

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Selected official pages for procurement and maintenance review

PRODUCT BRAND

Siemens

PRODUCT MODEL

6ES7132-6BF01-0BA0

Eight Channel Standard Digital Output. Relevant section pages: 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 29, 30, 31, 32. Adjacent model text on shared pages is outside this product reference.

OFFICIAL SOURCE

Digital output module DQ 8x24VDC/0.5A ST (6ES7132-6BF01-0BA0); 02/2019, A5E03574575-AF

Siemens original documentation and product reference

2019 wiring/configuration excerpt, not the latest manual. For FS21 use the 2025 data sheet: inductive switching is 0.1 Hz unless newer load guidance permits more; safety functions and safety-related tripping are not supported.

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Amikon Limited prepared this independent reference package. Selected manufacturer pages follow with their original content and pagination visible.

SIMATIC

ET 200SP Digital output module DQ 8x24VDC/0.5A ST (6ES7132-6BF01-0BA0)

Manual

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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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WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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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

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.

Changes compared to previous version

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

Technical specifications: Ambient temperature in horizontal and vertical mounting position, extended to min. -30 °C.

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 distributed I/O system ET 200SP.

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.

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Wiring up

3.1 Wiring and block diagram

This section includes the block diagram of the DQ 8x24VDC/0.5A ST module with the terminal assignments for a 1-wire, 2-wire and 3-wire connection.

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

You can find information on wiring the BaseUnit in the system manual Distributed I/O System ET 200SP (<http://support.automation.siemens.com/WW/view/en/58649293>).

Note

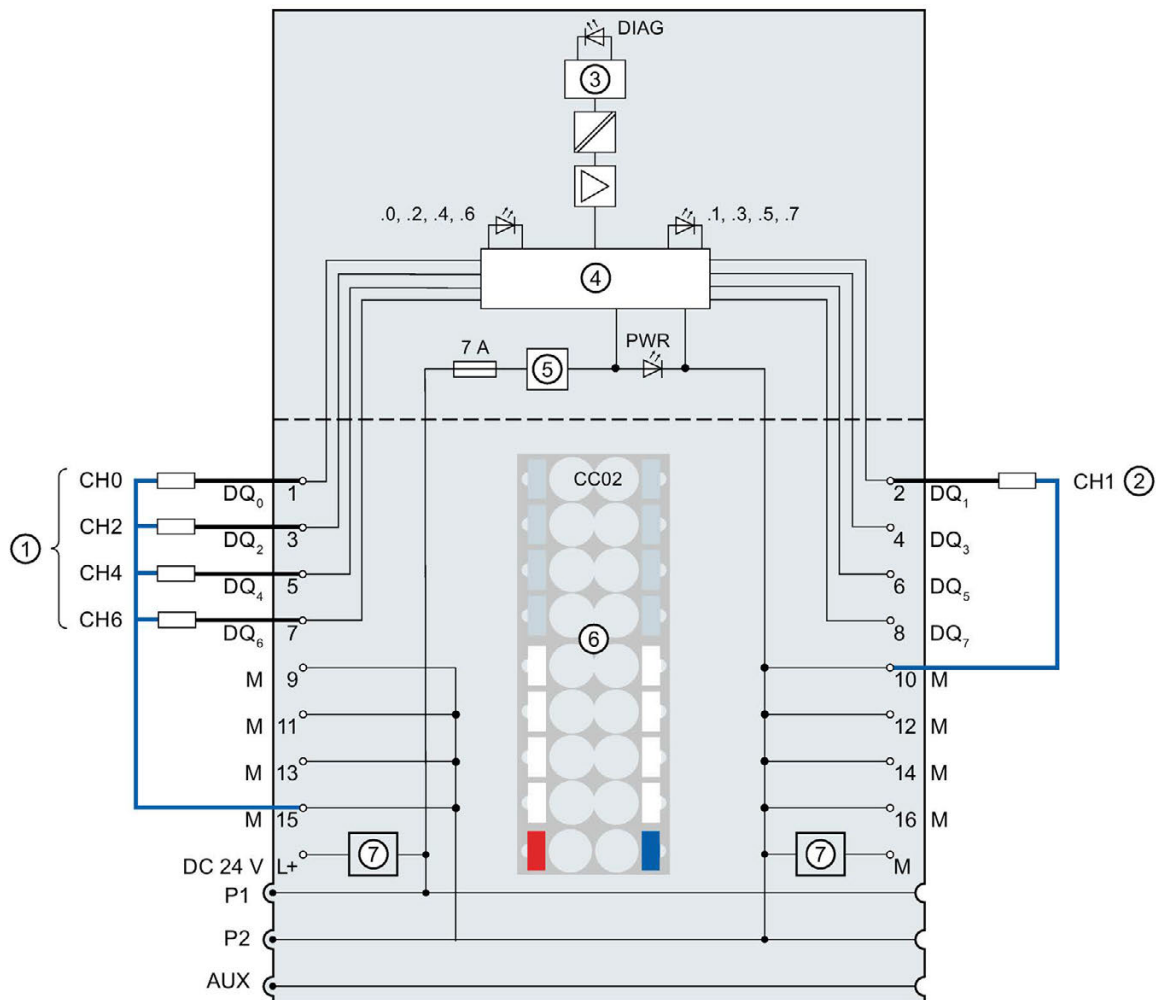
The load group of the module must begin with a light-colored BaseUnit. Keep this in mind also during the configuration.

