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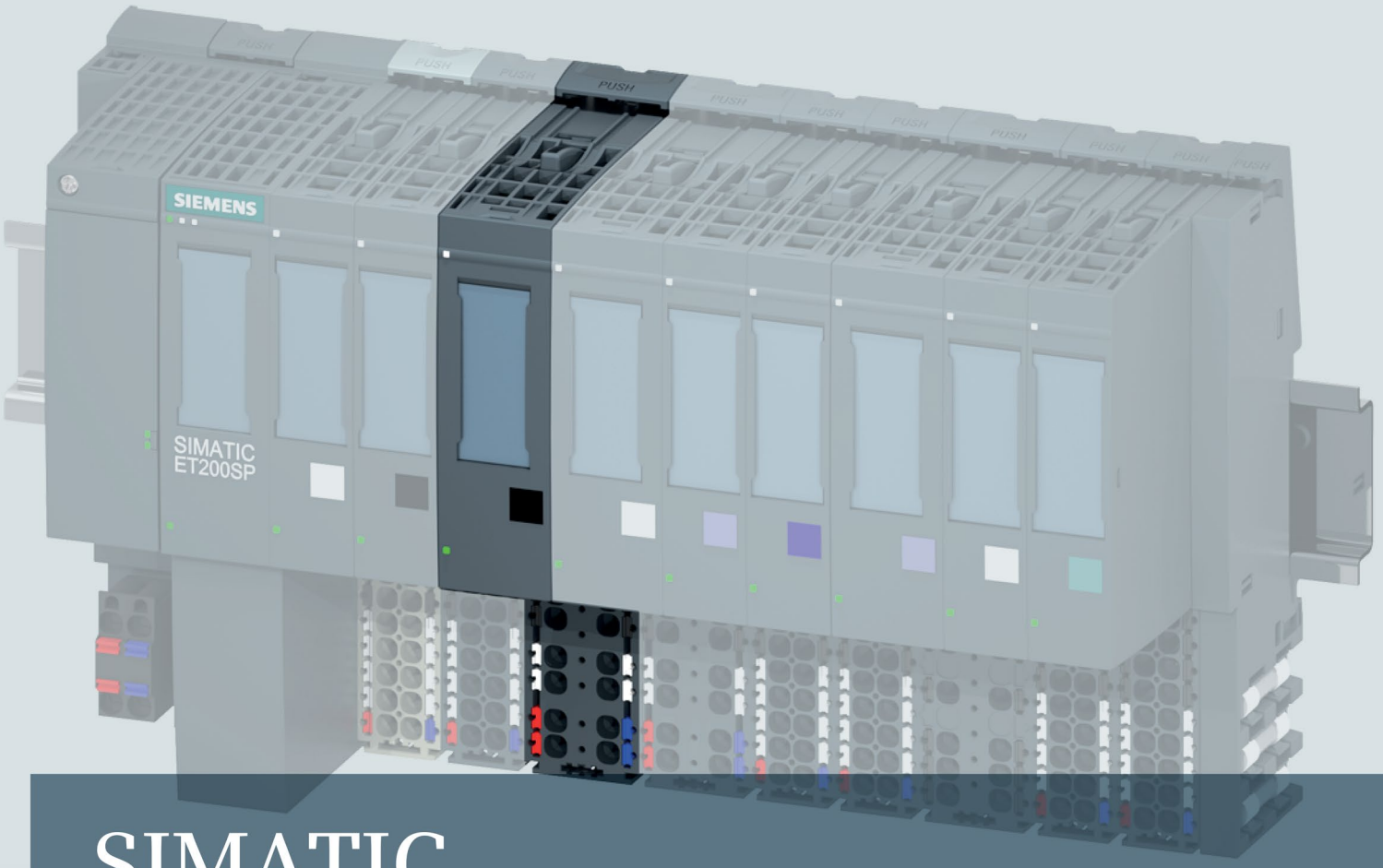

SIMATIC

ET 200SP

Digital output module DQ 4x24..230VAC/2A ST (6ES7132-6FD00-0BB1)

Manual

Edition 03/2015

Answers for industry.

