SIEMENS

SIMATIC

ET 200SP HA
Digital output module DQ 32x24VDC/0.5A HA (6DL1132-6BL00-0PH1)

Equipment Manual

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Siemens AG
Digital Industries
Postfach 48 48
90026 NÜRNBERG
GERMANY

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Security information

1

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Preface

Validity of the documentation

This manual describes the following I/O module:

System family	I/O module	Article number
SIMATIC; Distributed I/O System; ET 200SP HA	DQ 32x24VDC/0.5A HA	6DL1132-6BL00-0PH1

It supplements the *ET 200SP HA Distributed I/O system* system manual.

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

The information in this device manual and the system/function manuals enables you to put the ET 200SP HA into operation.

Configuring the ET 200SP HA

You can configure the following components of the ET 200SP HA when the following updates are installed:

Component of the ET 200SP HA	Required updates
DQ 32x24VDC/0.5A HA	HSP0276 V02.00.00

Appendices

The appendices provide information that is relevant for using the ET 200SP HA outside the PCS 7 environment.

Conventions

Please also observe notes marked as follows:

Note

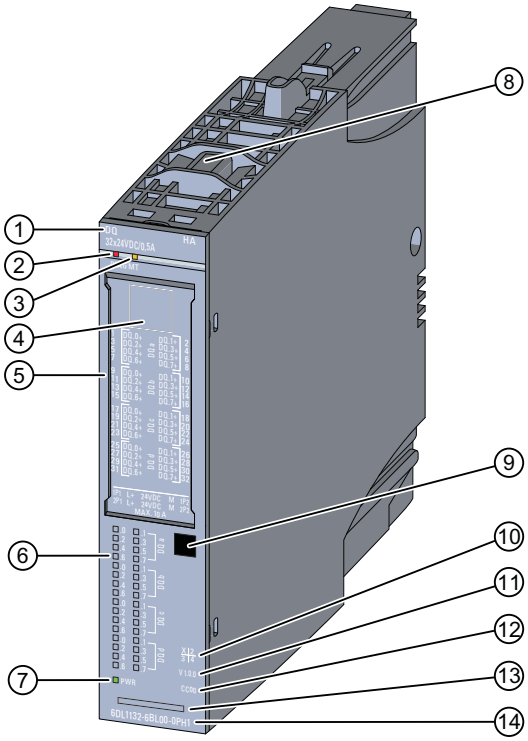
A note contains important information on the product described in the documentation, on the handling of the product or on the section of the documentation to which particular attention should be paid.

Product overview

3

3.1 Properties of the I/O module DQ 32x24VDC/0.5A HA

View of the module



① Module type and designation
② LED for diagnostics
③ LED for maintenance
④ 2D matrix code
⑤ Wiring diagram
⑥ LEDs for channel status
⑦ LED for supply voltage
⑧ Output disable switch
⑨ Module type color coding
⑩ Product version
⑪ Function status and firmware version
⑫ Color code for selection of the color-coded labels
⑬ Serial number
⑭ Article number

Figure 3-1 View of the DQ 32×24VDC/0.5A HA

Properties

The I/O module has the following technical properties:

- 32 digital outputs with the following properties that can be individually configured for each channel
  - Diagnostics
  - Substitute values
- Source output (PNP, switching to P potential)
- Module-specific configurable diagnostics for missing supply voltage L+
- Output current (Total current of all channels: Max. 10 A; single channel: Max. 0.5 A)
- Suitable for solenoid valves, DC contactors, and indicator lights

The I/O module supports the following functions:

- Firmware update
- I&M identification data
- Parameter reassignment in RUN
- Value status QI

You can configure the I/O module with HW Config and integrate it into your system.

Output disable switch

If you want to pull the I/O module in runtime, you have to press the output disable switch for 3 seconds for the I/O module to be deenergized.

When the output disable switch has been pressed for 3 seconds, the LED DIAG flashes red, the LED MT lights up yellow and the I/O module generates a diagnostics message. See section Status and error displays of the I/O module DQ 32x24VDC/0.5A HA (Page 21).

