SIEMENS

SIMATIC

S7-1500/ET 200MP
Power supply module
PS 25W 24VDC
(6ES7505-0KA00-0AB0)

Equipment Manual

Legal information

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

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

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

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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.

Preface

Preface

Purpose of this documentation

This manual supplements the system manuals:

- S7-1500 automation system
  (http://support.automation.siemens.com/WW/view/en/59191792)

- ET 200MP distributed I/O system
  (http://support.automation.siemens.com/WW/view/en/59193214)

Functions that concern the systems in general are described in these manuals.

The information in this manual along with the system manuals/function manuals will enable you to commission the systems.

Conventions

The term "CPU" as used in this manual refers to both the central modules of the S7-1500 automation system and to the interface modules of the ET 200MP distributed I/O system.

Please observe notes labeled as follows:

Note

A note contains important information about the product described in the documentation and its use, or about a specific section of the documentation to which you should pay particular attention.

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You can register for a product-specific newsletter here.

For the safe operation of a plant/machine, however, it is also necessary to integrate the automation components into an overall IT security concept for the entire plant/machine, which corresponds to the state-of-the-art IT technology. You can find information on this on the Internet (http://www.siemens.com/industrialsecurity).

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Table of contents

Documentation guide

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Introduction

The modular documentation of the S7-1500 and ET 200MP system families covers all aspects of your automation system.

The documentation consists of different modules that are divided into system manuals, function manuals and manuals.

The following table provides an overview of the documents that complement this manual. Information in the manual overrides specifications in the system manual.

Overview of the documentation for the power supply module PS 25W 24VDC

The table below lists additional documentation for using the PS 25W 24VDC benötigen. power supply module.

Table 1- 1   Documentation for the power supply module PS 25W 24VDC

Topic	Documentation	Most important contents
System description	System manual S7-1500 automation system (http://support.automation.siemens.com/WW/view/en/59191792) System manual ET 200MP distributed I/O system (http://support.automation.siemens.com/WW/view/en/59193214)	• Application planning • Installation • Wiring • Commissioning • Standards and approvals • Electromagnetic compatibility • Mechanical and climatic ambient conditions
Designing interference-free controllers	Function manual Designing interference-free controllers (http://support.automation.siemens.com/WW/view/en/59193566)	• Basics • Electromagnetic compatibility • Lightning protection
System diagnostics	Function manual System diagnostics (http://support.automation.siemens.com/WW/view/en/59192926)	• Overview • Hardware/software diagnostics evaluation

SIMATIC manuals

All current manuals for SIMATIC products are available for download free of charge from the Internet (http://www.siemens.com/automation/service&support).

Product overview

<div style="text-align: right; font-size: 3em;">2</div>

2.1 Properties

Order number

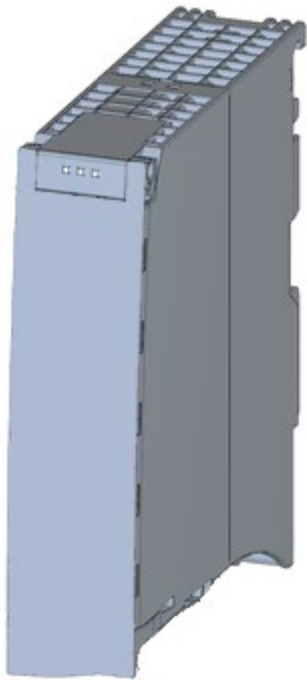6ES7505-5KA00-0AB0

View of the module

Figure 2-1   View of the PS 25W 24VDC module

Properties

The PS 25W 24VDC power supply module permits the use of additional modules.

The power supply module has the following properties:

- Technical properties
  - Rated input voltage 24 V DC (SELV)
  - Output power 25 W
  - Mains buffering
  - Functional electrical isolation from the bus
- Supported functions
  - Firmware update
  - Identification data I&M0 to I&M4
  - Configuring in RUN
 - Diagnostic alarms
  - Diagnostic interrupts

Accessories

The following components are supplied with the power supply module:

- Power connector
- U connector

These components are also available as spare parts.

