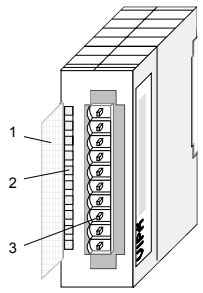
The digital output module controls the power drain of the outputs by using the settings of the user program. The module provides 2 individual trigger able channels and requires an AC 100...230V supply via the connector located on the front. The maximum load current per output is 2A.

The module has a configurable software dimmer function to avoid a step change of the load current. The software dimmer function transforms a step change of the load current into a slow dim up or down of the load.

Properties

- Software dimmer for resistive, inductive or capacitive load
- 2 outputs, isolated from the backplane bus
- Output current 2A
- Automatic load detection
- Voltage AC 100 ... 230V
- Frequency range 47 ... 63Hz
- LEDs for supply voltage and error message

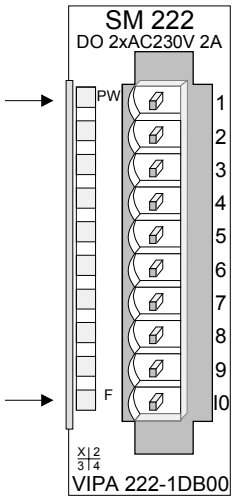
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

LED	Description
PW	LED (green) Module is power supplied by back plane bus
F	LED (red) Overload, overheat, missing power supply or parameterization error

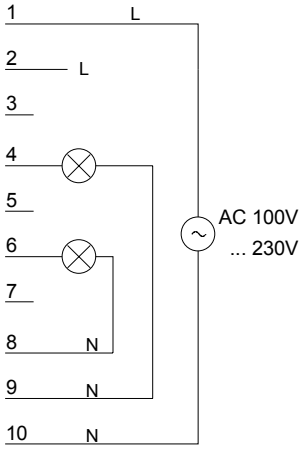


Pin	Assignment
1	AC 100...230V load voltage (L) *1)
2	AC 100...230V load voltage (L) *1)
3	not connected
4	Output Q+0.0 channel 0
5	not connected
6	Output Q+2.0 channel 1
7	not connected
8	AC 100...230V neutral conductor (N) *2)
9	AC 100...230V neutral conductor (N) *2)
10	AC 100...230V neutral conductor (N) *2)

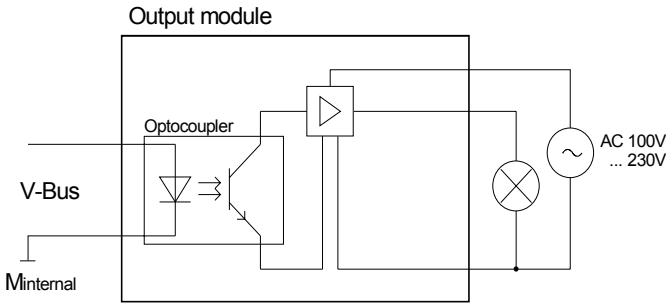
*1) internally bridged
*2) internally bridged

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Safety precautions

Danger!

- The module is not certified for applications in explosive environments (EX-zone)!
- You have to disconnect the module from the main power source before commencing installation or maintenance work, i.e. before you start to work the main supply line must be disconnected (disconnect plugs, on permanent installations the respective fuse has to be turned off)!
- Only properly qualified electrical staff is allowed to install, connect and/or modify electrical equipment!
- To provide a sufficient level of ventilation and cooling to the power supply components whilst maintaining the compact construction it was not possible to protect the unit from incorrect handling and a proper level of fire protection. For this reason the required level of fire protection must be provided by the environment where the power supply is installed (e.g. installation in a switchboard that satisfies the fire protection rules and regulations)!
- Please adhere to the national rules and regulations of the location and/or country where the units are installed (installation, safety precautions, EMC ...).

Automatic load detection

For each channel the module has an automatic load detection. On each channel you may connect either an inductive or a capacitive load.

Attention!

Mixing respectively switching over inductive and capacitive loads at one channel is not allowed. Resistive loads may always be merged.

Data output area

The module uses 2bytes per channel of the data output area. During run time a value 0...100 may be preset. This is corresponding to dim value 0% (switched off) ... 100% (max. load).

A channel is deactivated with values > 100%.

Data output area:

Byte	Bit 7 ... Bit 0
0, 1	0 ... 100: Software dimmer in % for output channel 0
2, 3	0 ... 100: Software dimmer in % for output channel 1

Parameter data

15byte are available for the configuration data.

Parameter area:

Byte	Bit 7 ... Bit 0	Default
0	Diagnostic alarm byte: Bit 0: 0: Overcurrent recognition channel 0 off 1: Overcurrent recognition channel 0 on Bit 1: 0: Overcurrent recognition channel 1 off 1: Overcurrent recognition channel 1 on Bit 3 ... 2: reserved Bit 4: 0: Overheat recognition off 1: Overheat recognition on Bit 5: reserved Bit 6: 0: Diagnostic interrupt disabled 1: Diagnostic interrupt enabled Bit 7: reserved	00h
1	reserved	00h
2	Software coefficient channel 0 1 ... 255: Software coefficient	09h
3	Software coefficient channel 1 1 ... 255: Software coefficient	09h
4	Preheat time channel 0 0 ... 255: Periods of the load voltage	09h
5	Preheat time channel 1 0 ... 255: Periods of the load voltage	09h
6	Bit 0: Behavior at CPU STOP channel 0 0: Switch substitute value 1: Keep last value Bit 1: Behavior at CPU STOP channel 1 0: Switch substitute value 1: Keep last value Bit 7 ... 2: reserved	00h
7, 8	Substitute value channel 0	00h
9, 10	Substitute value channel 1	00h
11, 12	Preheat value channel 0 (0 ... 100%)	00h
13, 14	Preheat value channel 1 (0 ... 100%)	00h

Diagnostic interrupt

A diagnostic is an error message to the CPU. If diagnostic interrupt is enabled by parameterization, the following events may release a diagnostic interrupt:

- Overcurrent recognition channel 0
- Overcurrent recognition channel 1
- Overheat recognition for both channels
- Missing or failure of load voltage

The error events *overcurrent* and *overheat* recognition may be activated respectively deactivated by the parameterization.