Note**Cross circuit at output**

Be aware that voltage from a cross-circuit at the output can feed L+ to modules.

Wiring: 1 and 2-wire connection of actuators

The following figure shows an example of the terminal assignment of the digital output module DQ 8x24VDC/0.5A ST on the BaseUnit BU type A0 without AUX terminals (1-wire and 2-wire connection).



①	1-wire connection	24 V DC	Supply voltage L+ (infed for light-colored BaseUnit only)
②	2-wire connection	M	Ground
③	Backplane bus interface	P1, P2, AUX	Internal self-assembling voltage buses Connection to left (dark-colored BaseUnit) Connection to left interrupted (light-colored BaseUnit)
④	Output electronics	DQ _n	Output signal, channel n
⑤	Polarity reversal protection	DIAG	Error or diagnostics LED (green, red)
⑥	Color-coded label with color code CC02 (optional)	.0 to .7	Channel status LED (green)
⑦	Filter connection supply voltage (only when light-colored BaseUnit is present)	PWR	Power LED (green)

Figure 3-1 Block diagram and terminal assignment for 1- and 2-wire connection of actuators

Wiring: 3-wire connection of actuators

The following figure shows an example of the terminal assignment of the digital output module DQ 8x24VDC/0.5A ST on the BaseUnit BU type A0 with AUX terminals (3-wire connection).