2.2 Control and display elements

The following figure shows the control and connection elements of the PS 25W 24VDC behind the front cover as well as the power connector.
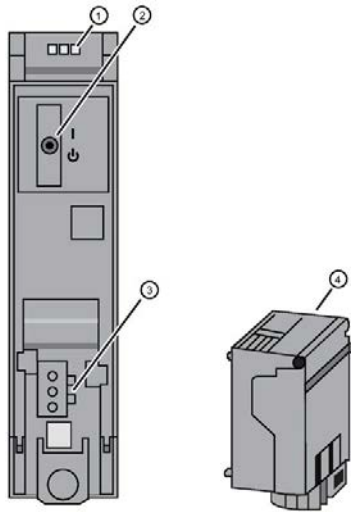
① LED displays indicating the current operating state and diagnostic status of the PS

② On/off switch

③ Connection for the power supply by means of the power connector

④ Power connector, inserted in delivery state

Figure 2-2   View of the PS 25W 24VDC (without front cover) and of the power connector

Wiring

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3.1   Connecting the power supply module

3.1.1   Connecting the supply voltage (PS 25W 24VDC)

This section contains information on connecting the power supply module to the mains voltage.

Mains connection

⚠ WARNING
Installation instructions
Risk of death or serious injury.
Observe the general installation instructions applicable in your country when wiring the power supply module.
Fuse the power cables according to their conductor cross-section.

The following applies to mains connection of the power supply module using the power connector:

- The power connector enables connection of the input voltage to the power supply module with touch protection.
- The power connector enables permanent wiring.
- The power connector features internal strain relief.
- The power connector ensures reverse polarity protection. A coding element assigns each power connector to a specific type of power supply module on delivery. A connector coded for 230 V AC does not fit in the connection to a 24 V DC power supply module.
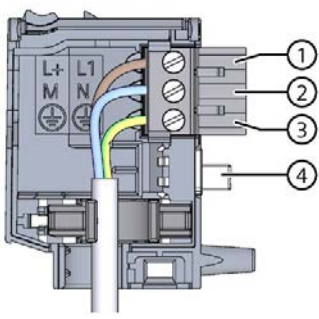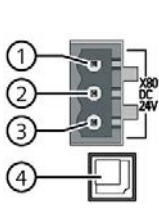
⚠ DANGER
Do not manipulate or omit the coding element
Changes to the coding element can result in dangerous states in your plant and/or damage to the outputs of the I/O modules. In order to avoid damage, do not manipulate the coding. The coding element may not be omitted.

Connection plug

The connection plug for the power supply is plugged in when the power supply module ships from the factory.

The following figure shows the assignment of the connection plug:

Connector	PS connection	Name
		① L ② N ③ Protective conductor ④ Coding element

Cables

You need flexible cables to wire power to the power supply module. The conductor cross-section must be 1.5 mm² (AWG: 16). The diameter of a 3 x 1.5 mm² sheathed cable can be no more than 8.5 mm. The ground conductor of flexible cables must be longer than the two other conductors. The fusing must meet the requirements of the corresponding control cabinet.

> ⚠ **DANGER**
>
> **Input voltage**
>
> Risk of death or serious injury.
>
> The input voltage of the PS 25W 24VDC must be supplied as safety extra low voltage (SELV).

Reference

You can find additional information about wiring the mains connector in the system manual S7-1500 automation system (https://support.industry.siemens.com/cs/de/de/view/59191792/en).

Siemens recommends the use of devices from the SITOP family of products for applications with load power supplies. Wiring information is available in the documentation for the load power supply.

Parameters

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4.1 Parameters

Parameters of the PS 25W 24VDC

For parameter assignment of the module with STEP 7, you specify the properties of the module using various parameters. The table below shows the configurable parameters.

When the parameters are assigned in the user program, they are transferred to the module with the WRREC instruction (configuring in RUN), see section Parameter data record (Page 22).

