

**SIEMENS**



# SIMATIC

S7-1500 / ET 200MP

Digital input module DI 32x24VDC BA (6ES7521-1BL10-0AA0)

Manual

Edition

09/2014

Answers for industry.

# SIEMENS

## SIMATIC

### S7-1500/ET 200MP Digital input module DI 32x24VDC BA (6ES7521-1BL10-0AA0)

Manual

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# Preface

## Purpose of the documentation

This product manual supplements the system manuals:

- S7-1500 Automation System
- ET 200MP Distributed I/O System

Functions that relate in general to the systems are described in these system manuals.

The information provided in this product manual and in the system/function manuals supports you in commissioning the systems.

## Changes compared to previous version

Compared to the previous version, this product manual includes detailed information on the module functions, for example, as of which STEP 7 version the function is supported.

## Conventions

The term "CPU" is used in this manual both for the CPUs of the S7-1500 automation system, as well as for interface modules of the ET 200MP distributed I/O system.

Please also observe notes marked as follows:

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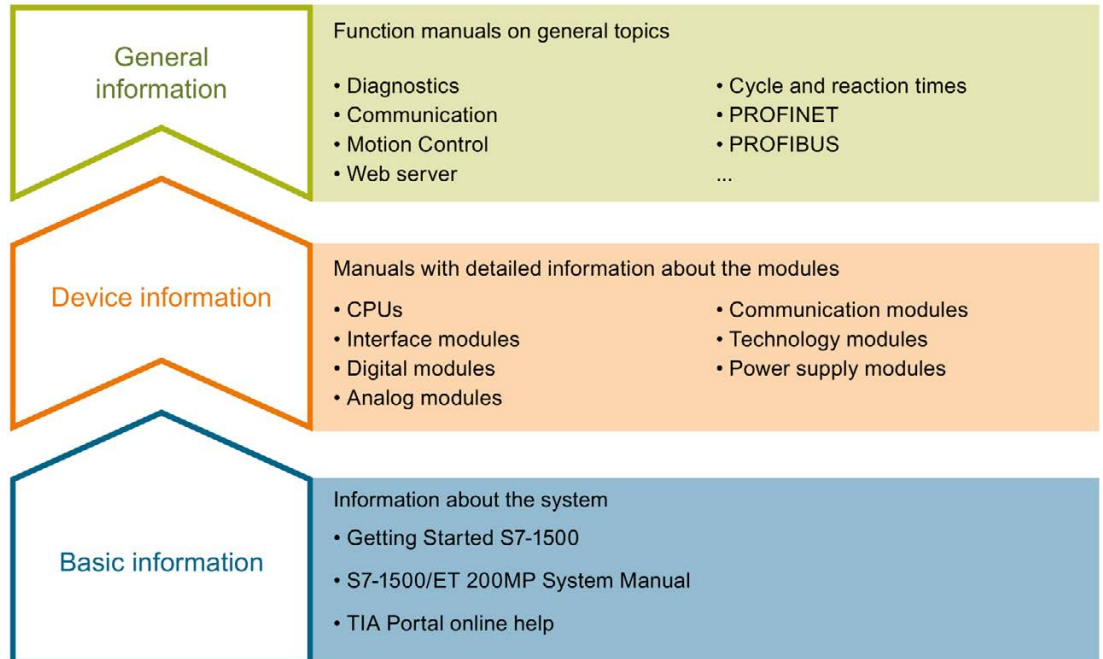
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# Documentation guide

The documentation for the SIMATIC S7-1500 automation system and the SIMATIC ET 200MP distributed I/O system is arranged into three areas. This arrangement enables you to access the specific content you require.



## Basic information

System Manual and Getting Started describe in detail the configuration, installation, wiring and commissioning of the SIMATIC S7-1500 and ET 200MP systems. The STEP 7 online help supports you in the configuration and programming.

## Device information

Manuals contain a compact description of the module-specific information, such as properties, terminal diagrams, characteristics, technical specifications.

## General information

The function manuals contain detailed descriptions on general topics regarding the SIMATIC S7-1500 and ET 200MP systems, e.g. diagnostics, communication, Motion Control, Web server.

You can download the documentation free of charge from the Internet (<http://www.automation.siemens.com/mcms/industrial-automation-systems-simatic/en/manual-overview/tech-doc-controllers/Pages/Default.aspx>).