SIEMENS

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ET 200SP
DQ 4x24..230VAC/2A ST digital output module (6ES7132-6FD00-0BB1)

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A5E32043575-AB

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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A5E32043575-AB
℗ 12/2016 Subject to change

Preface

Purpose of the documentation

This manual supplements the system manual ET 200SP distributed I/O system (http://support.automation.siemens.com/WW/view/en/58649293).

Functions that generally relate to the system are described in this manual.

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

Conventions

CPU: When the term "CPU" is used in this manual, it applies to the CPUs of the S7-1500 automation system as well as to the CPUs/interface modules of the ET 200SP distributed I/O system.

STEP 7: In this documentation, "STEP 7" is used as a synonym for all versions of the configuration and programming software "STEP 7 (TIA Portal)".

Please also observe notes marked as follows:

Note

A note contains important information on the product described in the documentation, on the handling of the product or on the section of the documentation to which particular attention should be paid.

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, solutions, machines, equipment and/or networks. They are important components in a holistic industrial security concept. With this in mind, Siemens' products and solutions undergo continuous development. Siemens recommends strongly that you regularly check for product updates.

For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action (e.g. cell protection concept) and integrate each component into a holistic, state-of-the-art industrial security concept. Third-party products that may be in use should also be considered. You can find more information about industrial security on the Internet (http://www.siemens.com/industrialsecurity).

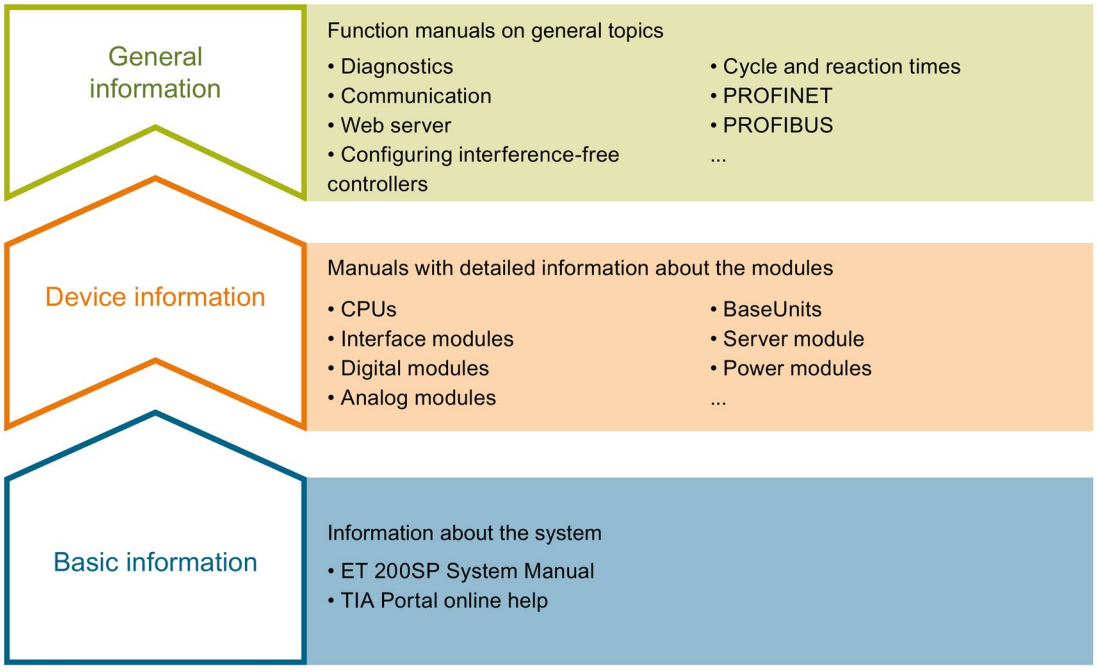
To stay informed about product updates as they occur, sign up for a product-specific newsletter. You can find more information on the Internet (http://support.automation.siemens.com).

Table of contents

Guide to documentation

1

The documentation for the SIMATIC ET 200SP distributed I/O system is arranged into three areas.
This arrangement enables you to access the specific content you require.



Basic information

The system manual describes in detail the configuration, installation, wiring and commissioning of the SIMATIC ET 200SP. distributed I/O system. The STEP 7 online help supports you in the configuration and programming.