With a diagnostic 10bytes are transferred to the CPU.
Within the CPU you may react to the diagnostic by an appropriate program. Details may be found at "Diagnostic data".

Software coefficient

For each channel the module has a configurable software dimmer function to avoid a step change of the load current. The software dimmer function transforms a step change of the load current into a slow dim up or down of the load.

By means of the *software coefficient* you may determine a constant rate of change for the dimming operation.

The software coefficient results from the desired time for dimming from 0% to 100% and the period duration of the load voltage. It is valid:

$$n = \frac{time}{2 \cdot P}$$

with n = Software coefficient (1...255)
$time$ = desired time for 0%...100% in s (max. 10s)
P = Period duration of the load voltage in s at f = 47...63Hz

A higher *software coefficient* results in a slower slew rate of the dimmer function.

Behavior at CPU STOP, substitute value

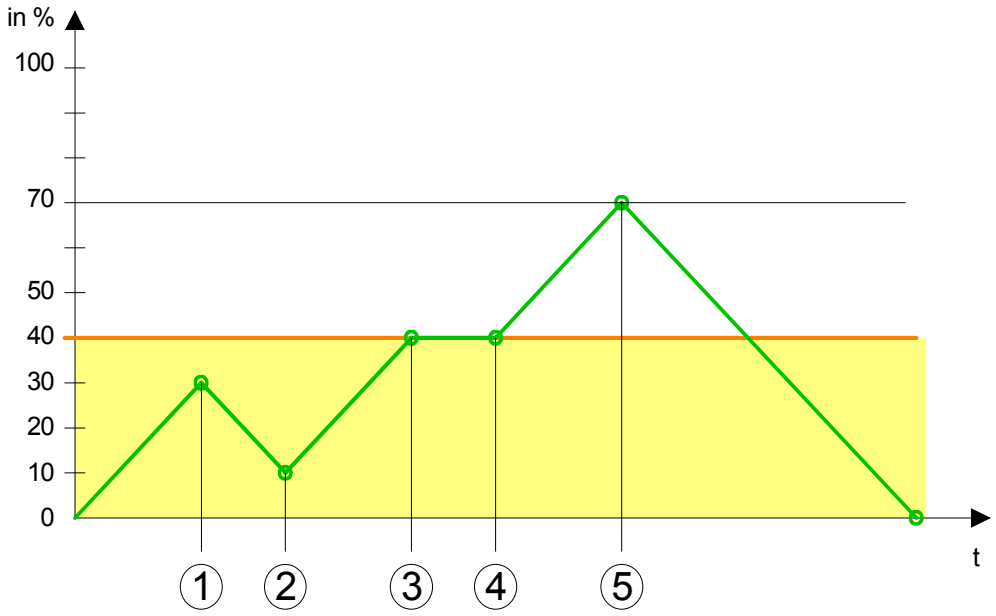
For each channel the behavior of the module at a CPU STOP may be configured here. You may either keep the last value or switch a substitute value. This may be defined at *substitute value*.

Preheat time
Preheat value

For each channel the module has a configurable preheat function to avoid overcurrent errors by fast dimming of a cold filament. For configuration there are the parameters *preheat time* and *preheat value*. With the preheat time the duration of preheating may be preset. With the preheat value a threshold in % may be preset starting from the preheat function is active.

The following figure shows the usage of the preheat function at an example.

The preheat value is e.g. 40%. Values below this threshold are output without preheating. Here it is dimmed to maximally 70%.



(1) Dim up to 30% (no preheating - below the threshold)
(2) Dim down to 10%
(3) Dim up to 70%, at 40% constant during the preheat time
(4) At preheat time it is dimmed up to the preset 70%.
(5) It is directly dimmed down to 0%.

Diagnostic data

The diagnostic data have a size of 10bytes and are stored in the record sets 0 and 1 of the system data area.

As soon as you activated the alarm release in byte 0 of the parameter area, in case of an error *record set 0* is transferred to the superordinated system.

Record set 0 has a fixed content and a length of 4byte. The contents of *record set 0* may be monitored in plain text via the diagnosis window of the CPU.

For extended diagnostic purposes during runtime, you may evaluate the *record set 1* with a size of 10bytes via the SFCs 51 and 59.

Evaluate diagnosis

At a diagnostic task the CPU interrupts the user application and branches into OB 82. With according programming, you may request in this OB with the SFCs 51 and 59 detailed diagnostic information and react on it.

After execution of the OB 82, the processing of the user application is continued. The diagnostic data remains consistent until leaving the OB 82.

Record set 0

Byte 0 to 3:

Record set 0 (Byte 0 to 3):

Byte	Bit 7 ... Bit 0	Default
0	Bit 0: Error in module Bit 1: reserved Bit 2: External error Bit 3: Channel error Bit 4: reserved Bit 5: Error load voltage (L) Bit 6: reserved Bit 7: Wrong parameter in module	00h
1	Bit 3 ... 0: Module class 1111 Digital module Bit 4: Channel information present Bit 7 ... 5: reserved	1Fh
2	not used	00h
3	Bit 7 ... 0: reserved	00h

Record set 1

Byte 0 to 9:

Record set 1 contains the 4byte of record set 0 and 6byte module specific diagnostic data.