Changes and supplements to the manuals are documented in a Product Information.

## Manual Collection S7-1500 / ET 200MP

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## Product overview

### 2.1 Properties

Part number:

6ES7521-1BL10-0AA0

#### View of the module

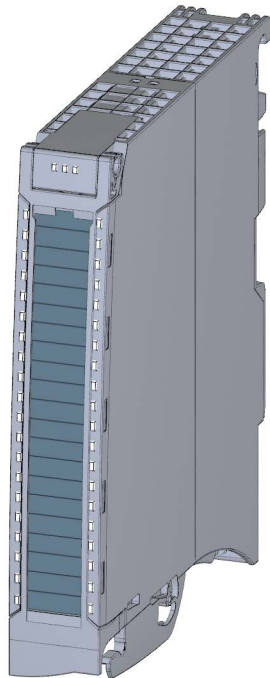


Figure 2-1 View of the DI 32x24VDC BA module

### Properties

The module has the following technical properties:

- 32 digital inputs; electrically isolated in groups of 16
- Rated input voltage 24 VDC
- Suitable for switches and 2-/3-/4-wire proximity switches
- Hardware compatible with digital input module DI 16x24VDC BA (6ES7521-1BH10-0AA0)

The module supports the following functions:

Table 2- 1 Version dependencies of the module functions

Function	Firmware version of the module	Configuration software	
		STEP 7 (TIA Portal)	GSD file in STEP 7 (TIA Portal) V12 or higher, or STEP 7 V5.5 SP3 or higher
Firmware update	V1.0.0 or higher	V13 or higher	X
Identification data I&M0 to I&M3	V1.0.0 or higher	V13 or higher	X
Module internal shared input (MSI)	V1.0.0 or higher	V13 Update 3 or higher (PROFINET IO only)	X (PROFINET IO only)
Configurable submodules / submodules for Shared Device	V1.0.0 or higher	V13 Update 3 or higher (PROFINET IO only)	X (PROFINET IO only)

You can configure the module with STEP 7 (TIA Portal) and with a GSD file.

### Accessories

The following accessories are supplied with the module and can also be ordered separately as spare parts:

- Front connector (push-in terminals) including cable tie
- Labeling strips
- U connector
- Universal front door

You can find more information on accessories in the S7-1500 Automation System (<http://support.automation.siemens.com/WW/view/en/59191792>) system manual and the ET 200MP Distributed I/O System (<http://support.automation.siemens.com/WW/view/en/59193214>) system manual.

# Wiring

## 3.1 Wiring and block diagram

This section contains the block diagram of the module and outlines various connection options.

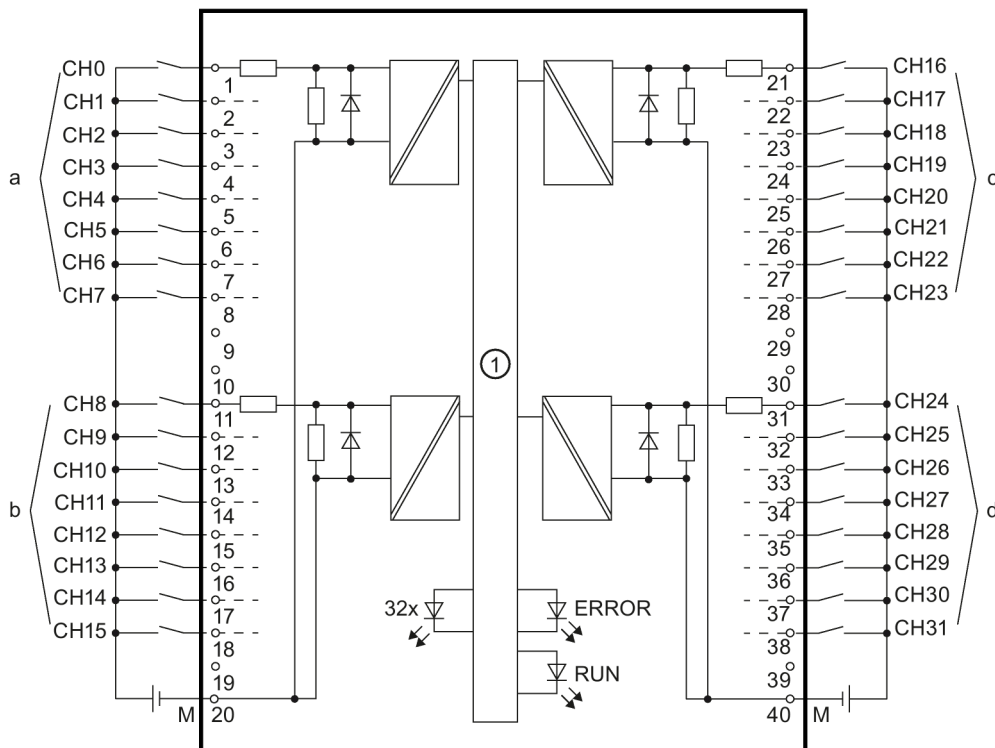
For more information on front connector wiring and creating cable shields, for example, refer to the "Wiring" section in the S7-1500 Automation System (<http://support.automation.siemens.com/WW/view/en/59191792>) and ET 200MP Distributed I/O System (<http://support.automation.siemens.com/WW/view/en/59193214>) system manuals.