Device information

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

General information

The function manuals contain detailed descriptions on general topics regarding the SIMATIC ET 200SP distributed I/O system, e.g. diagnostics, communication, Web server, designing interference-free controllers.

You can download the documentation free of charge from the Internet (http://w3.siemens.com/mcms/industrial-automation-systems-simatic/en/manual-overview/tech-doc-et200/Pages/Default.aspx).

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

Manual Collection ET 200SP

The Manual Collection contains the complete documentation on the SIMATIC ET 200SP distributed I/O system gathered together in one file.

You can find the Manual Collection on the Internet (http://support.automation.siemens.com/WW/view/en/84133942).

My Documentation Manager

The My Documentation Manager is used to combine entire manuals or only parts of these to your own manual.
You can export the manual as PDF file or in a format that can be edited later.

You can find the My Documentation Manager on the Internet (http://support.industry.siemens.com/My/ww/en/documentation).

Application examples

Applications examples support you with various tools and examples for solving your automation tasks. Solutions are shown in interplay with multiple components in the system - separated from the focus in individual products.

You can find application examples on the Internet (http://support.industry.siemens.com/cs/ww/en/ps/ae).

CAx Download Manager

The CAx Download Manager is used to access the current product data for your CAx or CAe systems.

You configure your own download package with a few clicks.

In doing so you can select:

- Product images, 2D dimension drawings, 3D models, internal circuit diagrams, EPLAN macro files
- Manuals, characteristics, operating manuals, certificates
- Product master data

You can find the CAx Download Manager on the Internet (http://support.industry.siemens.com/my/ww/en/CAxOnline).

TIA Selection Tool

With the TIA Selection Tool, you can select, configure and order devices for Totally Integrated Automation (TIA).
This tool is the successor of the SIMATIC Selection Tool and combines the known configurators for automation technology into one tool.
With the TIA Selection Tool, you can generate a complete order list from your product selection or product configuration.

You can find the TIA Selection Tool on the Internet (http://w3.siemens.com/mcms/topics/en/simatic/tia-selection-tool).

Product overview

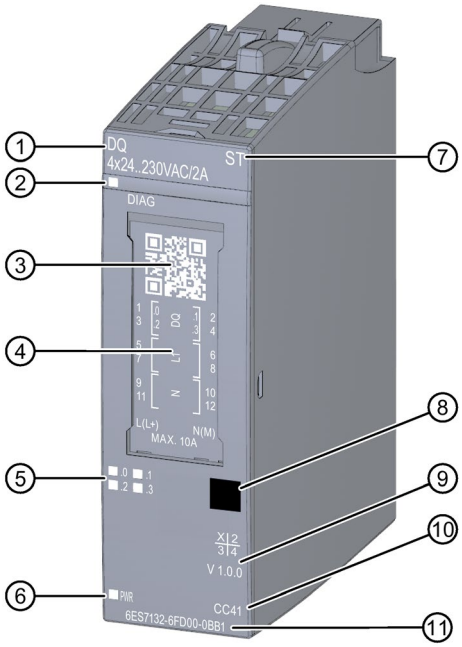
2

2.1 Properties

Article number

6ES7132-6FD00-0BB1

View of the module



① Module type and name
② LED for diagnostics
③ 2D matrix code
④ Wiring diagram
⑤ LEDs for channel status
⑥ LED for supply voltage
⑦ Function class
⑧ Color coding module type
⑨ Function and firmware version
⑩ Color code for selecting the color identification labels
⑪ Article number

Figure 2-1 View of the DQ 4×24..230VAC/2A ST module

Properties

The module has the following technical properties:

- 4 digital outputs each with a value status (quality information)
- Supply voltage L+
- Switches in zero point
- Output current 2 A per channel
- Total current 8 A (per module)
- Configurable substitute values (per channel)
- Suitable for solenoid valves, AC contactors, and indicator lights

The module supports the following functions:

- Firmware update
- Identification data I&M0 to I&M3
- Reconfiguration in RUN
- PROFIenergy

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

Accessories

The following accessories must be ordered separately:

- Labeling strips
- Color identification labels
- Reference identification label

You can find more information on accessories in the ET 200SP distributed I/O system (http://support.automation.siemens.com/WW/view/en/58649293) system manual.