Note

Pressing the output disable switch interrupts any ongoing firmware update. A firmware update cannot be performed when the device is deenergized.

Accessories

The following accessories must be ordered separately:

- Labeling strips
- Color-coded labels
- Reference identification label
- Shield connector

Wiring

4

4.1 Pin assignment of the I/O module DQ 32x24VDC/0.5A HA (1-wire connector)

Terminal blocks

You can operate the I/O module with the following terminal blocks:

- 6DL1193-6TP00-0DH1, light
- 6DL1193-6TP00-0BH1, dark
- 6DL1193-6TP00-0DN0, light, terminal block with potential distributor on the right side for connecting actuators to ground
- 6DL1193-6TP00-0BN0, dark, terminal block with potential distributor on the right side for connecting actuators to ground

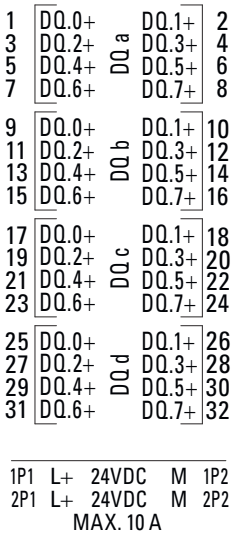
The terminal block is not included in the scope of delivery of the I/O module and must be ordered separately.

Note

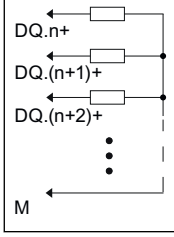
You can find additional information on the configuration in the system manual.

General pin assignment

Table 4-1 Pin assignment of the DQ 32x24VDC/0.5A HA

Terminal	Allocation	Terminal	Allocation	Explanations
1	DQ a/DQ.0+	**2**	DQ a/DQ.1+	DQ a /DQ.n+: Output signal, channel n (0...7) DQ b /DQ.n+: Output signal, channel n (8...15) DQ c /DQ.n+: Output signal, channel n (16...23) DQ d /DQ.n+: Output signal, channel n (24...31) M: Ground 1P1: Supply voltage L+ of the voltage bus 1P 2P1: Supply voltage L+ of the voltage bus 2P 1P2: Ground reference of the voltage bus 1P 2P2: Ground reference of the voltage bus 2P  Pin assignment on the front of the module.
3	DQ a/DQ.2+	**4**	DQ a/DQ.3+	
5	DQ a/DQ.4+	**6**	DQ a/DQ.5+	
7	DQ a/DQ.6+	**8**	DQ a/DQ.7+	
9	DQ b/DQ.0+	**10**	DQ b/DQ.1+	
11	DQ b/DQ.2+	**12**	DQ b/DQ.3+	
13	DQ b/DQ.4+	**14**	DQ b/DQ.5+	
15	DQ b/DQ.6+	**16**	DQ b/DQ.7+	
17	DQ c/DQ.0+	**18**	DQ c/DQ.1+	
19	DQ c/DQ.2+	**20**	DQ c/DQ.3+	
21	DQ c/DQ.4+	**22**	DQ c/DQ.5+	
23	DQ c/DQ.6+	**24**	DQ c/DQ.7+	
25	DQ d/DQ.0+	**26**	DQ d/DQ.1+	
27	DQ d/DQ.2+	**28**	DQ d/DQ.3+	
29	DQ d/DQ.4+	**30**	DQ d/DQ.5+	
31	DQ d/DQ.6+	**32**	DQ d/DQ.7+	
1P1	L+	**1P2**	M	
2P1	L+	**2P2**	M	

1-wire connection

Connection scheme	Note
 	• Ensure that the total current does not exceed 10 A overall. • Ensure that the total current does not exceed 2 A for each terminal.

4.2 Pin assignment of the I/O module DQ 32x24VDC/0.5A HA (2-wire connector)

General pin assignment with potential distributor

- The pin assignment on the left side of the terminal block corresponds to the assignment in the section "Pin assignment of the I/O module DQ 32x24VDC/0.5A HA (1-wire connector) (Page 11)".
- The potential distributor with 36 M terminals is located on the right side of the terminal block.