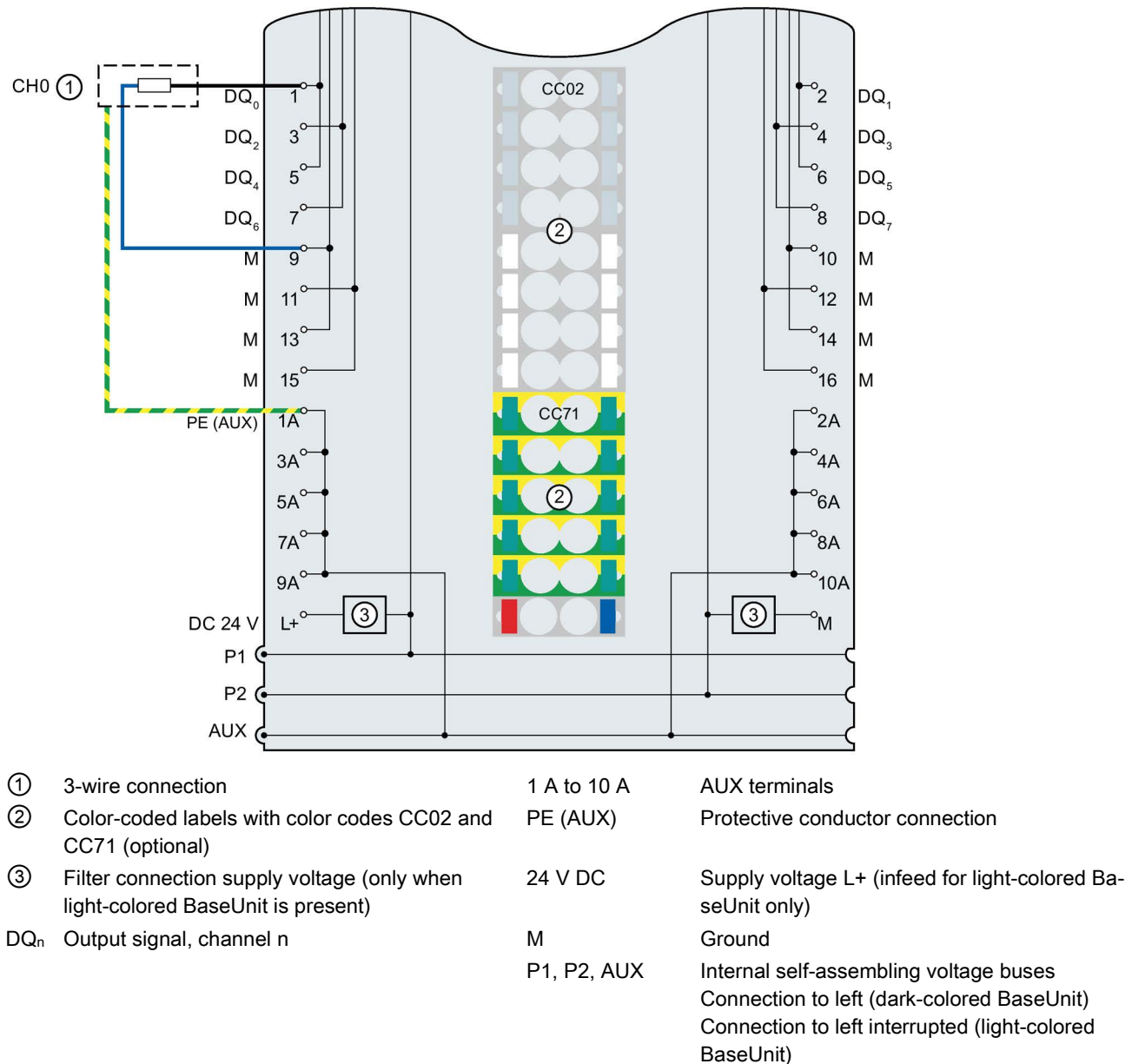


Figure 3-2 Terminal assignment for 3-wire connection of actuators

Parameters/address space

4.1 Parameters

Parameters for DQ 8x24VDC/0.5A ST

Specify the module properties with the various parameters in the course of your STEP 7 configuration. The following table lists the configurable parameters. The effective range of the 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 assigning parameters in the user program, use the "WRREC" instruction to transfer the parameters to the module by means of data records, see section Parameter assignment and structure of parameter data record (Page 28).

The following parameter settings are possible:

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

Parameters	Value range	Default	Configura- tion in RUN	Scope with configuration software, e.g. STEP 7 (TIA Portal)	
				GSD file PROFINET IO	GSD file PROFIBUS DP ¹
Diagnostics No supply voltage L+	• Disable • Enable	Disable	yes	Module	Module
Diagnostics Short-circuit to ground	• Disable • Enable	Disable	yes	Module	Module
Diagnostics Short-circuit to L+	• Disable • Enable	Disable	yes	Module	Module
Diagnostics Wire break	• Disable • Enable	Disable	yes	Module	Module
Channel activated	• Disable • Enable	Enable	yes	Channel	Channel

4.1 Parameters

Parameters	Value range	Default	Configura- tion in RUN	Scope with configuration software, e.g. STEP 7 (TIA Portal)	
				GSD file PROFINET IO	GSD file PROFIBUS DP ¹
Reaction to CPU STOP	- Turn off - Keep last value - Output substitute value 1	Turn off	yes	Channel	Module
Potential group	- Use potential group of the left module (module plugged into a dark-colored BaseUnit) - Enable new potential group (module plugged in- to light-colored BaseUnit)	Use potential group of the left module	no	Module	Module

¹ Due to the limited number of parameters of a maximum of 244 bytes per ET 200SP station with a PROFIBUS GSD configuration, the parameter assignment options are restricted. The parameter length of the I/O module is 4 bytes with PROFIBUS GSD configuration. If necessary, you can set this parameter by using the data record 128, see the appendix "Parameter data record".

Note

If both parameters "Diagnostics: short-circuit to L+" and "Diagnostics: wire break" are enabled and one of these diagnostic events occurs, the affected channel is switched off to avoid triggering an undefined load and the corresponding diagnostic alarm.

If both parameters "Diagnostics: short-circuit to L+" and "Diagnostics: wire break" are enabled and one of these diagnostic events occurs, the affected channel is switched off to avoid triggering an undefined load and the corresponding diagnostic alarm.