Wiring

3

3.1 Wiring and block diagram

This section includes the block diagram of the DQ 4x24..230VAC/2A ST module with the terminal assignments for 2-wire and 3-wire connection.

You can find information on wiring the BaseUnit in the ET 200SP distributed I/O system system manual.

NOTICE
Dangerous voltage. Risk of death or serious injury. Always disconnect the system and module from the power supply before commencing work.

Note

Limiting overvoltage

You must ensure overvoltage is limited to 1 kV for the encoder supply.

Note

Power limitation

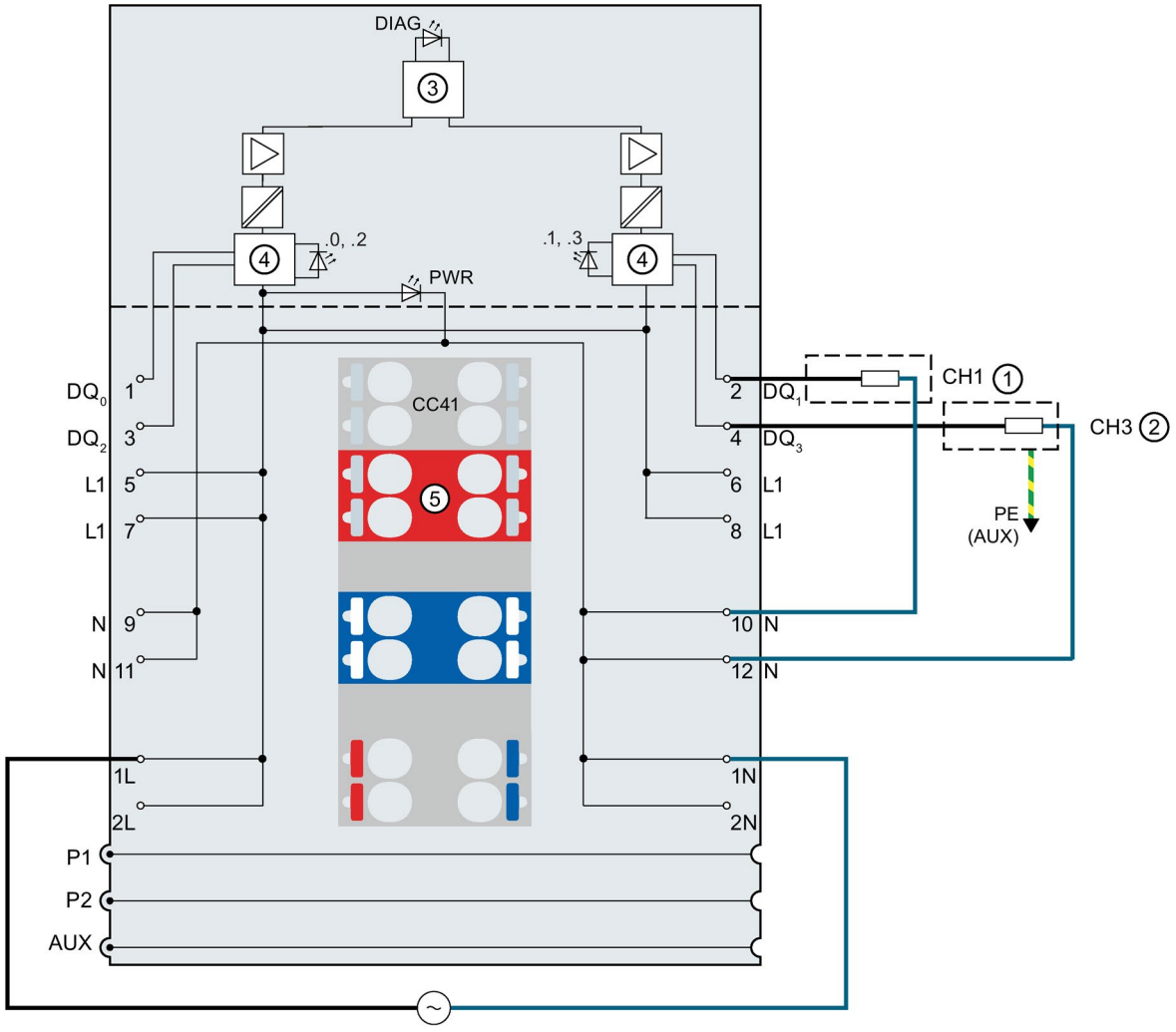
To limit power, each input voltage must have a fuse with a maximum rating of 10 A tripping current. The fuse must be a quick-acting microfuse.

