

**SIEMENS**



# SIMATIC

## S7-1500

Digital output module DQ 8x230VAC/5A ST Relais (6ES7522-5HF00-0AB0)

Manual

Edition

09/2016

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# SIEMENS

## SIMATIC

S7-1500/ET 200MP  
Digital output module  
DQ 8x230VAC/5A ST Relay  
(6ES7522-5HF00-0AB0)

Manual

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|  |
|--|
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|  <b>WARNING</b>       |
| indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.  |
|  <b>CAUTION</b>       |
| indicates that minor personal injury can result if proper precautions are not taken.                   |
| <b>NOTICE</b>  |
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### Qualified Personnel

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|  |
|--|
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# Preface

## Purpose of the documentation

This manual supplements the system manual S7-1500/ET 200MP (<https://support.industry.siemens.com/cs/ww/en/view/59191792>).

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

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

## Changes compared to previous version

Compared to the previous version, this manual contains the following change:

Original texts of the license conditions and copyright notes for open-source software are available on the Internet as of 09/2016.

## Conventions

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

Please also observe notes marked as follows:

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### 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.

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For legal reasons, we are obliged to publish the original text of the license conditions and copyright notices. Please read the information relating to this on the Internet (<https://support.industry.siemens.com/cs/ww/en/view/109741045>).

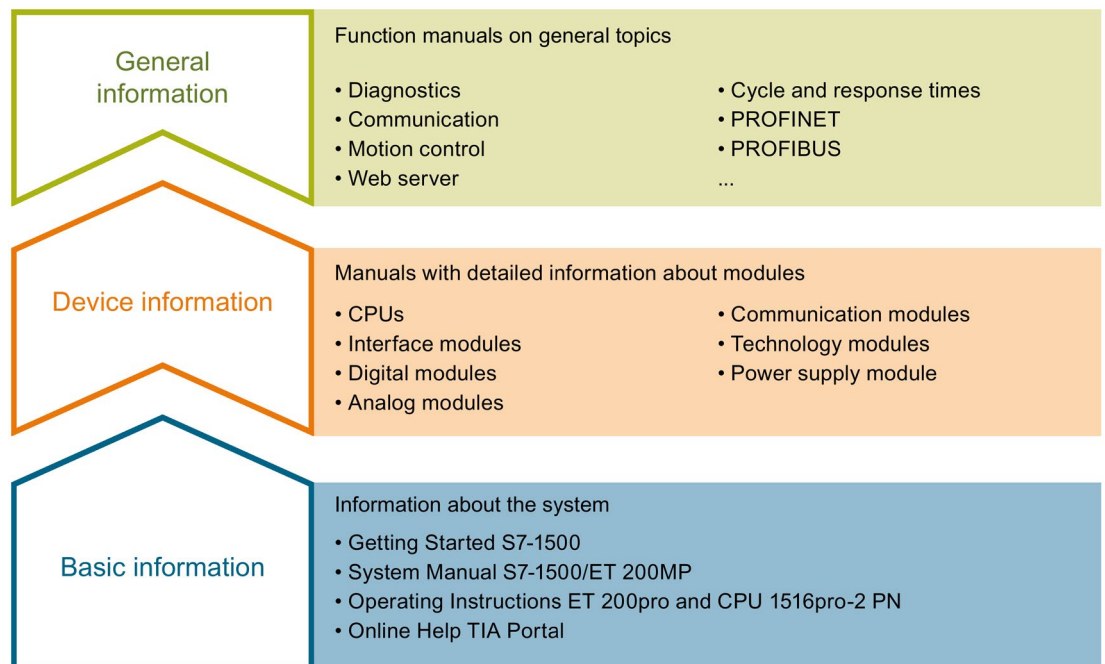
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## Documentation guide

The documentation for the SIMATIC S7-1500 automation system, the CPU 1516pro-2 PN based on SIMATIC S7-1500 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

The System Manual and Getting Started describe in detail the configuration, installation, wiring and commissioning of the SIMATIC S7-1500 and ET 200MP systems. For CPU 1516pro-2 PN you use the corresponding operating instructions. 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, wiring diagrams, characteristics and 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, OPC UA.

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

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

You can download the product information free of charge from the Internet (<https://support.industry.siemens.com/cs/us/en/view/68052815>).

### Manual Collection S7-1500/ET 200MP

The Manual Collection contains the complete documentation on the SIMATIC S7-1500 automation system and the ET 200MP distributed I/O system gathered together in one file.

You can find the Manual Collection on the Internet (<https://support.industry.siemens.com/cs/ww/en/view/86140384>).

### SIMATIC S7-1500 comparison list for programming languages

The comparison list contains an overview of which instructions and functions you can use for which controller families.

You can find the comparison list on the Internet (<https://support.industry.siemens.com/cs/ww/en/view/86630375>).

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You can export the manual as PDF file or in a format that can be edited later.

You can find "mySupport" - Documentation on the Internet (<http://support.industry.siemens.com/My/ww/en/documentation>).



## "mySupport" - CAx data

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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 "mySupport" - CAx data on the Internet (<http://support.industry.siemens.com/my/ww/en/CAxOnline>).

## Application examples

The application 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 on individual products.

You will find the application examples on the Internet (<https://support.industry.siemens.com/sc/ww/en/sc/2054>).

## 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>).

## SIMATIC Automation Tool

You can use the SIMATIC Automation Tool to run commissioning and maintenance activities simultaneously on various SIMATIC S7 stations as a bulk operation independently of the TIA Portal.

The SIMATIC Automation Tool provides a multitude of functions:

- Scanning of a PROFINET/Ethernet network and identification of all connected CPUs
- Address assignment (IP, subnet, gateway) and station name (PROFINET device) to a CPU
- Transfer of the date and the programming device/PC time converted to UTC time to the module
- Program download to CPU
- Operating mode switchover RUN/STOP
- Localization of the CPU by means of LED flashing
- Reading out CPU error information
- Reading the CPU diagnostic buffer
- Reset to factory settings
- Updating the firmware of the CPU and connected modules

You can find the SIMATIC Automation Tool on the Internet (<https://support.industry.siemens.com/cs/ww/en/view/98161300>).