**Abbreviations used**

Meaning of the abbreviations used in the following figure:

- M                      Ground connector
- CHx                    Channel or display for the channel status

The figure below shows you how to connect the module and the assignment of the channels to the addresses (input byte a to input byte d).



① Backplane bus interface

Figure 3-1 Block diagram and terminal assignment

# Address space

## 4.1 Address space

The module can be configured in various ways in STEP 7. Depending on the configuration, additional/different addresses are assigned in the process image of the inputs.

### Configuration options of DI 32x24VDC BA

You can configure the module with STEP 7 (TIA Portal) or with a GSD file.

When you configure the module by means of the GSD file, the configurations are available under different abbreviations/module names.

The following configurations are possible:

Table 4- 1 Configuration options

Configuration	Short designation/ module name in the GSD file	Configuration software, e.g., with STEP 7 (TIA Portal)	
		Integrated in hard- ware catalog STEP 7 (TIA Portal)	GSD file in STEP 7 (TIA Portal) V12 or higher or STEP 7 V5.5 SP3 or higher
1 x 32-channel without value status	DI 32x24VDC BA	V13 or higher	X
4 x 8-channel without value status	DI 32x24VDC BA S	V13 Update 3 or higher (PROFINET IO only)	X (PROFINET IO only)
1 x 32-channel with value status for module- internal Shared Input with up to 4 submodules	DI 32x24VDC BA MSI	V13 Update 3 or higher (PROFINET IO only)	X (PROFINET IO only)



**Address space for configuration as 1 x 32-channel DI 32x24VDC BA MSI**

The channels 0 to 31 of the module are copied to up to 4 submodules with configuration 1 x 32-channel module (Module-internal Shared Input, MSI). Channels 0 to 31 are then available with identical input values in different submodules. These submodules can be assigned to up to four IO controllers when the module is used in a Shared Device. Each IO controller has read access to the same channels.

The number of usable submodules depends on the interface module used. Please observe the information in the manual for the particular interface module.

**Value status (Quality Information, QI)**

The meaning of the value status depends on the submodule involved.