The diagnostic bytes have the following assignment:

Record set 1 (Byte 0 to 9):

Byte	Bit 7 ... Bit 0	Default
0 ... 3	Content of record set 0 (see page above)	-
4	Bit 6 ... 0: Channel type 72h: Digital output Bit 7: reserved	72h
5	Bit 7 ... 0: Number of diagnostic output bits per channel	08h
6	Bit 7 ... 0: Number of similar channels of a module	02h
7	Bit 0: Channel 0: Channel error Bit 1: Channel 1: Channel error Bit 7 ... 2: reserved	00h
8	Bit 0: Channel 0: Parameterization error recognized Bit 2, 1: reserved Bit 3: Channel 0: Overload recognized Bit 5, 4: reserved Bit 6: Channel 0: Missing load voltage or is failed Bit 7: Channel 0: Overheat recognized	00h
9	Bit 0: Channel 1: Parameterization error recognized Bit 2, 1: reserved Bit 3: Channel 1: Overload recognized Bit 5, 4: reserved Bit 6: Channel 1: Missing load voltage or is failed Bit 7: Channel 1: Overheat recognized	00h

Technical data

Order no.	**222-1DB00**
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	190 mA
Power loss	6 W
Technical data digital outputs	
Number of outputs	2
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	AC 100...240 V
Current consumption from load voltage L+ (without load)	15 mA
Total current per group, horizontal configuration, 40°C	4 A
Total current per group, horizontal configuration, 60°C	3 A
Total current per group, vertical configuration	4 A
Output current at signal "1", rated value	2 A
Output delay of "0" to "1"	max. 1 AC cycle

Order no.	**222-1DB00**
Output delay of "1" to "0"	max. 1 AC cycle
Minimum load current	-
Lamp load	460 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	-
Switching frequency with inductive load	-
Switching frequency on lamp load	-
Internal limitation of inductive shut-off voltage	-
Short-circuit protection of output	yes, electronic
Trigger level	4 A
Number of operating cycle of relay outputs	-
Switching capacity of contacts	-
Output data size	4 Byte
Status information, alarms, diagnostics	
Status display	none
Interrupts	no
Process alarm	no
Diagnostic interrupt	yes, parameterizable
Diagnostic functions	no
Diagnostics information read-out	possible
Supply voltage display	green LED per group
Group error display	red SF LED
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	-
Between channels and backplane bus	✓
Insulation tested with	DC 4000 V
Datasizes	
Input bytes	0
Output bytes	4
Parameter bytes	17
Diagnostic bytes	10
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	70 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	-

222-1HF00 - DO 8xRelay COM

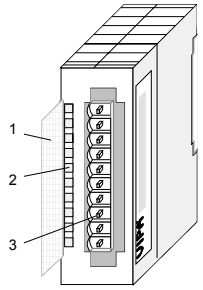
Order data DO 8xRelay COM VIPA 222-1HF00

Description The digital output module accepts binary control signals from the central bus system and controls the connected loads at the process level via relay outputs. The module derives power from the backplane bus. The load voltage must be connected to terminal 1. When the total current exceeds 8A you have to balance the load current between terminals 1 and 10. The module has 8 channels and the status of each channel is displayed by means of an LED.

Properties

- 8 relay outputs
- Power supply via backplane bus
- External load voltage AC 230V / DC 30V
- Output current per channel 3A (AC 230V / DC 30V)
- Suitable for motors, lamps, magnetic valves and DC contactors
- Active channel indication by means of LED

Construction

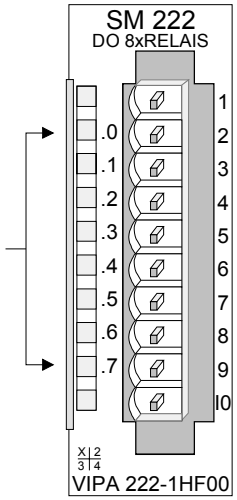


[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator

LED	Description
.0... .7	LEDs (green) Q+0.0 to Q+0.7 when an output is active the respective LED is turned on

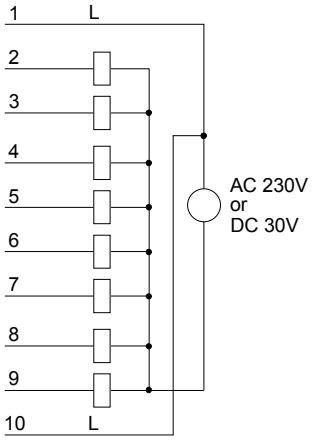
pin assignment



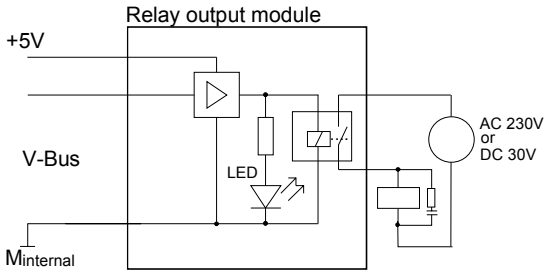
Pin	Assignment
1	Supply voltage L
2	Relay output Q+0.0
3	Relay output Q+0.1
4	Relay output Q+0.2
5	Relay output Q+0.3
6	Relay output Q+0.4
7	Relay output Q+0.5
8	Relay output Q+0.6
9	Relay output Q+0.7
10	Supply voltage L