Note

You may use and combine the different wiring options for all channels.

Connection: 2-wire and 3-wire connection of actuators

The following figure shows the block diagram and an example for the terminal assignment of the digital input module DQ 4x24..230VAC/2A ST on the BaseUnit BU type B1.



①	2-wire connection	N	Neutral
②	3-wire connection	1L, 2L	Supply voltage 120 V AC to 230 V AC
③	Backplane bus interface	1N, 2N	Neutral conductor supply voltage
④	Output electronics	PE (AUX)	Protective conductor connection
⑤	Color identification label CCxx (optional)	DIAG	Diagnostics LED (red/green)
DQ_n	Output signal, channel n	.0, .1, .2, .3	Channel status LED (green)
L1	Encoder supply	PWR	Power LED (green)
P1, P2, AUX	Internal self-assembling voltage buses Connection to left (dark-colored BaseUnit)		

Figure 3-1 Wiring and block diagram for 2-wire and 3-wire connection of actuators

No connection for three-phase loads

The digital output is not suitable for three-phase loads.

Parameter assignment/addressing

4

4.1 Parameters

DQ 4×24..230VAC/2A ST parameters

The table below lists the parameters that can be set. The effective range of the configurable parameters depends on the type of configuration. The following configurations are possible:

- Central operation with an ET 200SP CPU
- Distributed operation on PROFINET IO in an ET 200SP system
- Distributed operation with PROFIBUS DP in an ET 200SP system

When performing the configuration in the user program, use the "WRREC" instruction to transfer the parameters to the module using data records (refer to the section Parameter assignment and structure of parameter data record (Page 21)).

The following parameter settings are possible:

Table 4- 1 Configurable parameters and their defaults (GSD file)

Parameter	Range of values	Default	Reconfiguration in RUN	Effective range with configuration software, e.g. STEP 7 (TIA Portal)	
				GSD file PROFINET IO	GSD file PROFIBUS DP[1]
Operating mode	• Channel activated • Channel deactivated	Channel activated	Yes	Channel	Channel
Reaction to CPU STOP	• Turn off • Keep last value • Output substitute value 1	Turn off	Yes	Channel	Module

[1] Only for configuration using the PROFIBUS GSD file; does not affect configuration with STEP 7 using HSP: As the number of parameters with PROFIBUS GSD configuration is limited to a maximum of 244 bytes per ET 200SP station, the configuration options are limited. If required, however, you can still set this parameter using data record 128 as described in the column "GSD file PROFINET IO" (see the table above). The parameter length of the I/O module is 3 bytes.

4.2 Explanation of parameters

Operating mode

Determines whether a channel is enabled or disabled.

Reaction to CPU STOP

Determines the behavior of the module in the event of a CPU STOP.

See also

ET 200SP distributed I/O system
(http://support.automation.siemens.com/WW/view/en/58649293)

4.3 Address space

Configuration options of DQ 4×24..230VAC/2A ST

The following configurations are possible:

- Configuration 1: Without value status
- Configuration 2: With value status

Evaluating the value status

An additional byte is allocated in the input address space if you enable the value status for the digital module. Bits 0 to 3 in this byte are assigned to a channel. They provide information about the validity of the digital value.

Bit =1: No fault is present on the channel.

Bit =0: Channel is deactivated or there is an error on the module.

If an error on a channel occurs with this module, the value status for all channels is 0.

Address space of the digital output module DQ 4×24..230VAC/2A ST

The following figure shows the assignment of the address space for the DQ 4×24..230VAC/2A ST with value status (Quality Information (QI)). The addresses for the value status are only available if the value status is enabled.