If the parameter "Diagnostics: short-circuit to L+" is enabled and "Diagnostics: wire break" is disabled, the signal status is retained at the affected channel when "Diagnostics: short-circuit to L+" occurs. A diagnostic alarm is triggered only for 0 signal.

4.2 Explanation of the parameters

Diagnostics no supply voltage L+

Enabling of the diagnostics for no or insufficient supply voltage L+.

Diagnostics short-circuit to ground

Enabling of the diagnostics if a short-circuit of the actuator supply to ground occurs.

Diagnostics short-circuit to L+

Enabling of the diagnostics if a short-circuit of the actuator supply to L+ occurs.

Diagnostics wire break

Enabling of the diagnostics if the line to the actuator is broken.

The module responds to a wire break as follows:

- Disabled
 - Channel status LED lit green.
 - Output voltage present at channel.
- Enabled
 - Channel status LED is off.
 - Output is switched off.
 - In addition, the "Diagnostics: Wire break" is signaled and the DIAG LED on the module flashes.

Note

If one of the two parameters "Diagnostics: Short-circuit to L+" or "Diagnostics: Wire break" is enabled and one of these diagnostics occurs, the affected channel is switched off. This prevents undefined load switching and supports detection of a faulty channel for module diagnostics.

Channel activated

Determines whether a channel is enabled or disabled.

Reaction to CPU STOP

Specifies the behavior of the module if the CPU changes to STOP.

Potential group

A potential group consists of a group of directly adjacent I/O modules within an ET 200SP station, which are supplied via a common supply voltage.

A potential group begins with a light-colored BaseUnit through which the required voltage is supplied for all modules of the potential group. The light-colored BaseUnit interrupts the three self-assembling voltage buses P1, P2 and AUX to the left neighbor.

All additional I/O modules of this potential group are plugged into dark-colored BaseUnits. You take the potential of the self-assembling voltage buses P1, P2 and AUX from the left neighbor.

A potential group ends with the dark-colored BaseUnit, which follows a light-colored BaseUnit or server module in the station configuration.

4.3 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 of the inputs.

Configuration options of DQ 8x24VDC 0.5A ST

You can configure the module with STEP 7 (TIA Portal) or with a GSD file. If you configure the module using a GSD file, the configurations are available under various short designations/module names; see the table below. The following configurations are possible:

Table 4- 2 Configuration options with GSD file

Configuration	Short designation/module name in the GSD file	Configuration software, e.g. with STEP 7 (TIA Portal)		
		Integrated in hardware catalog STEP 7	GSD file PROFINET IO	GSD file PROFIBUS DP
1 x 8-channel without value status	DQ 8x24VDC 0.5A ST V0.0	V14, SP1 or higher with HSP 0222	X	X
1 x 8-channel with value status	DQ 8x24VDC 0.5A ST V0.0, QI	V14, SP1 or higher with HSP 0222	X	---

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 7 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.

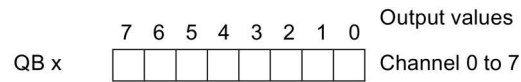
Bit = 0: Channel is disabled or there is a fault/error on the module.

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

Address space

The following figure shows the assignment of the address space for the DQ 8×24VDC/0.5A ST with value status (Quality Information (QI)). The addresses for the value status are only available if the value status is enabled.

Assignment in the process image output (PIQ)



Assignment in the process image input (PII)



Figure 4-1 Address space of the DQ 8×24VDC/0.5A ST with value status

Interrupts/diagnostics alarms

5.1 Status and error display

LED display

DQ 8x24VDC/0.5A ST.

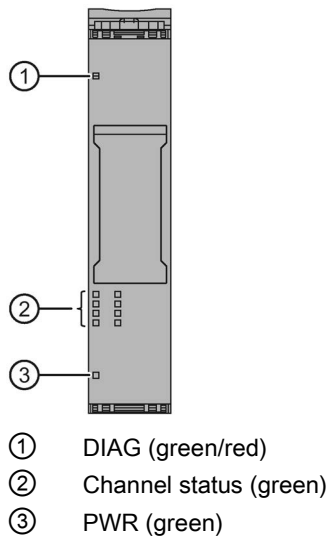


Figure 5-1 LED display

Meaning of the LED displays

The following tables show the meaning of the status and error displays. Measures for dealing with diagnostics alarms can be found in the section Diagnostics alarms (Page 22).