Table 4- 1   Configurable parameters and their defaults

Parameters	Value range	Default	Configuring in RUN
Diagnostic/maintenance			
• Supply voltage missing	Yes/No	No	Yes
• Switch position Off	Yes/No	No	Yes

Note

Diagnostic alarms without supply voltage

Even when there is no supply voltage or when the On/Off switch is set to "Off", the power supply module of the CPU or the IM is supplied with enough voltage by the backplane bus that it can generate a diagnostic alarm. The entire diagnostic functionality is still available.

Interrupts, diagnostic alarms, error and status messages

5

5.1 Status and error displays

Introduction

Diagnostics by means of LEDs is a basic tool for troubleshooting. Usually, you can pinpoint the source of error more precisely by analyzing the module status information in STEP 7, or in the diagnostic buffer of the CPU. These locations contain the corresponding error information in plain text.

LED displays

The following figure shows the LED displays (status and error displays) of the PS 25W 24VDC.

①   RUN-LED
②   ERROR-LED
③   MAINT-LED
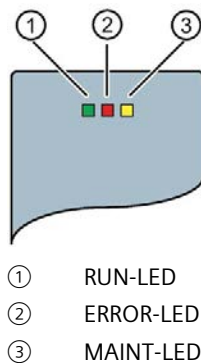
Figure 5-1   LED displays of the PS 25W 24VDC

Meaning of the LED displays

The following table explains the meaning of the status and error displays. You can find remedial measures for diagnostic alarms in the section Diagnostic alarms (Page 15).

Table 5- 1   Status and error displays RUN/ERROR/MAINT

LED			Meaning	Remedy
RUN	ERROR	MAINT		
□ Off	□ Off	□ Off	OFF, PS supplies no bus voltage • External error and diagnostics is not enabled • PS not supplied in the system, no supply voltage connected to the PS and no supply voltage connected to CPU/IM.	Supply PS with voltage Check supply voltage Switch on PS
■ On	■ On	■ On	Startup, all LED displays illuminate briefly after system startup or module startup after firmware update.	-
☼ Flashing	Not relevant	Not relevant	Startup, PS supplies bus voltage, PS waiting for parameter assignment	-
□ Off	☼ Flashing	Not relevant	Error, PS supplies no bus voltage • No supply voltage and diagnostics not enabled • Internal error	Evaluate diagnostic alarms and carry out appropriate remedial measures, see section Diagnostic alarms (Page 15)
□ Off	Not relevant	■ On	Maintenance demanded, PS supplies no bus voltage • Switch is off; supply is present and diagnostics is enabled	Switch on PS
☼ Flashing	☼ Flashing	☼ Flashing	Malfunction LED displays flash permanently	Replace PS

5.2 Diagnostic alarms

Diagnostic alarms

The following table shows the meaning of the diagnostic alarms and possible remedial measures for the respective cause.

One of the following "LED images" indicates directly on the PS that a diagnostic alarm was triggered.

- The red ERROR-LED is flashing.

  Indicates external or internal errors.

- The yellow MAINT-LED is lit.

  Maintenance; a maintenance request is active.

- All three LEDs are flashing permanently

  The PS is in "Defective" state.

In STEP 7, the diagnostic results are displayed in plain text by means of the online and diagnostic view. You can read the diagnostic data records by means of the "RDREC" instruction.

Table 5- 2   Diagnostic alarms, their meaning and remedies

Diagnostic alarm	Error code		Meaning	Reaction	Remedial measures
	Dec.	Hex.			
External error					
Supply voltage missing	266D	010AH	No supply voltage, or incorrect insertion of the power connector into the PS.	1	Check the supply voltage.
Internal error					
Overtemperature	5D	0005H	Overtemperature on the printed circuit board.	3	Check PS load. Isolate PS from mains. Wait one minute before you power on the PS again.
Overvoltage backplane bus	267D	010BH	High EMC interference or a defective PS, CPU or IM inserted.	3	Eliminate electromagnetic interference. Check inserted modules and bus connectors. Isolate PS from mains. Wait one minute before you power on the PS again.
Low voltage/overload in the power segment	281D	0119H	A voltage dip below the valid limit has been detected in the power segment to the right of the PS.	2	Check the modules in the affected segment; replace if necessary. Switch off the PS at the switch, then switch on again.
Error in the power segment	282D	011AH	PS or module to the right of the PS is defective.	2	Replace the defective module. Switch off the PS at the switch, then switch on again.
Safety shutdown	285D	011DH	Reliable operation of the module is no longer guaranteed.	3	Check ambient conditions. Isolate PS from mains. Wait one minute before you power on the PS again.
Maintenance					
Switch turned off	268D	010CH	The PS is switched off.	1	Switch on PS.