## PRONETA

With SIEMENS PRONETA (PROFINET network analysis), you analyze the PROFINET network during commissioning. PRONETA features two core functions:

- The topology overview independently scans PROFINET and all connected components.
- The IO check is a fast test of the wiring and the module configuration of a system.

You can find SIEMENS PRONETA on the Internet (<https://support.industry.siemens.com/cs/ww/en/view/67460624>).

## Product overview

### 2.1 Properties

#### Article number

6ES7522-5HF00-0AB0

#### View of the module

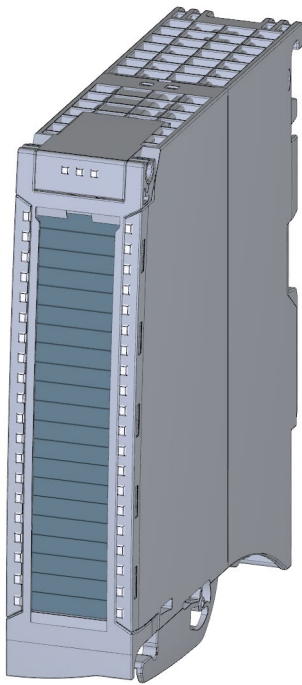


Figure 2-1 View of the DQ 8x230VAC/5A ST module

## Properties

The module has the following technical properties:

- 8 digital outputs (relays)
- Supply voltage of the 24 V DC relay coils
- Rated output voltage 230 V AC (24 V DC up to 120 V DC/24 V AC up to 230V AC)
- Rated output current 5 A
- Configurable substitute values (per channel)
- Assignable diagnostics (per channel group)
- Suitable for solenoid valves, DC contactors, and indicator lights

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               | V12 or higher                             | --- / X   |
| Identification data I&M0 to I&M3                   | V1.0.0 or higher               | V12 or higher                             | X   |
| Parameter assignment in RUN                        | V1.0.0 or higher               | V12 or higher                             | X   |
| Module-internal Shared Output (MSO)                | V2.0.0 or higher               | V13 Update 3 or higher (PROFINET IO only) | X (PROFINET IO only)  |
| Configurable after interface module IM 155-5 DP ST | V2.0.0 or higher               | V13 or higher                             | X   |

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:

- Labeling strips
- U connector
- Universal front door

## Other components

The following component can be ordered separately:

Front connectors, including potential jumpers and cable ties

You can find additional information on accessories in the system manual S7-1500/ET 200MP (<https://support.industry.siemens.com/cs/ww/en/view/59191792>).

## Wiring

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

You can find information on wiring the front connector, creating a cable shield, etc. in the Wiring section of the system manual S7-1500/ET 200MP

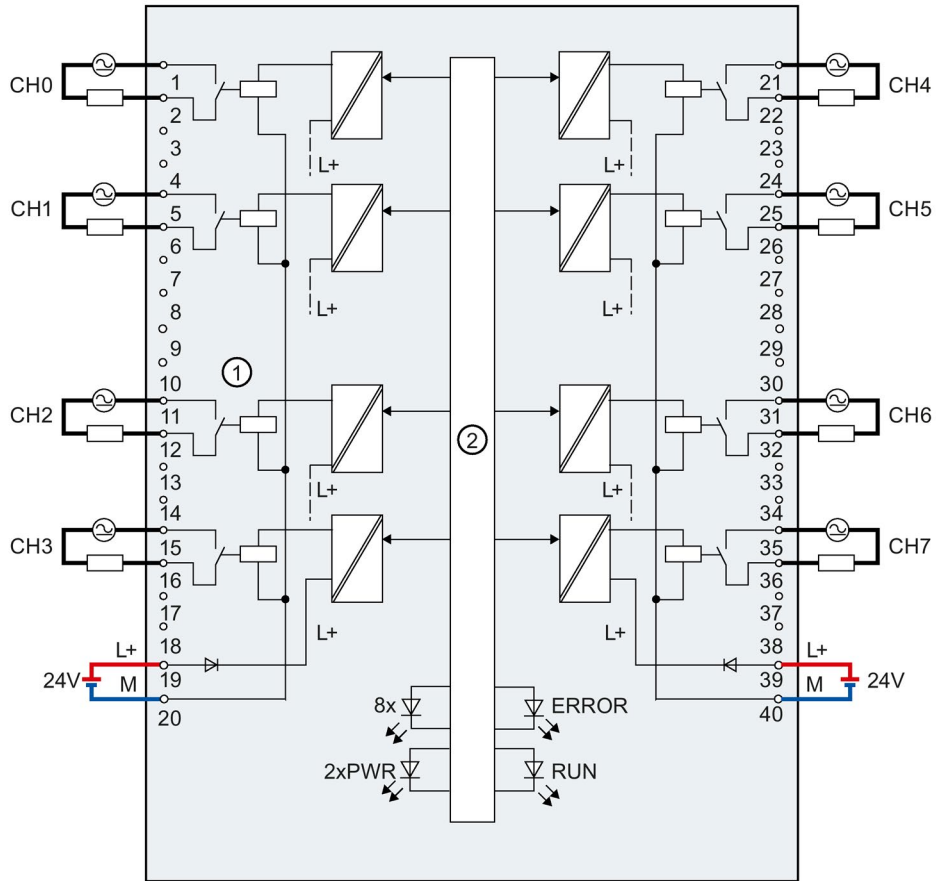
(<https://support.industry.siemens.com/cs/ww/en/view/59191792>).

### Wiring and block diagram

The example in the following figure shows the terminal assignment and the assignment of the channels.

**Note**

Note that the 24V DC supply voltage for this module must always be supplied by terminals 19/20 **and** terminals 39/40. Use the included potential jumpers for this purpose.