DIAG LED

Table 5- 1 DIAG LED fault/error display

DIAG LED	Meaning
 off	Backplane bus supply of the ET 200SP not OK
 Flashes	Module parameters not assigned
 on	Module parameters assigned
 Flashes	Module diagnostics is available

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 Interrupts

The digital output module DQ 8x24...24VDC/0.5A ST supports diagnostic interrupts.

Diagnostics interrupt

The module generates a diagnostics interrupt for the following events:

- Short-circuit
- Wire break
- Parameter assignment error
- No supply voltage

5.3 Diagnostics alarms

A diagnostic alarm is generated and the DIAG-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.

Table 5- 4 Diagnostics alarms, their meaning and how to deal with them

Diagnostics alarm	Error code	Meaning	Remedy
Short-circuit	1H	• Short-circuit of actuator supply to ground • Short-circuit of actuator supply to L+	Correct the process wiring
Wire break	6H	Actuator circuit impedance too high.	Use a different actuator type or wire differently, e.g. use cables with a larger cross-section
		Wire break between the module and actuator	Connect the cable
		Channel not connected (open)	• Disable diagnostics • Connect a resistor to the actuator contacts in the load resistance range
Parameter assignment error	10H	• The module cannot evaluate parameters for the channel. • Incorrect parameter assignment.	Correct the parameter assignment
No supply voltage	11H	No or insufficient supply voltage L+	• Check supply voltage L+ on the BaseUnit • Check BaseUnit type

Parameter data record

A.1 Parameter assignment and structure of the parameter data record

The data record of the module has an identical structure, regardless of whether you configure the module with PROFIBUS DP or PROFINET IO. With data record 128, you can reconfigure the module in your user program regardless of your programming. This means that you can use all the functions of the module even if you configured it via PROFIBUS-GSD.

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).

Changing parameters in RUN

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

Output parameter STATUS

If errors occur when transferring parameters with the "WRREC" instruction, the module continues operation with the previous parameter assignment. The STATUS output parameter contains a corresponding error code.

You will find a description of the "WRREC" instruction and the error codes in the STEP 7 online help.

Structure of data record 128

Note

Channel 0 contains the diagnostics for the entire module.

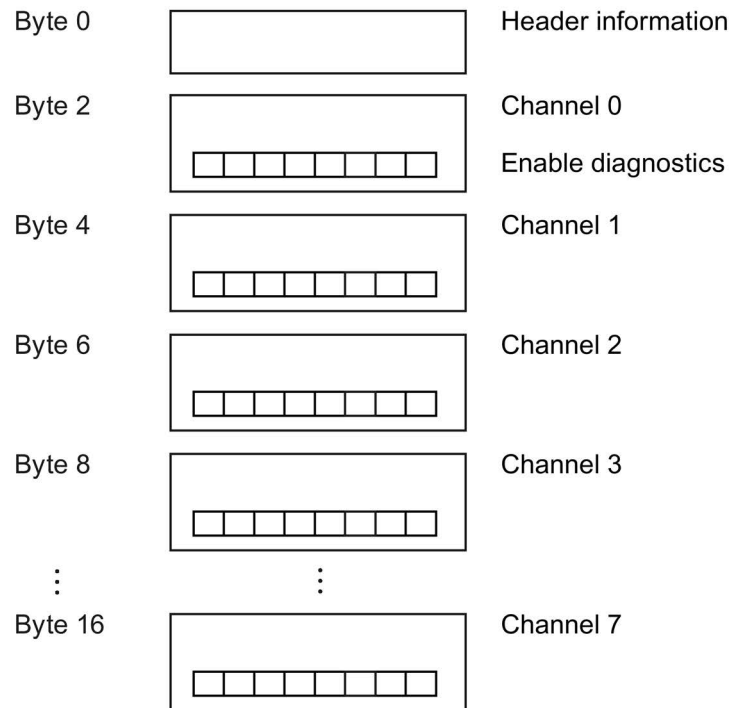


Figure A-1 Structure of data record 128

Header information

The figure below shows the structure of the header information.