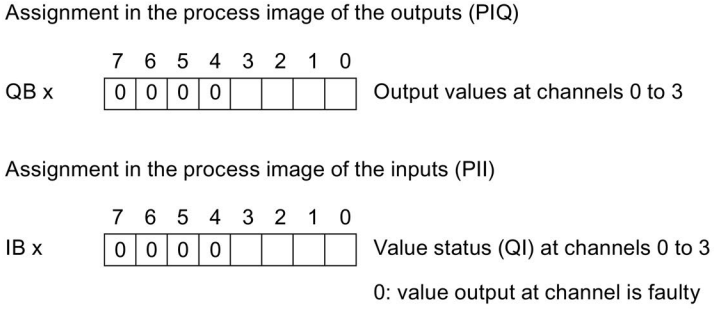


Figure 4-1 Address space of the DQ 4×24..230VAC/2A ST digital output module with value status

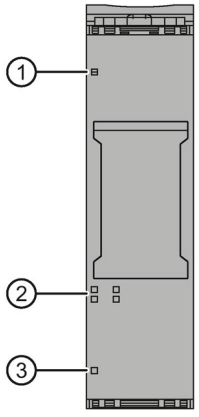
Interrupts/diagnostics alarms

5

5.1 Status and fault displays

LED display

The figure below shows the LED displays of the DQ 4×24..230VAC/2A ST.



① DIAG (green/red)
② Channel status (green)
③ PWR (green)

Figure 5-1 LED displays

Meaning of the LEDs

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

DIAG LED

Table 5- 1 Error display of the DIAG LED

DIAG LED	Meaning
Off	Backplane bus supply of the ET 200SP not OK
Flashes	Module parameters not assigned
On	Module parameters assigned and no module diagnostics
Flashes	Module parameters assigned and module diagnostics

Channel status LED

Table 5- 2 Status display of the channel status LED

Channel status LED	Meaning
Off	Channel deactivated or activated and process signal = 0
On	Channel activated and process signal = 1

PWR LED

Table 5- 3 Status display of the PWR LED

PWR LED	Meaning
Off	No supply voltage L+
On	Supply voltage L+ present

5.2 Load voltage status

Load voltage status

The firmware of the module cannot detect the status of the load voltage.

If the "Load voltage status" function tied to the server module is used, a "1" is always displayed in the status bit for a slot with the DQ 4×24..230VAC/2A ST. Even when the load voltage is not applied.

The state of the load voltage at the terminal does not impact the PROFIenegy behavior.

5.3 Interrupts

The DQ 4x24...230VAC/2A ST digital output module supports diagnostics interrupts.

Diagnostics interrupts

The module generates a diagnostic interrupt at the following events:

- Channel temporarily unavailable
- Parameter assignment error

5.4 Diagnostics alarms

Diagnostics alarms

A diagnostics alarm is output for each diagnostics event and the DIAG LED flashes on the module. The diagnostics alarms can, for example, be read from the diagnostics buffer of the CPU. You can evaluate the error codes with the user program.

Table 5- 4 Diagnostics alarms, their meaning and corrective measures

Diagnostics alarm	Error code	Meaning	Solution
Parameter assignment error	10_H	• The module cannot evaluate parameters for the channel. • Incorrect parameter assignment.	Correct the parameter assignment
Channel/component temporarily unavailable	$1F_H$	Firmware update is currently in progress or has been canceled. The module does not read in process values in this state.	• Wait for firmware update • Restart the firmware update

Technical specifications

6

6.1 Technical specifications

Technical specifications of the DQ 4×24...230VAC/2A ST

	6ES7132-6FD00-0BB1
Product type designation	DQ 4x24 ... 230VAC/2A
General information	
Firmware version	V1.0
• FW update possible	Yes
Usable BaseUnits	BU type B1
Color code for module-specific color identification label	CC41
Product function	
I&M data	Yes; I&M0 to I&M3
Engineering with	
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 / -
PROFIBUS as of GSD version/GSD revision	GSD as of revision 5
PROFINET as of GSD version/GSD revision	GSDML V2.3
Operating mode	
DQ	Yes
DQ with energy-saving function	No
PWM	No
Oversampling	No
MSO	No
Supply voltage	
Rated value (AC)	230 V
Input current	
Current consumption (rated value)	11.5 mA
Power loss	
Power loss, typ.	9 W; active power, load voltage 230 V, all outputs loaded with 2 A, 50 Hz
Address area	
Address space per module	
Address space per module, max.	1 byte; + 1 byte for QI information
Input	1 byte; with QI
Output	1 bytes