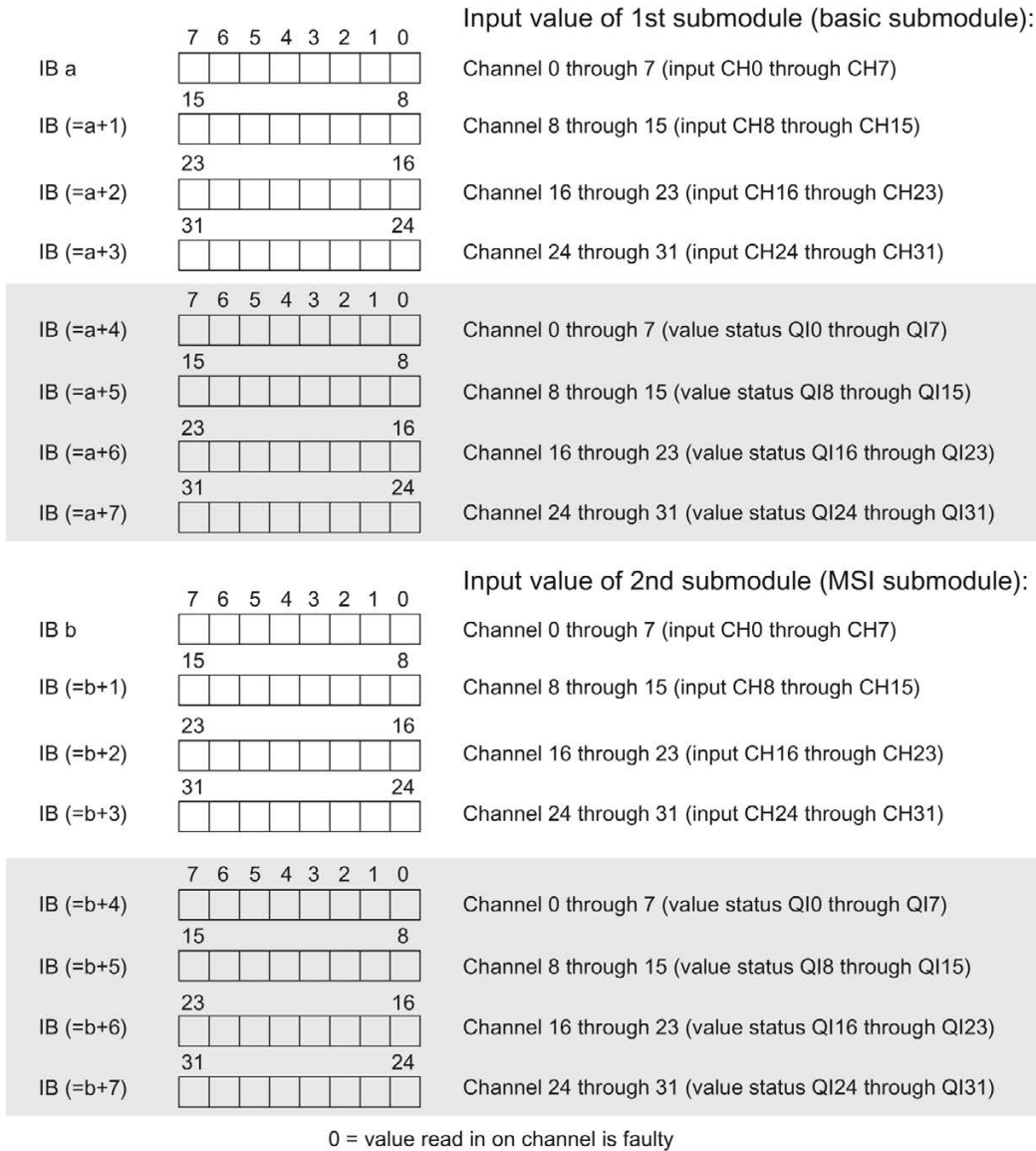
For the 1st submodule (=basic submodule), the value status is not relevant.

For the 2nd to 4th submodule (=MSI submodule), the value status 0 indicates that the value is incorrect or the basic submodule has not yet been configured (not ready for operation).

4.1 Address space

The figure below shows the assignment of the address space with submodules 1 and 2.