- |   |       |                                       |
|---|-------|---------------------------------------|
| ① Relay 8x                                | CHx   | Channel or channel status LED (green) |
| ② Backplane bus interface                 | RUN   | Status display LED (green)            |
| L Power supply 24 V DC for relay contacts | ERROR | Error display LED (red)               |
| + Ground                                  | PWR   | POWER supply voltage LED (green)      |
| M Ground                                  |       |                                       |

Figure 3-1 Block diagram and terminal assignment

**Tip: Using the potential jumpers**

Use the potential jumpers supplied with the front connector if you want to distribute the 24 V DC supply voltage to a neighboring module. This helps you to avoid having to terminate two wires to one terminal.

Proceed as follows:

1. Connect the 24 V DC supply voltage to terminals 19 and 20.
2. Insert the potential jumpers between terminals 19 and 39 (L+) and between terminals 20 and 40 (M).
3. Use the terminals 39 and 40 to loop the potential to the next module.

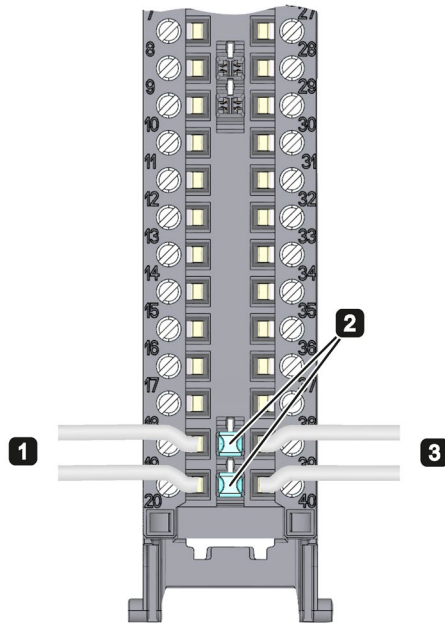


Figure 3-2 Using the potential jumpers

**Note**

Ensure that the maximum current load of 8 A per potential jumper is not exceeded.

## Parameters/address space

### 4.1 Parameters

#### DQ 8x230VAC/5A ST parameters

When you assign the module parameters in STEP 7, you use various parameters to specify the module properties. The following table lists the configurable parameters. The effective range of the configurable parameters depends on the type of configuration. The following configurations are possible:

- Central operation with a S7-1500 CPU
- Distributed operation on PROFINET IO in an ET 200MP system
- Distributed operation on PROFIBUS DP in an ET 200MP system

For parameter assignment in the user program, the parameters are transferred to the module using the WRREC instruction (parameter reassignment in RUN) and data records; see chapter Parameter assignment and structure of the parameter data records (Page 31).

Table 4- 1 Configurable parameters and their defaults

| Parameters  | Range of values  | Default setting | Parameter assignment in RUN | Scope with configuration software, e.g., STEP 7 (TIA Portal) |                      |
|---|--|-----------------|-----------------------------|--|----------------------|
|   |  |                 |                             | GSD file PROFINET IO   | GSD file PROFIBUS DP |
| <b>Diagnostics</b>  |  |                 |                             |  |                      |
| <ul style="list-style-type: none"> <li>• Missing supply voltage L+</li> </ul> | Yes/No   | No              | Yes                         | Channel group  | Channel group        |
| <b>Reaction to CPU STOP</b>   | <ul style="list-style-type: none"> <li>• Turn off</li> <li>• Keep last value</li> <li>• Output substitute value 1</li> </ul> | Turn off        | Yes                         | Channel  | Channel              |



## 4.2 Address space

The module can be configured differently in STEP 7; see following table. Depending on the configuration, additional/different addresses are assigned in the process image output/input.

### Configuration options of DQ 8x230VAC/5A ST

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 short designations/module names.

The following configurations are possible:

Table 4- 2 Configuration options

| Configuration   | Short designation/module name in the GSD file | Configuration software, e.g., STEP 7 (TIA Portal)  |  |
|---|---|--|--|
|   |   | Integrated in hardware 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 8-channel without value status  | DQ 8x230VAC/5A ST                             | X  | X  |
| 1 x 8-channel with value status   | DQ 8x230VAC/5A ST QI                          | X  | X  |
| 1 x 8-channel with value status for module-internal Shared Output with up to 4 submodules | DQ 8x230VAC/5A ST MSO                         | V13 Update 3 or higher<br>(PROFINET IO only)       | X<br>(PROFINET IO only)  |

### Value status (Quality Information, QI)

The value status is always activated for the following module names:

- DQ 8x230VAC/5A ST QI
- DQ 8x230VAC/5A ST MSO

An additional bit is assigned to each channel for the value status. The bit for the value status indicates if the output value specified by the user program is actually pending at the module terminal (0 = value is incorrect).

### Address space for configuration as 8-channel DQ 8x230VAC/5A ST

The following figure shows the assignment of the address space for the configuration as a 8-channel module with value status. You can freely assign the start address for the module. The addresses of the channels are derived from the start address.

The letters "a to d" are printed on the module; "QB a", for example, stands for module start address output byte a.

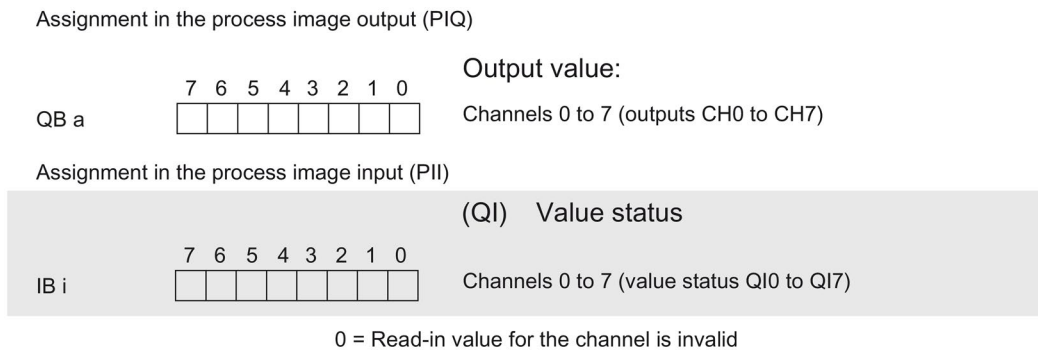


Figure 4-1 Address space for configuration as 8-channel DQ 8x230VAC/5A ST with value status

### Address space for configuration as 1 x 8-channel DQ 8x230VAC/5A ST MSO

For the configuration as a 1 x 8-channel module (module-internal Shared Output, MSO), channels 0 to 7 of the module are copied to multiple submodules. Channels 0 to 7 are then available with identical values in various submodules. These submodules can be assigned to up to four IO controllers when the module is used in a shared device:

- The IO controller to which submodule 1 is assigned has write access to outputs 0 to 7.
- The IO controllers to which submodule 2, 3, or 4 is assigned have read access to outputs 0 to 7.