	6ES7132-6FD00-0BB1
Digital outputs	
Number of outputs	4
Sinking output	No
Sourcing output	Yes
Short-circuit protection	No; install a fuse with 10A trigger current when using a type B1 BU
Switching capacity of outputs	
With resistive load, max.	2 A
With lamp load, max.	100 W
Output voltage	
For signal "1", min.	20.4 V
Output current	
For signal "1" rated value	2 A
For signal "1" permitted range, min.	10 mA
For signal "1" permitted range, max.	2 A
For signal "0" residual current, max.	460 µA
Output delay with resistive load	
"0" to "1", max.	10 ms
"1" to "0", max.	10 ms
Parallel switching of 2 outputs	
For logic operations	No
For increased performance	No
For redundant control of a load	Yes
Switching frequency	
With resistive load, max.	10 Hz
With inductive load, max.	0.5 Hz
With lamp load, max.	1 Hz
Total current of outputs	
Current per channel, max.	2 A
Current per module, max.	8 A
Total current of outputs (per module)	
Horizontal installation	
• up to 40 °C, max.	8 A
• up to 50 °C, max.	6 A
• up to 60 °C, max.	4 A
Vertical installation	
• up to 30 °C, max.	8 A
• up to 40 °C, max.	6 A
• up to 50 °C, max.	4 A
Output current per channel	
Horizontal installation	
• up to 60 °C, max.	2 A
Vertical installation	
• up to 50 °C, max.	2 A

	6ES7132-6FD00-0BB1
Triac outputs	
Size of motor starter according to NEMA, max.	5
Cable length	
Shielded, max.	1000 m
Unshielded, max.	600 m
Isochronous mode	
Isochronous mode (application synchronized up to terminal)	No
Interrupts/diagnostics/status information	
Substitute values can be applied	Yes
Interrupts	
Diagnostics interrupt	No
Diagnostics alarms	
Diagnostics	No
Monitoring of supply voltage	No
Diagnostics indicator LED	
Monitoring of the supply voltage (PWR LED)	Yes; green PWR LED
Channel status display	Yes; green LED
For module diagnostics	Yes; green/red DIAG LED
Electrical isolation	
Electrical isolation of channels	
Between the channels	No
Between the channels and the backplane bus	Yes
Between the channels and the supply voltage of the electronics	No
Insulation	
Insulation tested with	DC 2545 V 2 s (routine test)
Dimensions	
Width	20 mm
Weights	
Weight, approx.	50 g

Dimension drawing

See the manual ET 200SP BaseUnits (http://support.automation.siemens.com/WW/view/en/59753521)

Parameter data record

A

A.1 Parameter assignment and structure of parameter data record

The data records of the module have an identical structure, regardless of whether you configure the module with PROFIBUS DP or PROFINET IO.

Parameter assignment in the user program

You can change the parameters of the module in RUN.

Changing parameters in RUN

The "WRREC" instruction is used to transfer the parameters to the module using data record 128. The parameters set with STEP 7 are not changed in the CPU, which means the parameters set in STEP 7 will be valid after a restart.

Output parameter STATUS

The module ignores errors that occur during the transfer of parameters with the "WRREC" instruction and continues operation with the previous parameter assignment. However, a corresponding error code is written to the STATUS output parameter.

The description of the "WRREC" instruction and the error codes is available in the STEP 7 online help.