Wiring and schematic diagram

Wiring diagram

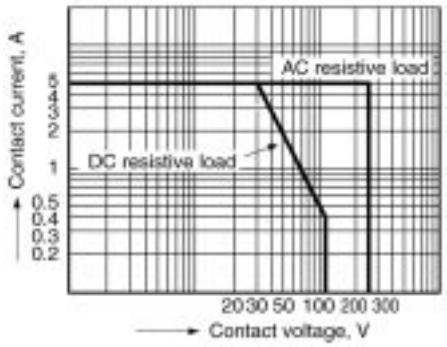


Schematic diagram

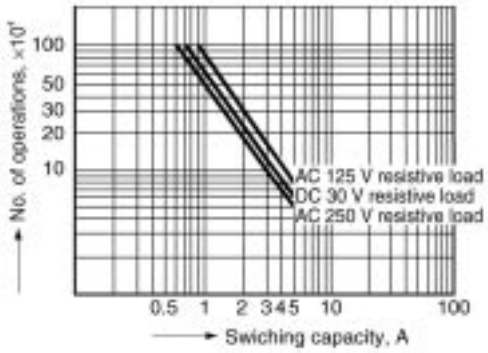


Note: When using inductive load please take a suitable protector (see installation guidelines).

Maximum load



Service life



Technical data

Order no.	**222-1HF00**
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	300 mA
Power loss	2 W
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
Current consumption from load voltage L+ (without load)	-
Total current per group, horizontal configuration, 40°C	8 A
Total current per group, horizontal configuration, 60°C	8 A
Total current per group, vertical configuration	8 A
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

Order no.	222-1HF00
Actuation of digital input	-
Switching frequency with resistive load	max. 0.33 Hz
Switching frequency with inductive load	max. 0.33 Hz
Switching frequency on lamp load	max. 0.33 Hz
Internal limitation of inductive shut-off voltage	-
Short-circuit protection of output	-
Trigger level	-
Number of operating cycle of relay outputs	10^7
Switching capacity of contacts	5 A
Output data size	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
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	-
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	0
Output bytes	1
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	110 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL certification	Yes
KC certification	-

222-1HD10 - DO 4xRelay

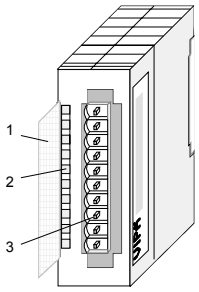
Order data DO 4xRelay VIPA 222-1HD10

Description The digital output module accepts binary control signals from the central bus system and controls the connected loads at the process level via relay outputs. The module derives power from the backplane bus. The module has 4 isolated channels that operate as switches and the status of each channel is displayed by means of a LED. Power required by active loads must be supplied externally.

Properties

- 4 isolated relay outputs
- Power supply via backplane bus
- External load voltage AC 230V / DC 30V (may be mixed)
- Max. output current per channel 3A (AC 230V / DC 30V)
- Suitable for motors, lamps, magnetic valves and DC contactors
- Active channel indication by means of an LED

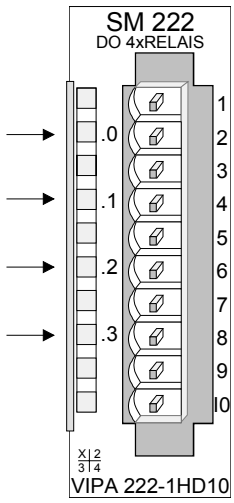
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator
pin assignment

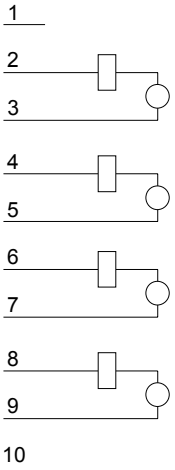
LED	Description
.0... .3	LEDs (green) Q+0.0 to Q+0.3 when an output is active the respective LED is turned on



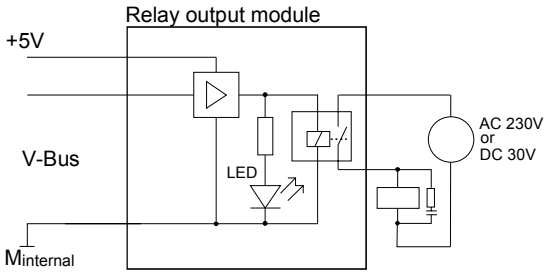
Pin	Assignment
1	not connected
2+3	Relay output Q+0.0
4+5	Relay output Q+0.1
6+7	Relay output Q+0.2
8+9	Relay output Q+0.3
10	not connected

Wiring and schematic diagram

Wiring diagram

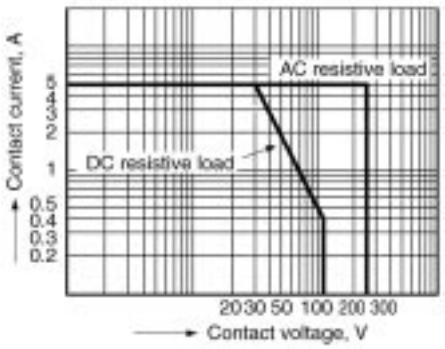


Schematic diagram

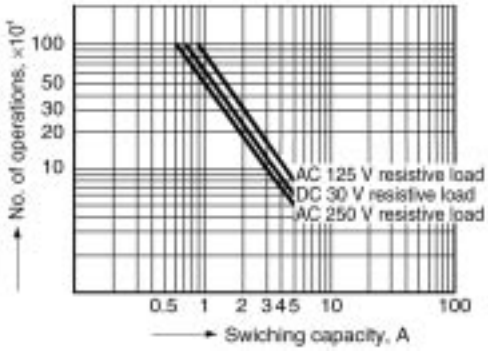


Note: When using inductive load please take a suitable protector (see installation guidelines).