The number of usable IO controllers 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.

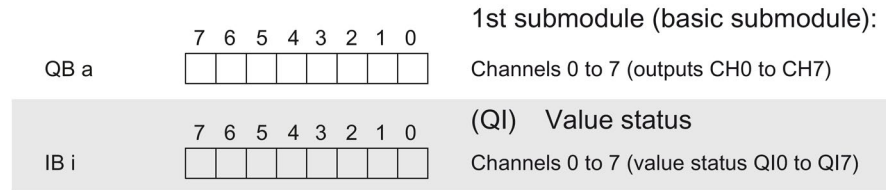
For the 1st submodule (=basic submodule), the value status 0 indicates that the value is incorrect or that the IO controller of the basic submodule is in STOP state.

For the 2nd to 4th submodule (=MSO submodule), the value status 0 indicates that the value is incorrect or one of the following errors has occurred:

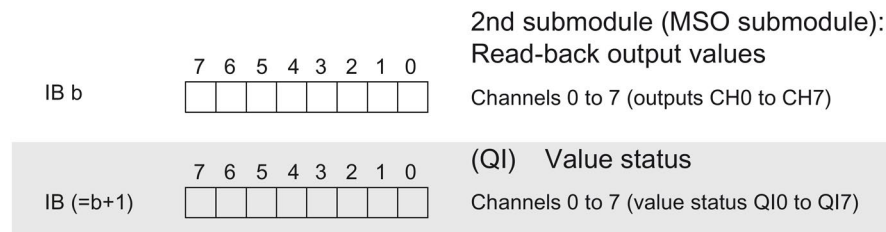
- The basic submodule is not yet configured (not ready).
- The connection between the IO controller and the basic submodule has been interrupted.
- The IO controller of the basic submodule is in STOP or POWER OFF state.

The following figure shows the assignment of the address space for submodules 1, 2, 3, and 4 and the value status.

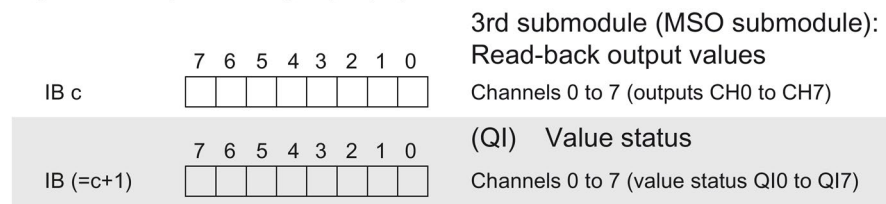
Assignment in the process image output (PIQ) for 1st submodule



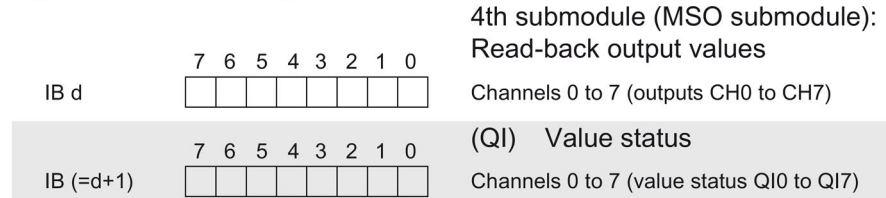
Assignment in the process image input (PII) for 2nd submodule



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



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



0 = Read-in value for the channel is invalid

Figure 4-2 Address space for configuration as 1 x 8-channel DQ 8x230VAC/5A ST S MSO with value status

## Reference

You can find information on the Shared Input/Output (MSI/MSO) function in the section Module-Internal Shared Input/Output (MSI/MSO) of the PROFINET with STEP 7 V13 (<https://support.industry.siemens.com/cs/ww/en/view/49948856>) function manual.

## Interrupts/diagnostics alarms

### 5.1 Status and error displays

#### LED displays

The figure below shows the LED displays (status and error displays) of the DQ 8x230VAC/5A ST.

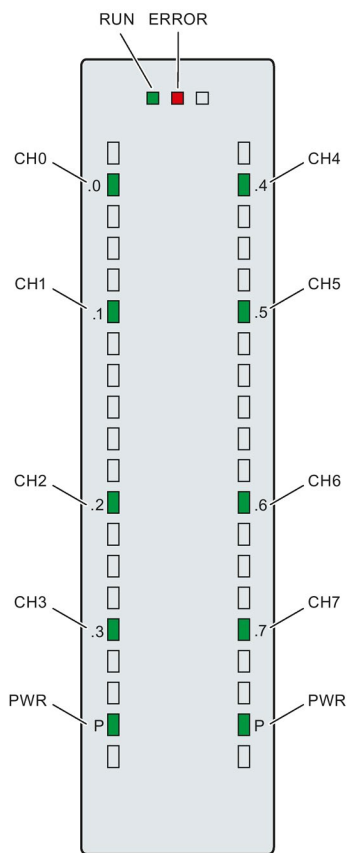


Figure 5-1 LED displays of the module DQ 8x230VAC/5A ST

## Meaning of the LED displays

The following tables explain the meaning of the status and error displays. Remedial measures for diagnostic alarms can be found in section Diagnostic alarms (Page 22).