Diagnostic alarm	Error code		Meaning	Reac-tion	Remedial measures
	Dec.	**Hex.**			
Malfunction					
Module failure	256D	0100H	PS failure.	3	Replace PS.

External errors, internal errors and malfunctions

- External errors occur outside the PS. In the parameterization, specify whether or not an external error can trigger a diagnostic alarm. By default, external errors do not trigger diagnostic alarms.

- Internal errors occur inside the PS. If still possible, an internal error always triggers a diagnostic alarm.

- A malfunction is a static state; the PS must be sent in for repair. If still possible, a defect always triggers a diagnostic alarm.

Explanation of the reactions

1. No power at the power segment to the right of the PS. Alarm is only generated if the PS is still powered by the CPU or IM via the backplane bus.

2. The modules to the right of the PS are switched off.

3. The PS is switched off retentively. Alarm is only generated if the PS is still powered by the CPU or IM via the backplane bus. You cannot switch on the module unless you have eliminated the error and disconnected power to the PS for approximately one minute.

5.3 Interrupts

What is a diagnostic interrupt?

You can determine reactions to internal or external errors in the user program, by programming a diagnostic interrupt which interrupts cyclic program execution on the CPU and triggers the diagnostic interrupt OB (OB82). The event which led to the interrupt is entered in the start information of the OB82.

Trigger of a diagnostic interrupt

Events that can trigger a diagnostic alarm can also trigger a diagnostic interrupt:

- Supply voltage missing
- Overtemperature
- Overvoltage on the backplane bus
- Low voltage/overload in the power segment
- Error in the power segment
- Safety shutdown
- Switch position Off
- Malfunction

Reactions to a diagnostic interrupt

You can find the CPU reaction to a diagnostic interrupt in the function manual System diagnostics (http://support.automation.siemens.com/WW/view/en/59192926).

Detailed information on the error event is available in the diagnostic interrupt OB by executing the "RALRM" instruction (read additional interrupt information) and in the STEP 7 Online Help.

Technical specifications

<div style="text-align: right; font-size: 2em;">6</div>

Technical specifications of the PS 25W 24VDC

	6ES7505-0KA00-0AB0
Product type designation	PS 25W 24VDC
General information	
Hardware version	FS02
Firmware version	V1.0.1
Engineering with	
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 or higher
FH technology	
Redundancy	
Redundancy capability	yes
• For increasing performance	yes
Power supply	
Rated value (DC)	24 V; SELV
Valid range low limit (DC)	static 19.2 V, dynamic 18.5 V
Valid range high limit (DC)	static 28.8 V, dynamic 30.2 V
Reverse polarity protection	yes
Short-circuit protection	yes
Power failure backup	
Power failure backup time	20 ms
Input current	
Current consumption (rated value)	1.3 A
Output current	
Short-circuit protection	yes
Power	
Power feed to the backplane bus	25 W
Power loss	
Typical power losses	6.2 W
Interrupts/diagnostics/status information	
Status display	yes
Electrical isolation	
Primary/secondary	Yes; electrical isolation for max. 60 V AC/75 V DC (basic insulation)
Insulation	
Insulation tested with	707 V DC (type test)

	6ES7505-0KA00-0AB0
EMC	
Immunity to surge voltages	
on the supply lines in accordance with IEC 61000-4-5	Yes; +/- 1 kV (according to IEC 61000-4-5; 1995; symm. surge), +/- 2 kV (according to IEC 61000-4-5; 1995; unsymm. surge), no external protective circuit required
Degree of protection and protection class	
Degree of protection according to EN 60529	IP20
Protection class	3; with ground conductor
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	350 g