Maximum load



Service life



Technical data

Order no.	**222-1HD10**
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	160 mA
Power loss	2 W
Technical data digital outputs	
Number of outputs	4
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	AC 230 V
Current consumption from load voltage L+ (without load)	5 A
Total current per group, horizontal configuration, 40°C	5 A
Total current per group, horizontal configuration, 60°C	5 A
Total current per group, vertical configuration	5 A
Output current at signal "1", rated value	3 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

Order no.	**222-1HD10**
Actuation of digital input	-
Switching frequency with resistive load	max. 0.33 Hz
Switching frequency with inductive load	max. 0.33 Hz
Switching frequency on lamp load	max. 0.33 Hz
Internal limitation of inductive shut-off voltage	-
Short-circuit protection of output	-
Trigger level	-
Number of operating cycle of relay outputs	10^7
Switching capacity of contacts	5 A
Output data size	1 Byte
Status information, alarms, diagnostics	
Status display	green LED per channel
Interrupts	no
Process alarm	no
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	1
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	0
Output bytes	1
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	100 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL certification	yes
KC certification	-

222-1HD20 - DO 4xRelay bistable

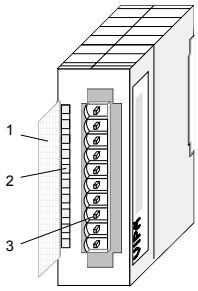
Order data DO 4xRelay bistable VIPA 222-1HD20

Description The digital output module accepts binary control signals from the central bus system and controls the connected loads at the process level via bistable relay outputs. The module derives power from the backplane bus. The module has 4 channels that operate as switches. The status of the respective switch is retained if the power from the controlling system fails.

Properties

- 4 isolated relay outputs
- Power supply via backplane bus
- External load voltage AC 230V / DC 30V (may be mixed)
- Max. Output current per channel 16A (AC 230V / DC 30V)
- Suitable for motors, lamps, magnetic valves and DC contactors

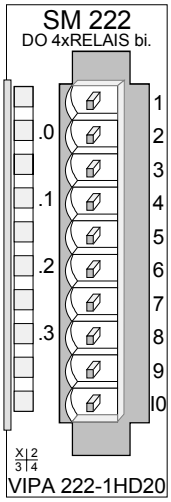
Construction



[1] Label for the bit address with description
[2] LEDs (not used)
[3] Edge connector

Output byte / Pin assignment

Bit	Description
Bit 0	set Q+0.0
Bit 1	set Q+0.1
Bit 2	set Q+0.2
Bit 3	set Q+0.3
Bit 4	reset Q+0.0
Bit 5	reset Q+0.1
Bit 6	reset Q+0.2
Bit 7	reset Q+0.3

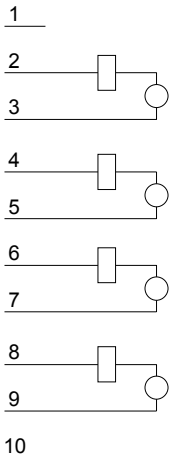


Pin	Assignment
1	not connected
2+3	Relay output Q+0.0
4+5	Relay output Q+0.1
6+7	Relay output Q+0.2
8+9	Relay output Q+0.3
10	not connected

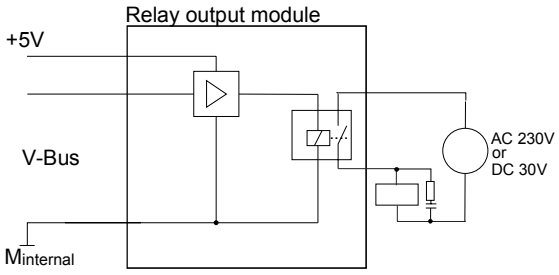
Setting the Bits 0 ... 3 activates the concerning output. Setting the Bits 4 ... 7 causes a reset of the concerning output.

Wiring and schematic diagram

Wiring diagram



Schematic diagram



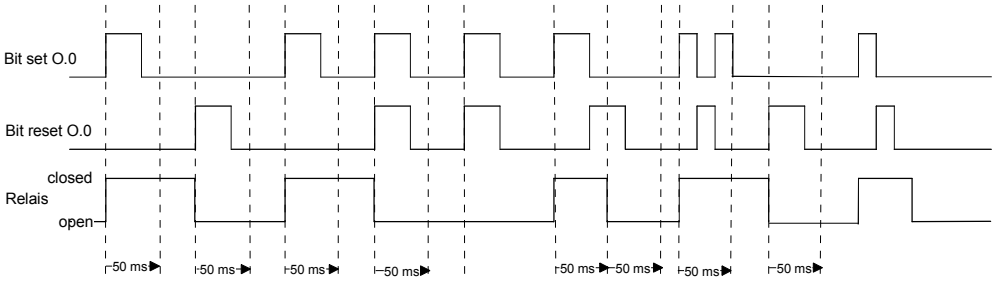
Note: When using inductive load please take a suitable protector (see installation guidelines).

Attention!

With this module, you may only use the supplied front connector!

The connectors available with order number 292-1AF00 respectively 10pole front connectors of other modules may not be used for the 16A nominal current of this module.

Signaling diagram



Note!

Please consider that a relay output that has been set respectively reset may only be reset respectively set after at least 50ms when the set-signal respectively reset-signal is not applied!