### RUN and ERROR LED

Table 5- 1 Status and error displays RUN and ERROR

| LED          |              | Meaning  | Remedy  |
|--------------|--------------|--|---|
| RUN          | ERROR        |  |   |
| □<br>Off     | □<br>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> |
| ☀<br>Flashes | □<br>Off     | The module starts and flashes until the valid parameter assignment is set. | ---   |
| ■<br>On      | □<br>Off     | Module is configured   | ---   |
| ■<br>On      | ☀<br>Flashes | Indicates module error because supply voltage L+ is missing                | Evaluate the diagnostics data and eliminate the error.  |
| ☀<br>Flashes | ☀<br>Flashes | Hardware defective   | Replace the module.   |

### PWR LED

Table 5- 2 PWR status display

| LED PWR  | Meaning                              | Remedy                       |
|----------|--------------------------------------|------------------------------|
| □<br>Off | Supply voltage L+ too low or missing | Check the L+ supply voltage. |
| ■<br>On  | Supply voltage L+ is present and OK  | ---                          |

### CHx LED

Table 5- 3 CHx status display

| LED CHx  | Meaning                         | Remedy |
|----------|---------------------------------|--------|
| □<br>Off | 0 = Status of the output signal | ---    |
| ■<br>On  | 1 = Status of the output signal | ---    |

## 5.2 Interrupts

Digital output module DQ 8x230VAC/5A ST supports diagnostic interrupts.

You can find detailed information on the error event in the error organization block with the "RALRM" instruction (read additional interrupt info) and in the STEP 7 online help.

### Diagnostic interrupt

The module generates a diagnostic interrupt at the following event:

- Missing supply voltage L+
- Parameter assignment error

## 5.3 Diagnostics alarms

### Diagnostics alarms

A diagnostics alarm is generated and the ERROR LED flashes on the module for each diagnostics event. You can read out the diagnostics alarms, for example, in the diagnostics buffer of the CPU. You can evaluate the error codes with the user program.

If the module is operated distributed with PROFIBUS DP in an ET 200MP system, you have the option to read out diagnostics data with the instruction RDREC or RD\_REC using data record 0 and 1. The structure of the data records is available on the Internet in the "Manual for interface module IM 155-5 DP ST (6ES7155-5BA00-0AB0)".

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

| Diagnostics alarm          | Error code      | Meaning   | Corrective measures                         |
|----------------------------|-----------------|---|---|
| Parameter assignment error | 10 <sub>H</sub> | <ul style="list-style-type: none"> <li>• The module cannot evaluate parameters for the channel</li> <li>• Incorrect parameter assignment</li> </ul> | Correct the parameter assignment            |
| Load voltage missing       | 11 <sub>H</sub> | Supply voltage L+ of the module is missing  | Connect supply voltage L+ to module/channel |

# Technical specifications

## Technical specifications of the DQ 8x230VAC/5A ST

|  | 6ES7522-5HF00-0AB0        |
|--|---------------------------|
| <b>General information</b>   |                           |
| Product type designation   | DQ 8x230VAC/5A ST (Relay) |
| Hardware functional status   | FS01                      |
| Firmware version   | V2.0.0                    |
| <ul style="list-style-type: none"> <li>FW update possible</li> </ul> | Yes                       |
| <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         | V12 / V12                 |
| STEP 7 can be configured/integrated as of version                    | V5.5 SP3 / -              |
| PROFIBUS as of GSD version/GSD revision                              | V1.0 / V5.1               |
| PROFINET as of GSD version/GSD revision                              | V2.3 / -                  |
| <b>Operating mode</b>  |                           |
| DQ   | Yes                       |
| DQ with energy-saving function                                       | No                        |
| PWM  | No                        |
| Oversampling   | No                        |
| MSO  | Yes                       |
| <b>Supply voltage</b>  |                           |
| Rated value (DC)   | 24 V                      |
| Valid range, low limit (DC)  | 20.4 V                    |
| Valid range, high limit (DC)   | 28.8 V                    |
| Reverse polarity protection  | Yes                       |
| <b>Input current</b>   |                           |
| Current consumption, max.  | 80 mA                     |
| <b>Power</b>   |                           |
| Power consumption from the backplane bus                             | 0.8 W                     |
| <b>Power loss</b>  |                           |
| Power loss, typ.   | 5 W                       |

|  | 6ES7522-5HF00-0AB0   |
|--|--|
| <b>Digital outputs</b>   |  |
| Number of outputs  | 8  |
| Sinking output   | Yes  |
| Sourcing output  | Yes  |
| Short-circuit protection   | No   |
| Control of a digital input                                       | possible   |
| <b>Switching capacity of outputs</b>                             |  |
| With lamp load, max.   | 1500 W; 10 000 switching cycles  |
| Low energy/fluorescent lamps with electronic control gear        | 10x 58 W (25 000 switching cycles)   |
| Fluorescent tubes, conventionally compensated                    | 1x 58 W (25 000 switching cycles)  |
| Fluorescent tubes, uncompensated                                 | 10x 58 W (25 000 switching cycles)   |
| <b>Output current</b>  |  |
| For signal "1" rated value                                       | 5 A  |
| For signal "1" permitted range, min.                             | 5 mA; 10 V   |
| For signal "1" permitted range, max.                             | 8 A; thermal continuous current  |
| For signal "0" residual current, max.                            | 0 A  |
| <b>Parallel connection of two outputs</b>                        |  |
| For logic operations   | Yes  |
| For increased performance  | No   |
| For redundant control of a load                                  | Yes  |
| <b>Switching frequency</b>                                       |  |
| With resistive load, max.  | 2 Hz   |
| With inductive load, max.  | 0.5 Hz   |
| With lamp load, max.   | 2 Hz   |
| <b>Total current of outputs</b>                                  |  |
| Current per channel, max.  | 8 A; see additional description in the manual  |
| Current per group, max.  | 8 A; see additional description in the manual  |
| Current per module, max.   | 64 A; see additional description in the manual   |
| <b>Relay outputs</b>   |  |
| Number of relay outputs  | 8  |
| Rated input voltage of relay coil L+ (DC)                        | 24 V   |
| Current consumption of relays (coil current of all relays), typ. | 80 mA  |
| External fuse for relay outputs                                  | With miniature circuit breaker with characteristic B for: $\cos \varphi$ 1.0: 600 A $\cos \varphi$ 0.5 ... 0.7: 900 A with 8 A Diazed fuse: 1000 A |
| Contact connection (internal)                                    | No   |
| Size of motor starter according to NEMA, max.                    | 5  |
| Number of switching cycles, max.                                 | 4000000; see additional description in the manual  |
| Relay approved acc. to UL 508                                    | Yes; 250 V AC/5 A g.p.; 120 V AC TV-4 Tungsten; A300, R300   |
| Switching capacity of the contacts                               |  |
| • With inductive load, max.                                      | See additional description in the manual   |
| • With resistive load, max.                                      | See additional description in the manual   |