Note

Connection information

- The M terminals on the potential distributor are intended exclusively for the loads connected to the I/O using 2-wire connection system. You may not use these terminals as the ground terminals for other devices in the system.
- Ensure that the total current does not exceed 10 A overall.

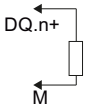
Recommendation: Use terminal blocks with potential distributors

For the connection of actuators with 2 wires, the following terminal block should be used:

Article No.	Function/parameter
6DL1193-6TP00-**0D**N0	Allow new potential group (light terminal block)
6DL1193-6TP00-**0B**N0	Use potential group of the left module (dark terminal block)

Connection of actuators with potential distributor

The figure below shows the connection of actuators with potential distributor.



This connection variant is approved only for terminal blocks with potential distributor.

Additional information

You can find additional information on the configuration in the system manual *SIMATIC; Distributed I/O System; ET 200SP HA*.

4.3 Schematic circuit diagram

The following figure shows the block diagram of the DQ 32x24VDC/0.5A HA.

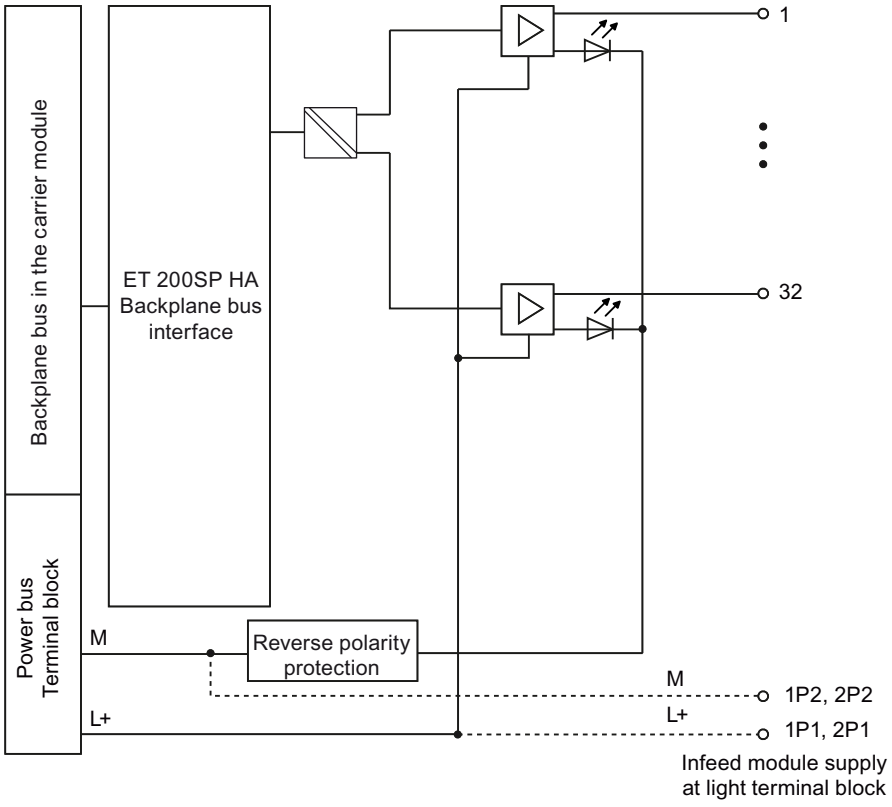


Figure 4-1 Block diagram DQ 32×24VDC/0.5A HA

4.4 Pulling I/O module in runtime / output disable switch activated

Pulling I/O module in runtime

If the I/O module is to be plugged in runtime, note the following:

1. The I/O module must be deenergized.
   To do this, press the output disable switch for 3 seconds.
2. You can recognize the output disable from the following responses:
   - DIAG LED flashes red, MT LED lit yellow
   - A diagnostics message was generated for the I/O module.

Parameters

5

5.1 Parameters of the I/O module DQ 32x24VDC/0.5A HA

Configuration

You configure the I/O module with PCS 7 V9.0 or higher.

Parameters

You define the functioning of the I/O module via parameters.