Technical data

Order no.	**222-1HD20**
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	200 mA
Power loss	2 W
Technical data digital outputs	
Number of outputs	4
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	AC 230 V
Current consumption from load voltage L+ (without load)	-
Total current per group, horizontal configuration, 40°C	16 A

Order no.	222-1HD20
Total current per group, horizontal configuration, 60°C	16 A
Total current per group, vertical configuration	16 A
Output current at signal "1", rated value	16 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. 0.33 Hz
Switching frequency with inductive load	max. 0.33 Hz
Switching frequency on lamp load	max. 0.33 Hz
Internal limitation of inductive shut-off voltage	-
Short-circuit protection of output	-
Trigger level	-
Number of operating cycle of relay outputs	10^7
Switching capacity of contacts	16 A
Output data size	1 Byte
Status information, alarms, diagnostics	
Status display	none
Interrupts	no
Process alarm	no
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	1
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	0
Output bytes	1
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	120 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL certification	yes
KC certification	-

222-1FF00 - DO 8xSolid State COM

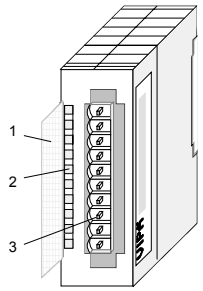
Order data DO 8xSolid State VIPA 222-1FF00

Description The digital output module accepts binary control signals from the central bus system and controls the connected loads at the process level via solid-state relay outputs. The module derives power from the backplane bus. The module has 8 channels that are interconnected via the load voltage that act as switches and display the status by means of LEDs. Solid-state relays change state when the load voltage passes through zero (AC).

Properties

- 8 solid-state outputs with active channel indication by means of a LED
- Extended service life due to the fact that the load voltage (provided this is AC) is switched when it passes through zero
- External load voltage AC 230V or DC 400V
- Max. output current per channel 0.5A (AC 230V / DC 400V)
- Suitable for small motors, lamps, magnetic valves and contactors

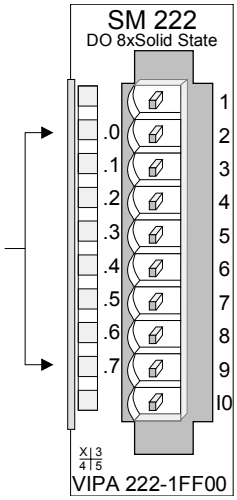
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

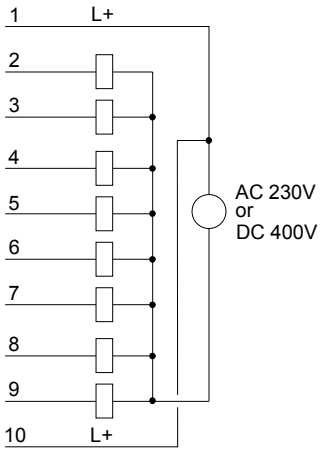
LED	Description
.0... .7	LEDs (green) Q+0.0 to Q+0.7 when an output is active the respective LED is turned on



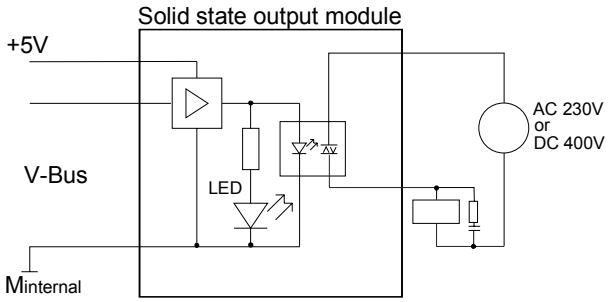
Pin	Assignment
1	Supply voltage
2	Output Q+0.0
3	Output Q+0.1
4	Output Q+0.2
5	Output Q+0.3
6	Output Q+0.4
7	Output Q+0.5
8	Output Q+0.6
9	Output Q+0.7
10	Supply voltage

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Note: When using inductive load please take a suitable protector (see installation guidelines).

Technical data

Order no.	**222-1FF00**
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	150 mA
Power loss	1.5 W
Technical data digital outputs	
Number of outputs	8
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	AC 230 V
Current consumption from load voltage L+ (without load)	-
Total current per group, horizontal configuration, 40°C	4 A
Total current per group, horizontal configuration, 60°C	4 A
Total current per group, vertical configuration	4 A
Output current at signal "1", rated value	0.5 A
Output delay of "0" to "1"	10 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. 0.5 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

Order no.	**222-1FF00**
Process alarm	no
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	-
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	0
Output bytes	1
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	100 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL certification	yes
KC certification	-

222-1FD10 - DO 4xSolid State

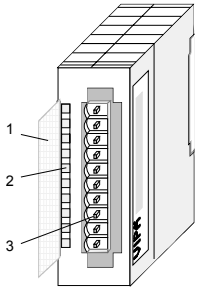
Order data DO 4xSolid State VIPA 222-1FD10

Description The digital output module accepts binary control signals from the central bus system and controls the connected loads at the process level via solid-state relay outputs. The module derives power from the backplane bus. The module has 4 separate channels that operate as switches and display the status by means of LEDs. Active loads must be supplied with external power.