Assignment in the process image input (PII) for 1st and 2nd submodule



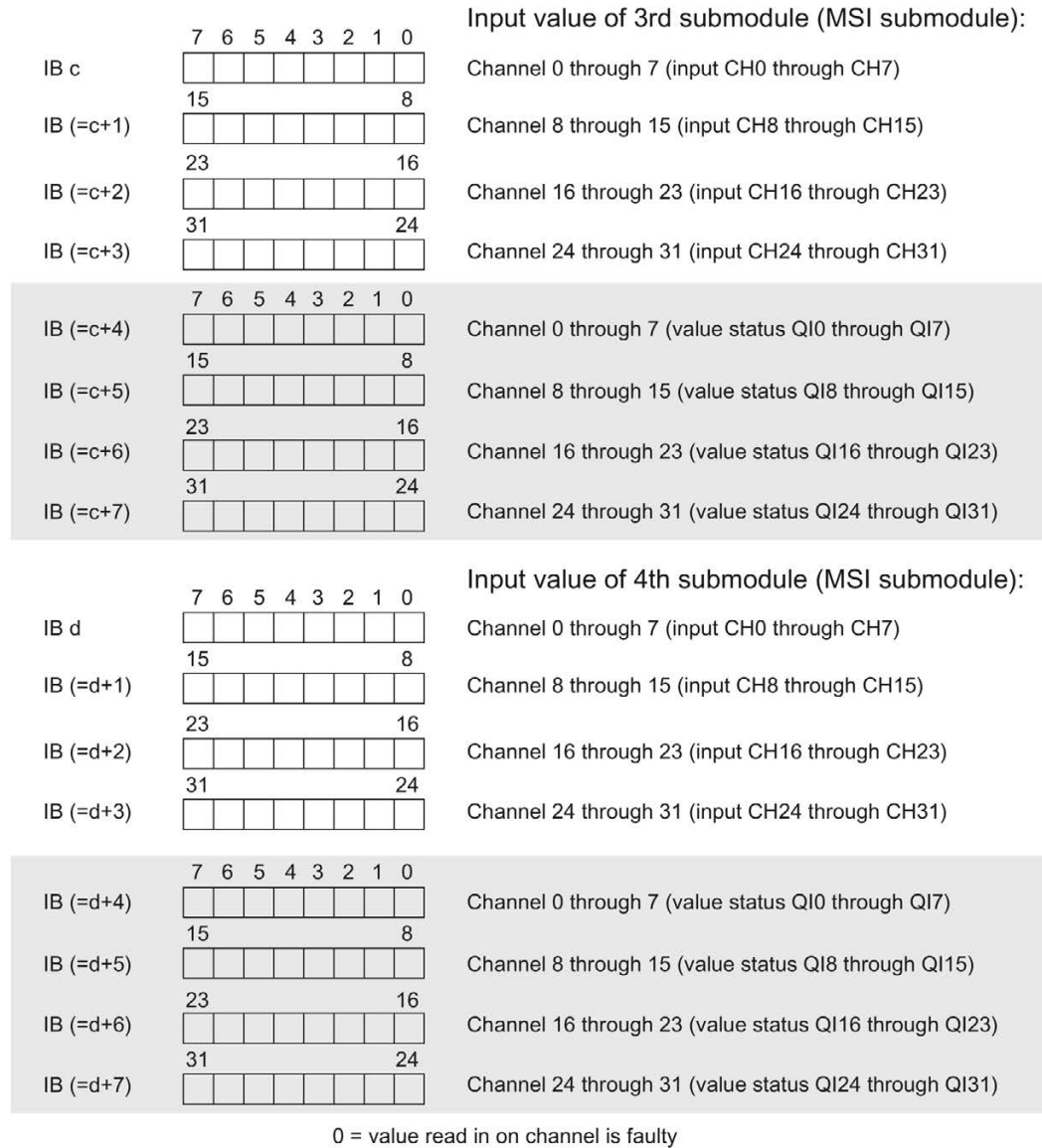
0 = value read in on channel is faulty

Figure 4-3 Address space for configuration as 1 x 32-channel DI 32x24VDC BA MSI with value status



The figure below shows the assignment of the address space with submodules 3 and 4.

Assignment in the process image input (PII) for 3rd and 4th submodule



0 = value read in on channel is faulty

Figure 4-4 Address space for configuration as 1 x 32-channel DI 32x24VDC BA MSI with value status

## Diagnostics alarms

The module has no selectable diagnostics. Diagnostics alarms, for example, cannot be output with STEP 7 (TIA Portal).

### 5.1 Status and error displays

#### LED displays

The figure below shows you the LED displays (status and error displays) of the DI 32x24VDC BA.

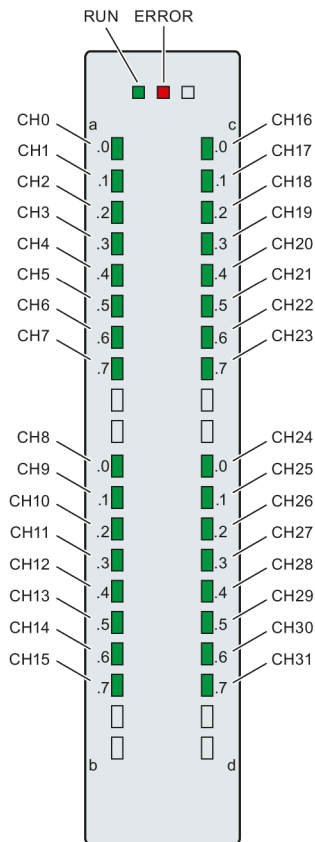


Figure 5-1 LED displays of the module DI 32x24VDC BA

## Meaning of the LED displays

The tables below explain the meaning of the status and error displays.