See also

Parameter assignment and structure of the module/channel parameters (Page 32)

5.2 Module/channel parameters

Parameters of the DQ 32x24VDC/0.5A HA

You have the following setting options:

Table 5-1 Parameters and their default settings

Parameter	Value range	Default	Parameter re-assignment in RUN	Efficiency range
Diagnostics, Missing supply voltage L+	• Enabled • Disabled	Enabled	Yes	Module
Diagnostics Short-circuit to ground	• Enabled • Disabled	Enabled	Yes	Channel
Channel activated	• Enabled • Disabled	Enabled	Yes	Channel
Reaction to CPU STOP	• Shutdown • Keep last value • Output substitute value	Shutdown	Yes	Channel
Substitute value [1]	• 0 • 1	0	Yes	Channel
Potential group	• Use potential group of the left module • Allow new potential group	Use potential group of the left module	No	Module
Double-wide terminal block [2]	• Enabled • Disabled	Disabled	No	Configuration (HW Config)

[1] Only applicable when the value "Output substitute value" has been enabled for the "Reaction to CPU STOP" parameter.

[2] I/O module on terminal block with potential distributor: Select the "Double-width terminal block" parameter in the hardware properties for the I/O module.

5.3 Explanation of the module/channel parameters

Diagnostics, Missing supply voltage L+

Enabling of the diagnostics for missing or insufficient supply voltage L+

Diagnostics, Short-circuit to ground

Can be used only for activated channels.

When the digital output is enabled, you can enable diagnostics that report a digital output short-circuit to M.
A short-circuit to ground is only recognized for an output value = 1 (output is switched on).

Note

Short-circuit signal

If the output value is set to 0 for a short-circuit, the short circuit to M diagnostics is reset.

Channel activated

Specifies whether a channel is activated or deactivated.

Reaction to CPU STOP

Determines the reaction of the digital output to CPU STOP or to failure of communication between the interface module and CPU.

Substitute value

Only applicable when the value "Output substitute value" has been enabled for the "Reaction to CPU STOP" parameter.

The entered substitute value is output by the I/O module in the following cases:

- When there is no connection to the CPU (for example, PROFInet cable unplugged)
- With CPU STOP

Potential group

A potential group consists of a group of terminal blocks arranged next to one another, with the associated I/O modules within an ET 200SP HA station.

Starting a potential group

- The first (left-hand) terminal block which you install in the IO device (on the first carrier module to the right next to the interface module) is a light-colored terminal block.
- Connect the supply voltage to a light-colored terminal block.

- Each light-colored terminal block which you install in the IO device starts a new potential group.
- The power bus is interrupted to the left.

Extending the potential group

- Each dark-colored terminal block passes the supply voltage connected on the light-colored terminal block to the I/O modules and to the dark terminal block positioned to the right of it.
- The power bus is continuous.

Ending a potential group

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

Power supply of I/O modules of a potential group

- All I/O modules of a potential group have a shared power supply.

You can find additional information on the configuration of the potential group in the system manual *SIMATIC; Distributed I/O System; ET 200SP HA*.

Double-width terminal block (I/O module on terminal block with potential distributor)

Select the "Double-width terminal block" parameter in the hardware properties for the I/O module.

The parameter only has an effect on the configuration in HW Config.

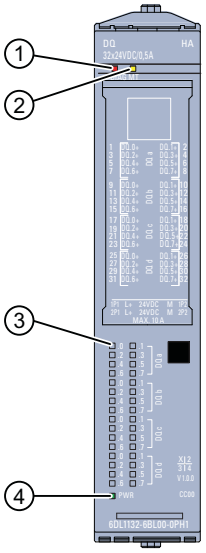
Displays and interrupts

6

6.1 Status and error displays of the I/O module DQ 32x24VDC/0.5A HA

LED displays

The following figure shows the LED displays of the I/O module:



① DIAG LED (green/red)
② MT LED (yellow)
③ Channel status LED (green)
④ PWR LED (green)

Figure 6-1 LED displays

Meaning of the LED displays

The tables below explain the meaning of the status and error displays. Remedial measures for diagnostics messages can be found in section Diagnostics messages and maintenance events (Page 34).