Properties

- 4 isolated solid-state outputs
- Power supply via backplane bus
- External load voltage AC 230V or DC 400V
- Max. output current per channel 0.5A (AC 230V / DC 400V)
- Suitable for motors, lamps, magnetic valves and contactors
- Active channel indication by means of an LED

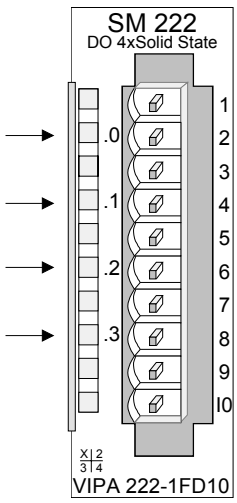
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator
pin assignment

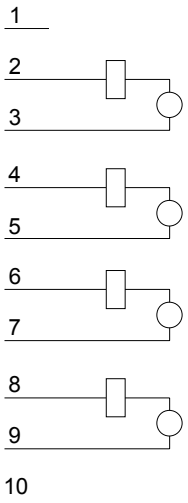
LED	Description
.0... .3	LEDs (green) Q+0.0 to Q+0.3 when an output is active the respective LED is turned on



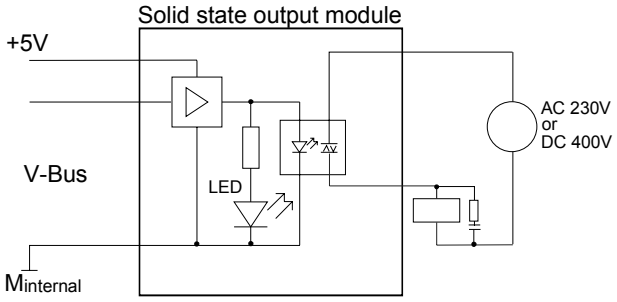
Pin	Assignment
1	not connected
2+3	Output Q+0.0
4+5	Output Q+0.1
6+7	Output Q+0.2
8+9	Output Q+0.3
10	not connected

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Note: When using inductive load please take a suitable protector (see installation guidelines).

Technical data

Order number	**222-1FD10**
Type	SM 222
Current consumption/power loss	
Current consumption from backplane bus	100 mA
Power loss	1.5 W
Technical data digital outputs	
Number of outputs	4
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	AC 230 V
Current consumption from load voltage L+ (without load)	-
Total current per group, horizontal configuration, 40°C	-
Total current per group, horizontal configuration, 60°C	-
Total current per group, vertical configuration	-
Output current at signal "1", rated value	0.5 A
Output delay of "0" to "1"	10 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. 0.5 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

Order number	222-1FD10
Process alarm	no
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	1
Between channels and backplane bus	✓
Insulation tested with	DC 500 V
Datasizes	
Input bytes	0
Output bytes	1
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	100 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL certification	yes
KC certification	-

Chapter 4 Digital input/output modules

Overview

This chapter contains a description of the construction and the operation of the VIPA digital input/output modules.

Inhalt

223-1BF00 - DIO 8xDC 24V 1A

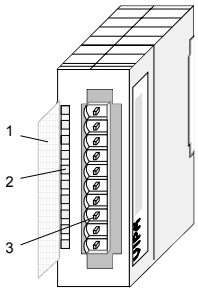
Order data DIO 8xDC 24V 1A VIPA 223-1BF00

Description This module is a combination module. It has 8 channels that may be used as input or as output channel. The status of the channels is displayed by means of LEDs. Every channel is provided with a diagnostic function, i.e. when an output is active the respective input is set to "1". When a short circuit occurs at the load, the input is held at "0" and the error is detectable by analyzing the input.

Properties

- 8 channels, isolated from the backplane bus (as input or output)
- Diagnostic function
- Nominal input voltage DC 24V / supply voltage DC 24V
- Output current 1A
- LED error display for overload, overheat or short circuit
- Active channels displayed by means of LED

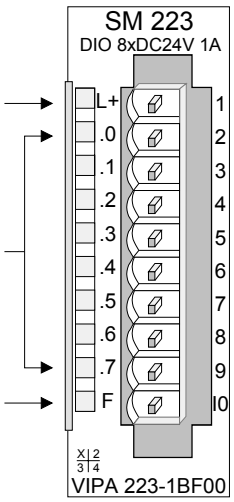
Construction



[1] Label for the bit address with description
[2] LED status indicator
[3] Edge connector

Status indicator pin assignment

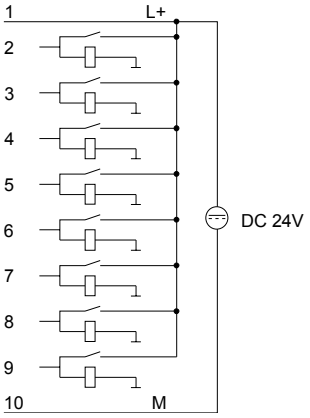
LED	Description
L+	LED (green) Supply voltage available
.0... .7	LEDs (green) when the input signal is "1" or the output is active the respective LED is turned on
F	LED (red) Overload, overheat or short circuit error



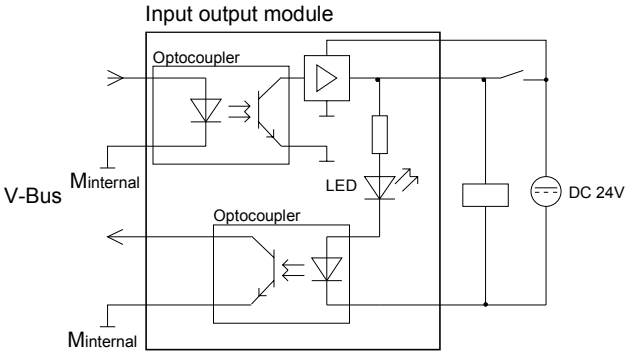
Pin	Assignment
1	+DC 24V supply voltage
2	I/Q+0.0
3	I/Q+0.1
4	I/Q+0.2
5	I/Q+0.3
6	I/Q+0.4
7	I/Q+0.5
8	I/Q+0.6
9	I/Q+0.7
10	Supply ground

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Attention!

Please regard that the voltage applied to an output channel must be ≤ the voltage supply applied to L+.

Due to the parallel connection of in- and output channel per group, a set output channel may be supplied via an applied input signal.