### LED RUN/ERROR

Table 5- 1 RUN/ERROR status and error displays

LED		Meaning	Remedy
RUN	ERROR		
□ Off	□ Off	Voltage missing or too low at backplane bus.	<ul style="list-style-type: none"> <li>• Switch on the CPU and/or the system power supply modules.</li> <li>• Verify that the U connectors are inserted.</li> <li>• Check to see if too many modules are inserted.</li> </ul>
⚡ Flashes	□ Off	Module is starting up.	---
■ On	□ Off	Module is ready.	---
⚡ Flashes	⚡ Flashes	Hardware defective.	Replace the module.

### LED CHx

Table 5- 2 CHx status display

LED CHx	Meaning	Remedy
□ Off	0 = Status of the input signal.	---
■ On	1 = Status of the input signal.	---

## Technical specifications

### Technical specifications of the DI 32x24VDC BA

	6ES7521-1BL10-0AA0
Product type designation	DI 32x24VDC BA
<b>General information</b>	
Hardware version	E01
Firmware version	V1.0.0
<b>Product function</b>	
I&M data	Yes; I&M0 to I&M3
<b>Engineering with</b>	
STEP 7 TIA Portal can be configured/integrated as of version	V13 / V13
STEP 7 can be configured/integrated as of version	V5.5 SP3 / -
<b>Operating mode</b>	
MSI	Yes
<b>Supply voltage</b>	
Type of supply voltage	DC
Rated value (DC)	24 V
Permitted range, low limit (DC)	20.4 V
Permitted range, high limit (DC)	28.8 V
<b>Power</b>	
Power taken from the backplane bus	1.05 W
<b>Power loss</b>	
Power loss, typ.	3 W
<b>Digital inputs</b>	
Number of inputs	32
Sinking/sourcing input	Sinking input
Input characteristic curve acc. to IEC 61131, type 3	Yes
<b>Input voltage</b>	
Rated value, DC	24
for signal "0"	-30 to +5 V
for signal "1"	11 to 30 V
Permitted voltage at input, min.	-30 V; -3 V permanently; -30 V brief reverse polarity protection
Permitted voltage at input, max.	30 V
<b>Input current</b>	
for signal "1", typ.	2.7 mA

<b>6ES7521-1BL10-0AA0</b>	
<b>Input delay (for rated value of input voltage)</b>	
For standard inputs	
• Configurable	No
• with "0" to "1", min.	3 ms
• with "0" to "1", max.	4 ms
• with "1" to "0", min.	3 ms
• with "1" to "0", max.	4 ms
For interrupt inputs	
• Configurable	No
<b>Cable length</b>	
Cable length shielded, max.	1000 m
Cable length unshielded, max.	600 m
<b>Encoders</b>	
<b>Connectable encoders</b>	
2-wire sensor	Yes
• Permitted quiescent current (2-wire sensor), max.	1.5 mA
<b>Isochronous mode</b>	
Isochronous mode (application synchronized up to terminal)	No
<b>Interrupts/diagnostics/status information</b>	
<b>Interrupts</b>	
Diagnostics interrupt	No
Hardware interrupt	No
<b>Diagnostics alarms</b>	
Diagnostics	No
Monitoring of the supply voltage	No
Wire break	No
Short-circuit	No
Fuse blown	No
<b>Diagnostics indicator LED</b>	
RUN LED	Yes; green LED
ERROR LED	Yes; red LED
MAINT LED	No
Monitoring of the supply voltage	No
Channel status display	Yes; green LED
For channel diagnostics	No
For module diagnostics	No

<b>6ES7521-1BL10-0AA0</b>	
<b>Electrical isolation</b>	
<b>Electrical isolation of channels</b>	
Between the channels	No
Between the channels, in groups of	16
Between the channels and the backplane bus	Yes
Between the channels and the supply voltage of the electronics	No
<b>Permitted potential difference</b>	
Between different circuits	75 VDC / 60 VAC (basic isolation)
<b>Isolation</b>	
Isolation tested with	707 VDC (type test)
<b>Distributed mode</b>	
Prioritized startup	Yes
<b>Dimensions</b>	
Width	25 mm
Height	147 mm
Depth	129 mm
<b>Weights</b>	
Weight, approx.	260 g
<b>Miscellaneous</b>	
Note:	Supplied incl. 40-pin push-in front connector

# Dimensional drawing

# A

The dimensional drawing of the module on the mounting rail, as well as a dimensional drawing with open front cover, are provided in this appendix. Always observe the specified dimensions for installation in cabinets, control rooms, etc.