Structure of data record 128

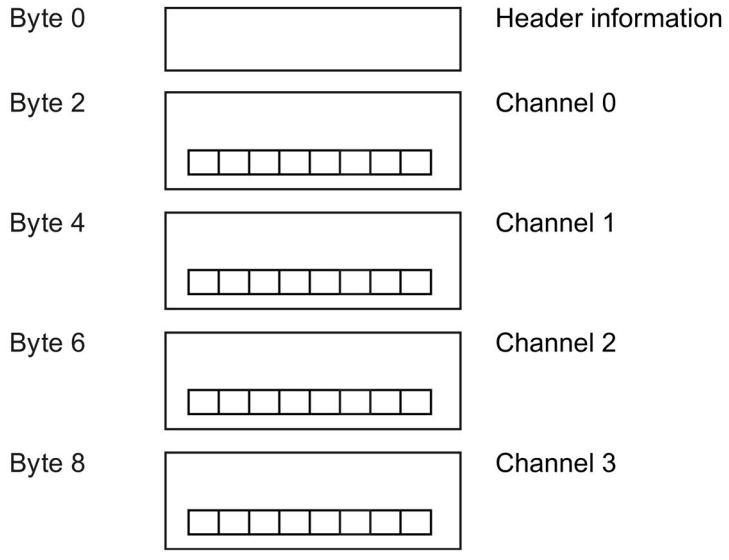


Figure A-1 Structure of data record 128

Header information

The figure below shows the structure of the header information.

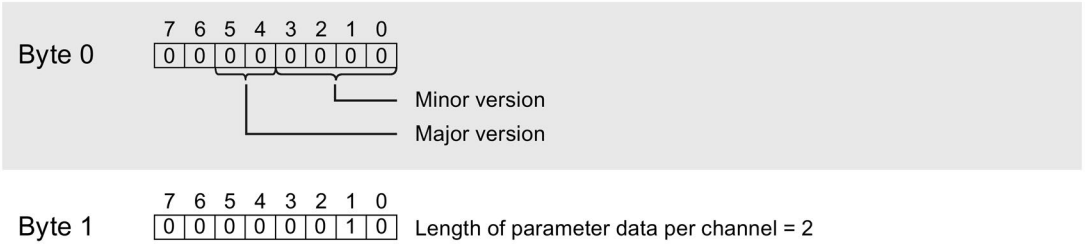
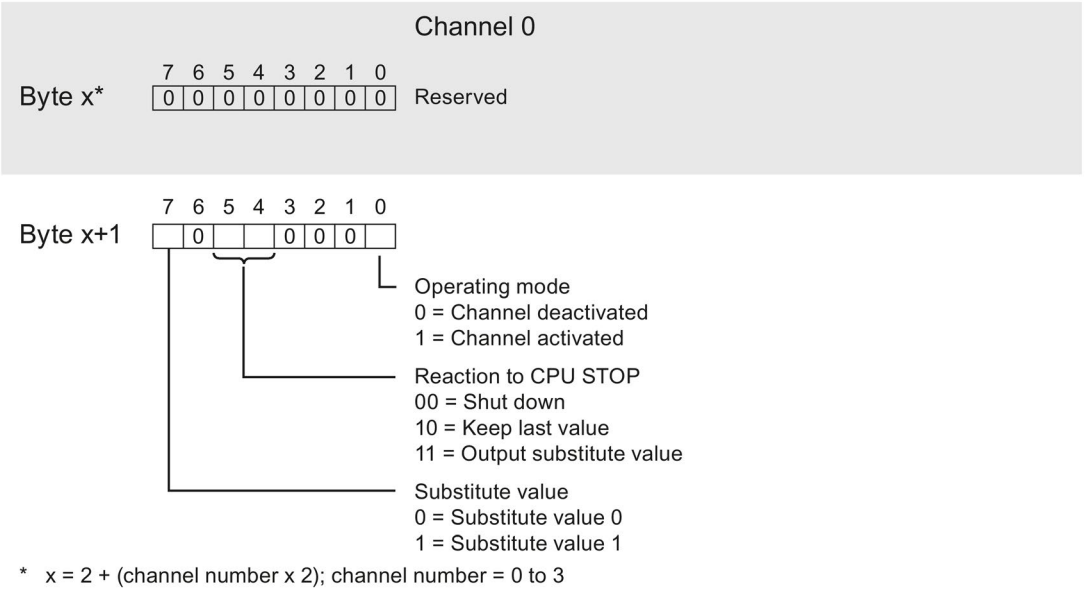


Figure A-2 Header information

Parameters

The figure below shows the structure of the parameters for channels 0 to 3.

You enable a parameter by setting the corresponding bit to "1".



* x = 2 + (channel number x 2); channel number = 0 to 3

Figure A-3 Structure byte x to x+1 for the channels 0 to 3