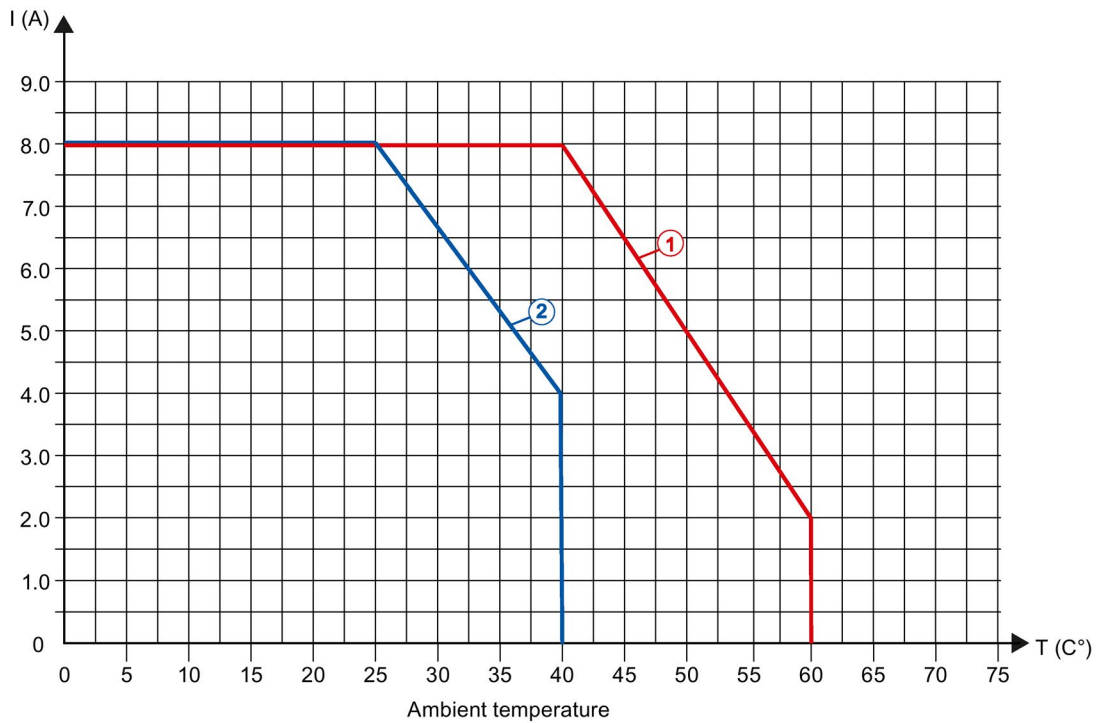


| <b>6ES7522-5HF00-0AB0</b>                                  |   |
|--|---|
| <b>Cable length</b>  |   |
| shielded, max.   | 1000 m  |
| unshielded, max.   | 600 m   |
| <b>Isochronous mode</b>                                    |   |
| Isochronous mode (application synchronized up to terminal) | No  |
| <b>Interrupts/diagnostics/status information</b>           |   |
| Diagnostics function                                       | Yes   |
| Substitute values can be applied                           | Yes   |
| <b>Interrupts</b>  |   |
| Diagnostic interrupt                                       | Yes   |
| <b>Diagnostics alarms</b>                                  |   |
| Monitoring of supply voltage                               | Yes   |
| Wire break   | No  |
| Short-circuit  | No  |
| <b>Diagnostics indicator LED</b>                           |   |
| RUN LED  | Yes; green LED  |
| ERROR LED  | Yes; red LED  |
| Monitoring of supply voltage (PWR LED)                     | Yes; green LED  |
| Channel status display                                     | Yes; green LED  |
| For channel diagnostics                                    | No  |
| For module diagnostics                                     | Yes; red LED  |
| <b>Electrical isolation</b>                                |   |
| <b>Electrical isolation of channels</b>                    |   |
| Between the channels                                       | Yes; Switching of different phases permitted  |
| Between the channels, in groups of                         | 1   |
| Between the channels and backplane bus                     | Yes   |
| Between the channels and load voltage L+                   | Yes   |
| <b>Permitted potential difference</b>                      |   |
| Between different circuits                                 | 250 V AC between the channels and the supply voltage L+; 250 V AC between the channels and the backplane bus; 500 V AC between the channels |
| <b>Insulation</b>  |   |
| Insulation tested with                                     | Between the channels: 3 100 V DC; between the channels and backplane bus: 3 100 V DC; between L+ and backplane bus 707 V DC (Type Test)     |
| <b>Ambient conditions</b>                                  |   |
| <b>Ambient temperature during operation</b>                |   |
| Horizontal mounting position, min.                         | 0 °C  |
| Horizontal mounting position, max.                         | 60 °C   |
| Vertical mounting position, min.                           | 0 °C  |
| Vertical mounting position, max.                           | 40 °C   |

| <b>6ES7522-5HF00-0AB0</b>    |        |
|------------------------------|--------|
| <b>Distributed operation</b> |        |
| Prioritized startup          | Yes    |
| <b>Dimensions</b>            |        |
| Width                        | 35 mm  |
| Height                       | 147 mm |
| Depth                        | 129 mm |
| <b>Weights</b>               |        |
| Weight, approx.              | 350 g  |

**Power reduction (derating) to aggregate current of outputs (per channel)**

The following graphs show the loading capacity of the relay contacts in relation to the mounting position of the S71500 automation system/ET 200MP distributed I/O system and the ambient temperature.