Also note section: "Pulling I/O module in runtime / output disable switch activated (Page 15)".

DIAG LED

Table 6-1 Diagnostics display of the DIAG LED

DIAG LED	Meaning
Off	The power supply of the ET 200SP HA is disrupted or switched off.
Flashes	Module is not configured.
On	Module is parameterized, there is no diagnostics message
Flashes	Module is configured, at least one diagnostic message is pending.

MT LED

Table 6-2 Status display of the LED MT

MT LED	Meaning
Off	No maintenance required.
On	Maintenance is required, i.e. at least one maintenance event has occurred. Note: After activating the output disable switch, only the associated diagnostic alarm is pending.

Channel status LED

The green LED channel status shows the signal level at the input terminal.

Table 6-3 Status display of the channel status LEDs

LED channel status	Meaning
Off	• Process signal = 0 or channel disabled • Module has been switched off • Module or channel diagnostics pending
On	Channel enabled and process signal = 1 (no channel diagnostics / module diagnostics pending)

PWR LED

Table 6-4 Status display of the PWR LED

PWR LED	Meaning
□ Off	Supply voltage L+ missing
■ On	Supply voltage L+ present

6.2 Interrupts

The I/O module supports diagnostics interrupts and maintenance messages.

Diagnostics interrupts

The I/O module generates a diagnostics interrupt at the following events:

- Supply voltage L+ missing
- Parameter assignment error
- Channel/component temporarily unavailable
- Short-circuit to ground
- Retentive memory in carrier module defective
- Retentive memory in the terminal block defective
- Module is faulty
- Shutdown on button activation

Maintenance messages

The I/O module generates a maintenance message for the following events:

- Retentive memory in carrier module defective
- Retentive memory in the terminal block defective

Technical specifications

7

Technical specifications of the DQ 32×24VDC/0.5A HA

Article number	6DL1132-6BL00-0PH1
General information	
Product type designation	DQ 32x24VDC/0.5A HA
Firmware version	V1.0
• FW update possible	Yes
Usable terminal block	TB type H1 and N0
Color code for module-specific color identification plate	CC00
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• PCS 7 configurable/integrated as of version	V9.0
Operating mode	
• DQ	Yes
• DQ with energy-saving function	No
• PWM	No
• Oversampling	No
Redundancy	
• Redundancy capability	No
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Input current	
Current consumption (rated value)	60 mA; without load
Current consumption, max.	70 mA; without load
Output voltage	
Rated value (DC)	24 V
Power loss	
Power loss, typ.	1.6 W; minimum - typ. specification not possible because load-dependent
Address area	
Address space per module	
• Inputs	4 byte; QI of the outputs
• Outputs	4 byte
Digital outputs	

Article number	6DL1132-6BL00-0PH1
Number of digital outputs	32
Current-sinking	No
Current-sourcing	Yes
Short-circuit protection	Yes; Clocked electronically
• Response threshold, typ.	2 A; Overload / short circuit
Open-circuit detection	No
Overload protection	Yes
Limitation of inductive shutdown voltage to	Typ. L+ (-53 V)
Controlling a digital input	Yes
Switching capacity of the outputs	
• with resistive load, max.	0.5 A
• on lamp load, max.	5 W
Load resistance range	
• lower limit	48 Ω
• upper limit	4 kΩ
Output current	
• for signal "1" rated value	0.5 A
• for signal "0" residual current, max.	0.1 mA
Output delay with resistive load	
• "0" to "1", typ.	54 µs
• "1" to "0", typ.	48 µs
Parallel switching of two outputs	
• for uprating	No
• for redundant control of a load	Yes; only outputs of the same group
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	2 Hz
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per channel, max.	0.5 A
• Current per module, max.	10 A
Total current of the outputs (per module)	
horizontal installation	
– up to 70 °C, max.	10 A
vertical installation	
– up to 60 °C, max.	10 A
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Substitute values connectable	Yes