Dimensional drawing

<div align="right">A</div>

A.1 Dimensional drawing

Dimensional drawing of the PS 25W 24VDC

This appendix includes the dimensional drawing of the power supply module mounted on a mounting rail and with shielding clamp. You must take into consideration the dimensions when mounting in cabinets, in switch rooms, etc.
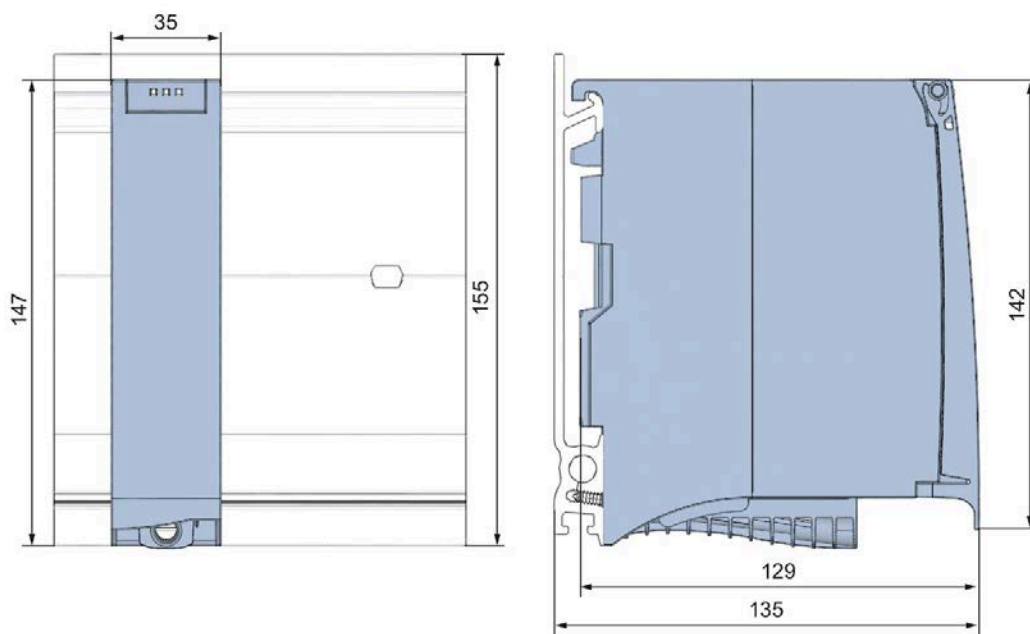
Figure A-1   Dimensional drawing of the PS 25W 24VDC module

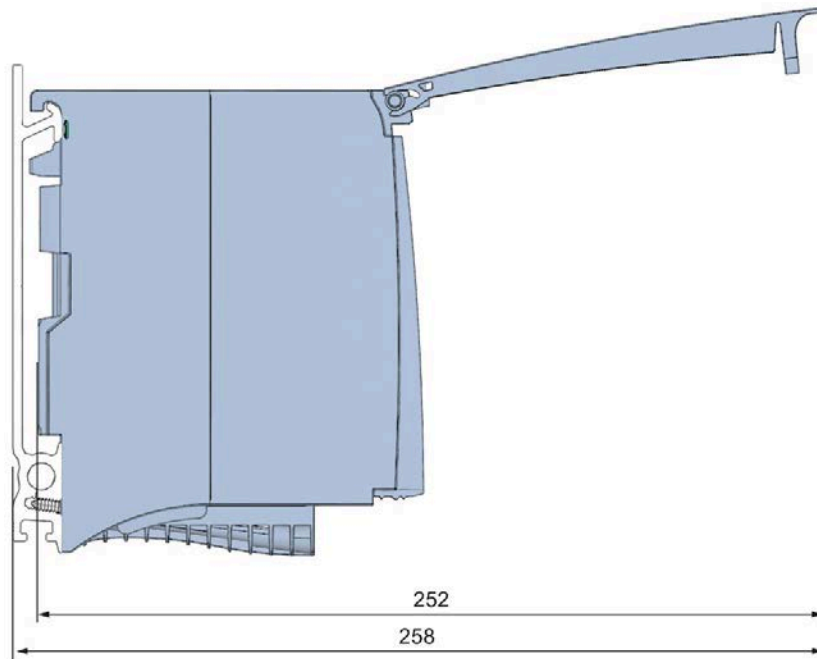This drawing shows the dimensions of the module with open front cover.