- ① Horizontal mounting of the system
- ② Vertical mounting of the system

Figure 6-1 Details on aggregate current of outputs (per channel)

## Details on the number of switching cycles

The following tables list the permissible number of switching cycles depending on the applied voltage and current load. Different values apply in each case to resistive and inductive loads.

Table 6- 1 Switching capacity and service life of relay contacts for resistive load

| For resistive load |         |                                   |
|--------------------|---------|-----------------------------------|
| Voltage            | Current | Number of switching cycles (typ.) |
| 24 V DC            | 8.0 A   | 0.1 million                       |
|                    | 5.0 A   | 0.2 million                       |
|                    | 2.5 A   | 0.7 million                       |
|                    | 2.0 A   | 1.0 million                       |
|                    | 1.5 A   | 2.0 million                       |
|                    | 0.5 A   | 4.0 million                       |
| 60 V DC            | 0.5 A   | 4.0 million                       |
| 120 V DC           | 0.2 A   | 1.6 million                       |
|                    | 0.1 A   | 2.0 million                       |
| 24 V AC            | 8.0 A   | 0.1 million                       |
| 48 V AC            | 8.0 A   | 0.1 million                       |
|                    | 2.0 A   | 1.6 million                       |
| 60 V AC            | 8.0 A   | 0.1 million                       |
|                    | 2.0 A   | 1.2 million                       |
| 120 V AC           | 8.0 A   | 0.1 million                       |
|                    | 5.0 A   | 0.2 million                       |
|                    | 4.0 A   | 0.3 million                       |
|                    | 2.0 A   | 0.5 million                       |
|                    | 1.0 A   | 0.7 million                       |
|                    | 0.5 A   | 1.5 million                       |
| 230 V AC           | 8.0 A   | 0.1 million                       |
|                    | 5.0 A   | 0.2 million                       |
|                    | 4.0 A   | 0.3 million                       |
|                    | 2.5 A   | 0.4 million                       |
|                    | 2.0 A   | 0.5 million                       |
|                    | 1.0 A   | 0.7 million                       |
|                    | 0.5 A   | 1.5 million                       |
|                    | 0.2 A   | 1.7 million                       |
|                    | 0.1 A   | 2.0 million                       |

Table 6-2 Switching capacity and lifetime of the relay contacts for inductive load

| <b>For inductive load</b> |                |  |
|---------------------------|----------------|--|
| <b>Voltage</b>            | <b>Current</b> | <b>Number of switching cycles (typ.)</b> |
| 24 V DC                   | 2.5 A          | 0.25 million                             |
|                           | 2.0 A          | 0.3 million                              |
|                           | 1.0 A          | 0.5 million                              |
|                           | 0.5 A          | 1.0 million                              |
|                           | 0.2 A          | 2.0 million                              |
| 60 V DC                   | 0.5 A          | 0.5 million                              |
|                           | 0.3 A          | 1.0 million                              |
| 120 V DC                  | 0.1 A          | 1.2 million                              |
|                           | 0.2 A          | 0.5 million                              |
| 24 V AC                   | 3.0 A          | 0.5 million                              |
| 48 V AC                   | 1.5 A          | 1.0 million                              |
|                           | 3.0 A          | 0.4 million                              |
| 60 V AC                   | 1.5 A          | 1.0 million                              |
|                           | 3.0 A          | 0.3 million                              |
| 120 V AC                  | 5.0 A          | 0.1 million                              |
|                           | 3.0 A          | 0.2 million                              |
|                           | 2.0 A          | 0.3 million                              |
|                           | 1.0 A          | 0.7 million                              |
|                           | 0.5 A          | 2.0 million                              |
| 230 V AC                  | 5.0 A          | 0.1 million                              |
|                           | 3.0 A          | 0.2 million                              |
|                           | 2.5 A          | 0.4 million                              |
|                           | 2.0 A          | 0.3 million                              |
|                           | 1.0 A          | 0.7 million                              |
|                           | 0.5 A          | 2.0 million                              |
|                           | 0.2 A          | 3.0 million                              |
|                           | 0.1 A          | 4.0 million                              |

# 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 the appendix. Always observe the specified dimensions for installations in cabinets, control rooms, etc.