Thus, a set output remains active even at power-off of the voltage supply with the applied input signal.

Non-observance may cause module demolition.

Technical data

Order no.	**223-1BF00**
Type	SM 223
Current consumption/power loss	
Current consumption from backplane bus	65 mA
Power loss	2 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 20.4...28.8 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

Order no.	223-1BF00
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Reverse polarity protection of rated load voltage	-
Current consumption from load voltage L+ (without load)	10 mA
Output current at signal "1", rated value	1 A
Output delay of "0" to "1"	150 µs
Output delay of "1" to "0"	100 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	1.7 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
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	green LED
Group error display	red SF LED
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	1
Output bytes	1
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PA 6.6
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	25.4 x 76 x 88 mm
Weight	100 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes

223-2BL10 - DI 16xDC 24V, DO 16xDC 24V 1A

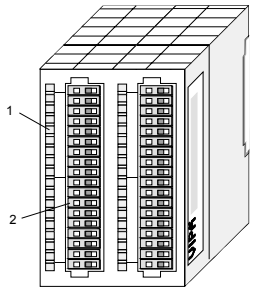
Order data DI 16xDC 24V, DO 16xDC 24V 1A VIPA 223-2BL10

Description The module has 32 channels that are isolated from the backplane bus. 16 channels operate as inputs and 16 as outputs. The status of the channels is displayed by means of LEDs.

Properties

- 32 channels, of these 16 input and 16 output channels
- Nominal input voltage DC 24V
- Supply voltage DC 24V(external) for outputs
- Output current 1A per channel
- LED error display for overload, overheat or short circuit
- Active channels displayed by means of an LED

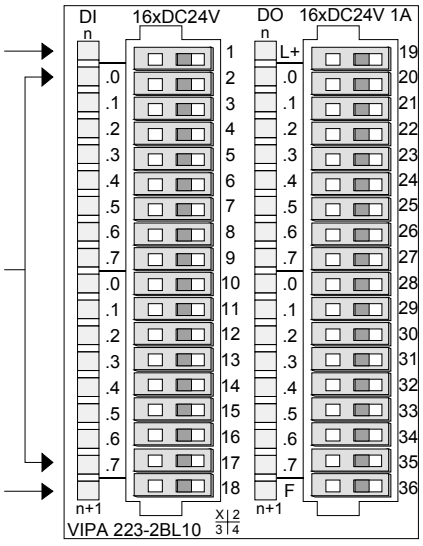
Construction



[1] LED status indicator
[2] Edge connector

Status indicator pin assignment

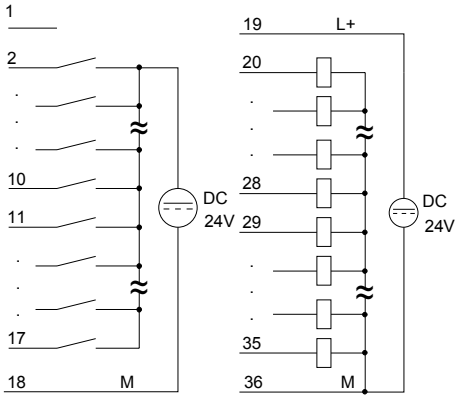
LED	Description
L+	LED (green) Supply voltage available
.0... .7	LED (green) I+0.0 ... I+1.7 Q+0.0 ... Q+1.7 when the signal (input) is "1" or the output is active, the respective LED is turned on
F	LED (red) Overload, overheat or short circuit error



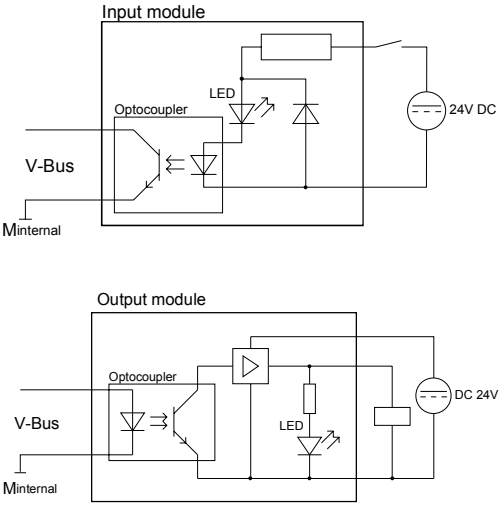
Pin	Assignment
1	not connected
2	Input I+0.0
.	.
.	.
.	.
17	Input I+1.7
18	Ground for inputs
19	Supply voltage +24V
20	Output Q+0.0
.	.
.	.
35	Output Q+1.7
36	Supply voltage ground outputs

Wiring and schematic diagram

Wiring diagram



Schematic diagram



Attention!

Please regard that the voltage applied to an output channel must be ≤ the voltage supply applied to L+.

Due to the parallel connection of in- and output channel per group, a set output channel may be supplied via an applied input signal.

Thus, a set output remains active even at power-off of the voltage supply with the applied input signal.

Non-observance may cause module demolition.

Technical data

Order no.	**223-2BL10**
Type	SM 223
Current consumption/power loss	
Current consumption from backplane bus	120 mA
Power loss	6.5 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 20.4...28.8 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	2 Byte
Technical data digital outputs	
Number of outputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 20.4...28.8 V
Reverse polarity protection of rated load voltage	-
Current consumption from load voltage L+ (without load)	10 mA
Output current at signal "1", rated value	1 A
Output delay of "0" to "1"	150 µs
Output delay of "1" to "0"	100 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	1.7 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

Order no.	223-2BL10
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	green LED
Group error display	red SF LED
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	16
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)	25.4 x 76 x 88 mm
Weight	150 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL508 certification	yes