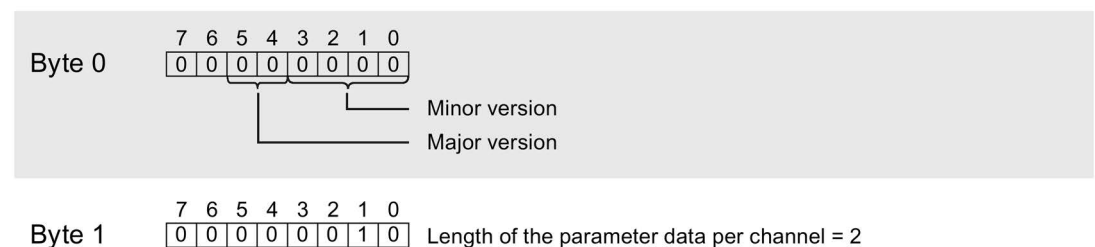


Figure A-2 Header information

Parameters

The figure below shows the structure of the parameters for channels 0 to 7.

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

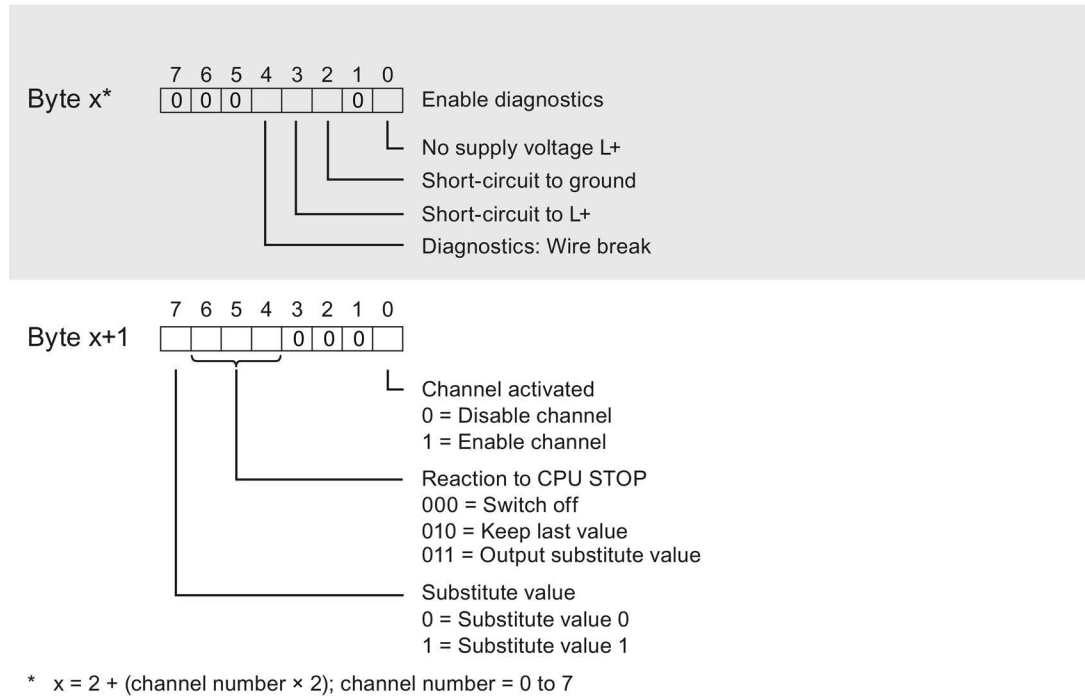


Figure A-3 Structure byte x to x+1 for the channels 0 to 7

Error transferring the data record

The module always checks all the values of the transferred data record. Only if all the values were transferred without errors does the module apply the values from the data record.

The WRREC instruction for writing data records returns corresponding error codes when errors occur in the STATUS parameter. (See also the description of the "STATUS" parameter in the STEP 7 online help).

The following table shows the module-specific error codes and their meaning for the parameter data record 128.

Error code in STATUS parameter (hexadecimal)				Meaning	Solution
Byte 0	Byte 1	Byte 2	Byte 3		
DF	80	B0	xx	Number of the data record unknown.	Enter a valid number for the data record.
DF	80	B1	xx	Length of the data record incorrect.	Enter a valid value for the data record length.
DF	80	B2	xx	Slot invalid or cannot be accessed.	- Check the station whether the module is plugged or drawn. - Check the assigned values for the parameters of the WRREC instruction.
DF	80	E0	xx	Wrong version or error in the header information.	Correct the version, length and number of parameter blocks.
DF	80	E1	06	Invalid coding for substitute value behavior.	Check the parameters of the module.