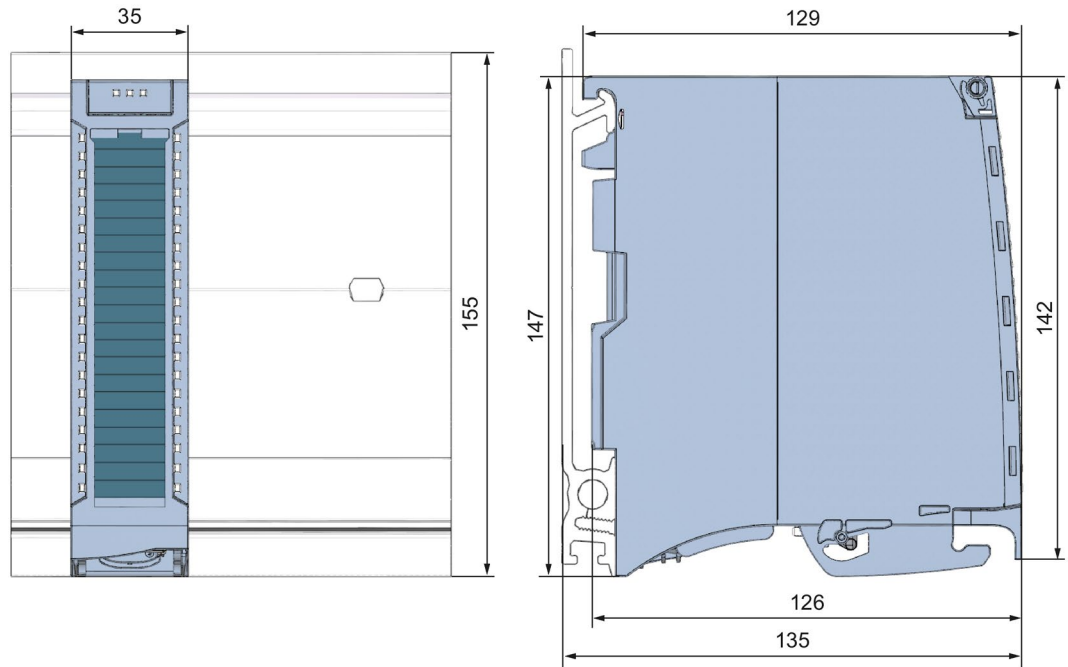


Figure A-1 Dimensional drawing of the DQ 8x230VAC/5A ST module

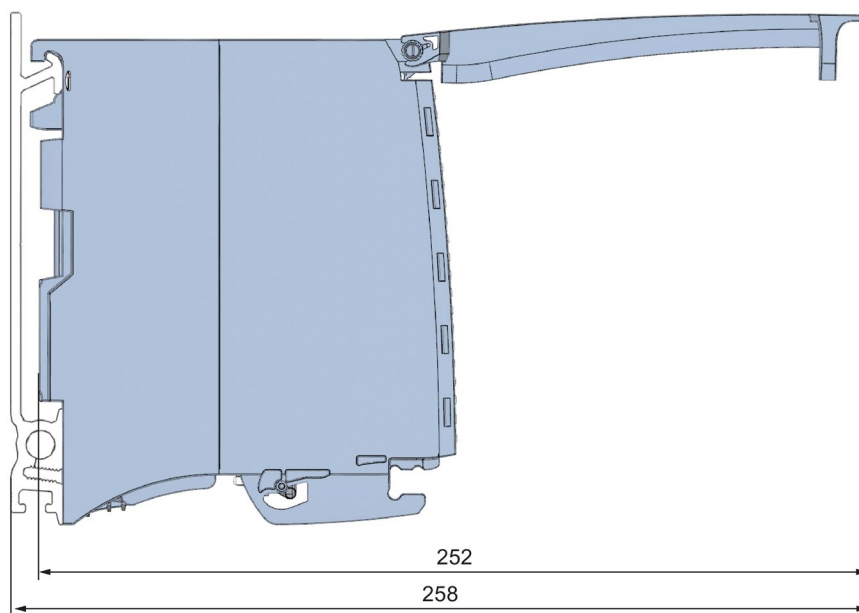


Figure A-2 Dimensional drawing of the DQ 8x230VAC/5A ST module, side view with open front cover

## Parameter data records

### B.1 Parameter assignment and structure of the parameter data records

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

#### Dependencies for configuration with GSD file

When a GSD file is used to configure a module, dependencies can arise when "assigning the parameters".

There are no dependencies for this module. You can assign the individual parameters in any combination.

#### Parameter assignment in the user program

You have the option to reconfigure the module in RUN (e.g. the response of selected channels to the CPU-STOP state can be changed in RUN without having an effect on the other channels).

#### Parameter assignment in RUN

The WRREC instruction is used to transfer the parameters to the module using data records 64 to 71. The parameters set in STEP 7 do not change in the CPU, which means the parameters set in STEP 7 are still valid after a restart.

The parameters are only checked for plausibility by the module after the transfer.

#### Output parameter STATUS

The module ignores errors that occurred 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.

#### Operation of the module behind a PROFIBUS DP interface module

If the module is operated behind a PROFIBUS DP interface module, the parameter data records 0 and 1 are not read back. You get the diagnostics data records 0 and 1 for the read back parameter data records 0 and 1. You can find more information in the Interrupts section of the PROFIBUS DP interface module device manual on the Internet (<http://support.automation.siemens.com/WW/view/en/78324181>).

**Assignment of data record and channel**

The channel parameters of the module are included in data records 64 to 71 and are assigned as follows:

- Data record 64 for channel 0
- Data record 65 for channel 1
- Data record 66 for channel 2
- Data record 67 for channel 3
- Data record 68 for channel 4
- Data record 69 for channel 5
- Data record 70 for channel 6
- Data record 71 for channel 7

**Data record structure**

The example in the following figure shows the structure of data record 64 for channel 0. The structure of channels 1 to 7 is identical. The values in byte 0 and byte 1 are fixed and may not be changed.

Enable a parameter by setting the corresponding bit to "1".

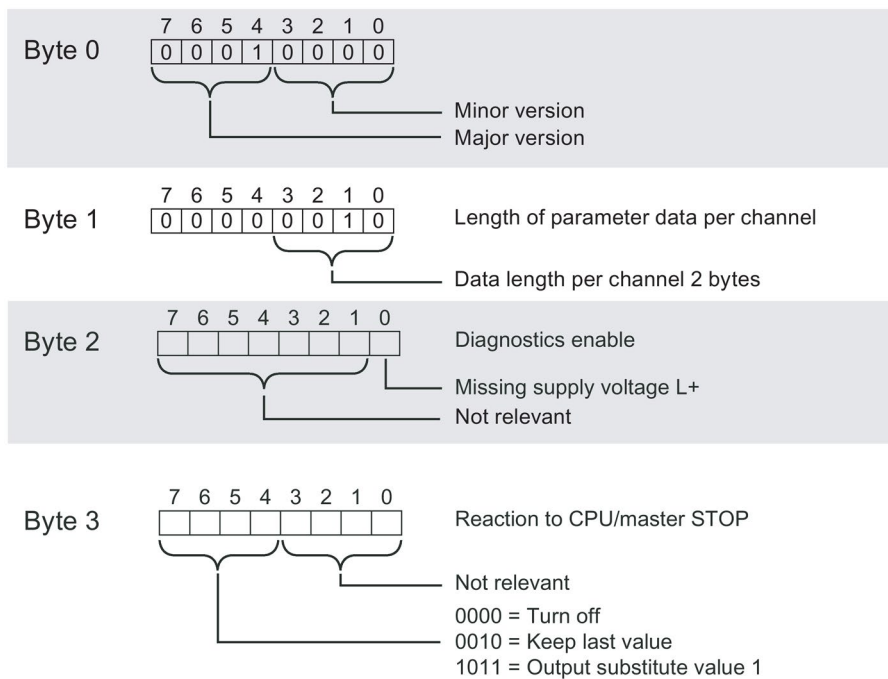


Figure B-1 Structure of data record 64: Bytes 0 to 3