Figure A-2   Dimensional drawing of the PS 25W 24VDC module from side with open front cover

Parameter data record

<div align="right">B</div>

Parameter assignment in the user program

You have the option to re-parameterize the power supply module in RUN mode of CPU.

Changing parameters in RUN mode

The parameters for the power supply module are contained in data record 0. You can use the WRREC instruction to transfer the configurable parameters to the power supply module. The parameters assigned in STEP 7 are not changed permanently in the CPU, which means the parameters assigned in STEP 7 are valid again after a restart.

Output parameter RET_VAL

The power supply module ignores errors that occur during transfer of parameters with the WRREC instruction and continues operation with the previous parameter assignment. However, a corresponding error code is written to the RET_VAL output parameter. If no error occurs, the length of the data actually transferred is entered in RET_VAL.

RET_VAL is 4 bytes long and structured as follows:

- Byte1: Function_Num, general error code
- Byte2: Error_Decode, location of the error detection
- Byte3: Error_Code_1, error detection
- Byte4: Error_Code_2, manufacturer-specific expansion of the error detection

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

Module-specific errors are displayed by means of Error_Code_1 = 224_D or Error_Code_1 = 225_D.

Manufacturer-specific expansions of the error detection of the WRREC instruction have the following meaning:

Table B- 1   Manufacturer-specific expansions of the error detection of the WRREC instruction

Error_Code 1	Error_Code 2	Meaning
224_D Error in the data record header	1_D	The version entered in the data record header is not supported by the module or reserved bits of the version are set.
	2_D	The net length entered in the data record header is incorrect.

Error_Code 1	Error_Code 2	Meaning
225 D	1 D	Diagnostic interrupt enable is incorrect
Error in the net data (parameters) entered in the data record	16 D	Reserved parameters are not 0

Data record structure

The following figure shows the structure of the data record 0.

- A fixed bit pattern is entered in byte 0. It indicates the version of the data record structure. Each time a data record is written, the module checks the written data and accepts only data records with major version 1.

- Byte 1 specifies the maximum data length that can be used for parameter data.

- Byte 2 contains the parameter data.

- Bytes 3 to 11 are reserved.

To enable a parameter in byte 2, set the corresponding bit to "1". The corresponding diagnostics is then activated, for example, for supply voltage monitoring. If you set the corresponding bit to "0", the diagnostics is deactivated.
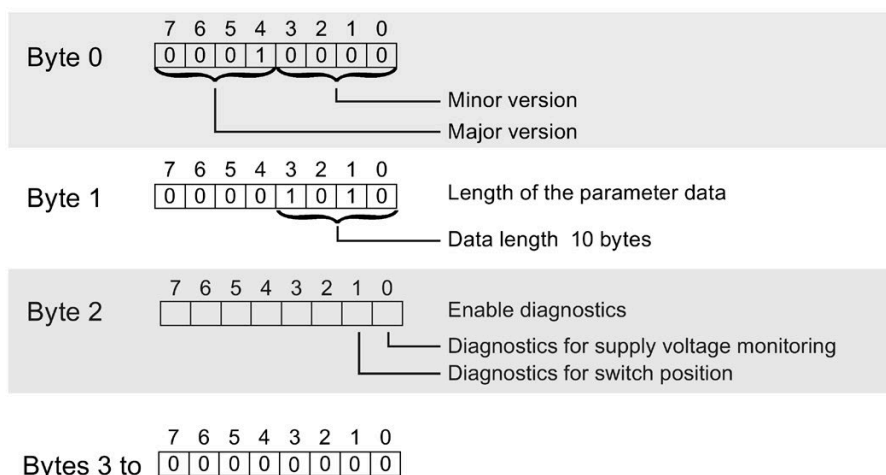
You are not permitted to change byte 0, byte 1 or bytes 3 to 11.

Figure B-1   Structure of data record 0