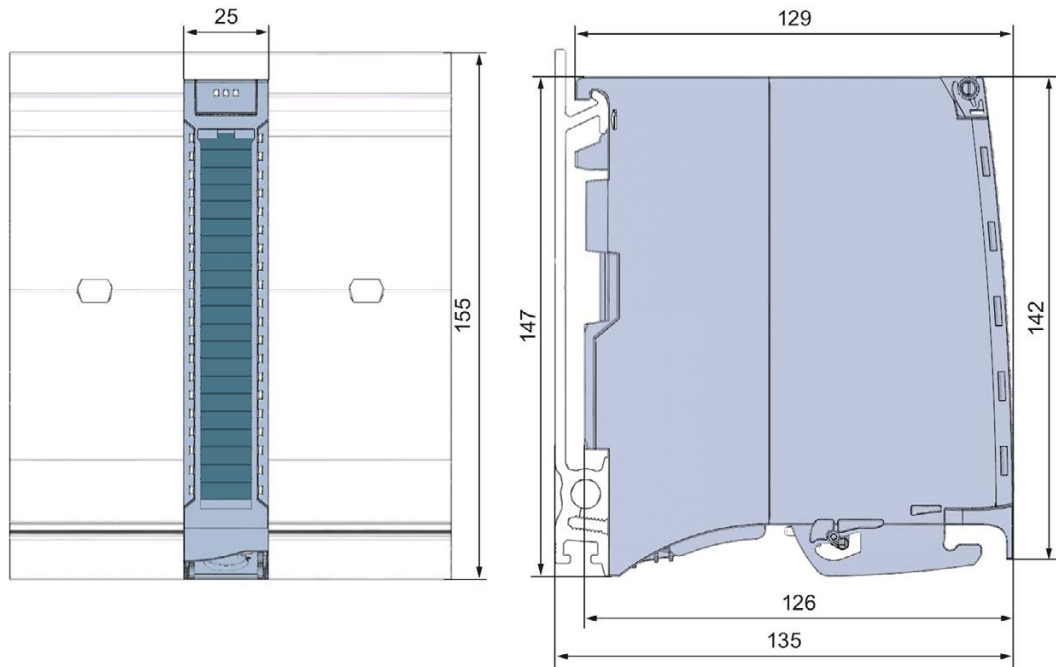


Figure A-1 Dimensional drawing of the DI 32x24VDC BA module

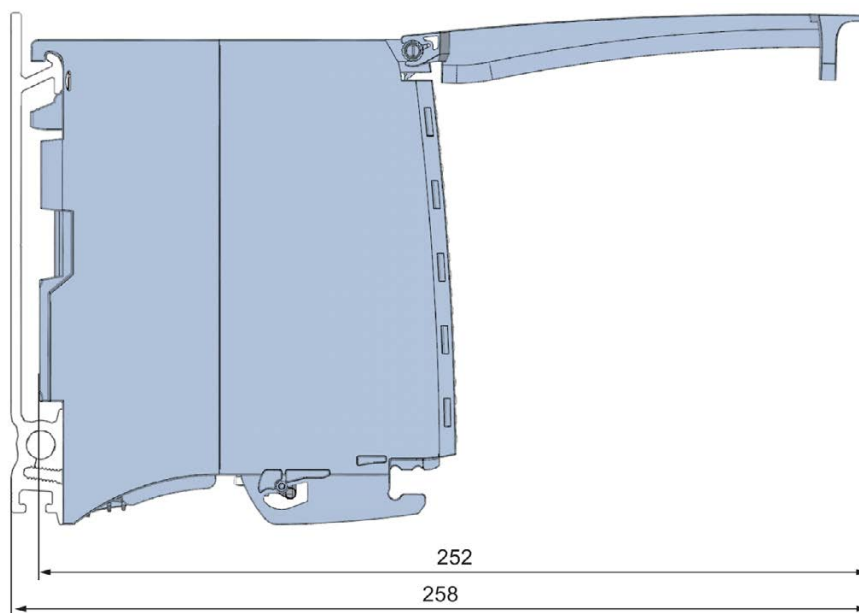


Figure A-2 Dimensional drawing of the DI 32x24VDC BA module, side view with open front cover



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