Article number	6DL1132-6BL00-0PH1
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Monitoring the supply voltage	Yes
– parameterizable	Yes
• Wire-break	No
• Short-circuit	Yes
• Short-circuit to M	Yes; channel by channel
• Short-circuit to L+	No
• Group error	Yes
Diagnostics indication LED	
• MAINT LED	Yes; yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes; Green LED
• for channel diagnostics	No
• for module diagnostics	Yes; green/red DIAG LED
Potential separation	
Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	1 500 V DC/1 min, type test
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C
• horizontal installation, max.	70 °C
• vertical installation, min.	-40 °C
• vertical installation, max.	60 °C
Dimensions	
Width	22.5 mm
Height	115 mm
Depth	138 mm
Weights	
Weight, approx.	150 g

Cycle time

The cycle time describes the time slice in which new process values are output. The cycle time of the I/O module is 150 µs.

Response to short-circuit detection

The I/O module is equipped with an overload protection that triggers as of about 2 A. When this limit is exceeded, the I/O module automatically limits the current (typically: to 1.3 A). If the overload continues, it results in a temperature increase in the I/O module. The respective output switches on and off again cyclically (clocked).

Note

Cable length

Ensure sufficient low-resistance cable routing to the sensor/actuators to reach the response threshold. Depending on the cable cross-section used, there may be restrictions in the cable lengths that can be used.

Drivers, parameters, diagnostics messages and address space

A

A.1 Concept of the driver and diagnostics blocks

Use with PCS 7

The following information shows you the benefits of using PCS 7. PCS 7 automatically carries out many important parameterizations and interconnections of blocks.

If you want to use the ET 200SP HA outside of the PCS 7 environment, note the next, following section.

Tasks of the driver and diagnostics blocks (driver blocks)

In process control systems, certain demands are placed on the diagnostics/signal processing. This includes the monitoring of modules, IO devices and IO controllers for malfunctions and failures.

To enable this, blocks are available in the PCS 7 library that implement the interface to the hardware including test functions.

These blocks perform two basic tasks:

- They provide signals from the process to the AS for further processing.
- They monitor modules, IO devices and IO controllers for failure.

When the process signals are read in, these blocks access the process image input (or process image partition) (PII) and when the process signals are output, they access the process image output (or process image partition) (PIQ).

Concept

The concept of the driver and diagnostics blocks for PCS 7 can be characterized as follows:

- The separation between user data processing (CHANNEL blocks) and diagnostics data processing (MODULE blocks)
- The symbolic addressing of the I/O signals
- The automatic generation of the MODULE blocks by CFC

This block concept supports all modules from the list of approved modules.
When new Siemens or non-Siemens module types are integrated, the meta-knowledge for the driver generator can be extended by additional XML files (object and action lists).

Note

Driver and diagnostics blocks

- The library with the driver blocks has to installed using the Setup program on the PC. This is the only method of ensuring that the meta-knowledge required for the driver generator is available. You must not copy the library from another computer.
- You can also use driver blocks from another library (for example, your own blocks from your own library). You can specify this additional library in the "Generate module drivers" dialog box. The driver generator then searches for the block to be imported in the library specified here. If the block is not found here, it is searched for in the library specified in the control file (XML file).
- If the S7 program contains a signal-processing block but not from one of the PCS 7 libraries, you have to specify the version of the driver library from which the driver blocks are to be imported in the "Generate module drivers" dialog box.

Time-optimized processing

For time-optimized processing of the user program in runtime, PCS 7 automatically carries out the following programming tasks:

- Divide organization blocks for error handling (for example, OB 85, OB 86) into runtime groups
- Installing driver blocks in the corresponding runtime groups

If an error occurs, the SUBNET block, for example, activates the relevant runtime group, the RACK block or MODULE block contained in the runtime group detects the error, evaluates it and outputs a process control message to the OS.

The diagnostics information of the MODULE block (OMODE_xx output) is also transferred to the corresponding CHANNEL block (MODE input).

If necessary, this information can be displayed by means of a PCS 7 block that can be operated and monitored on the OS or by means of a user block in a process picture (color change of the measured value or flashing display, etc.).

A.2 Parameters, diagnostics messages and address space without PCS 7

A.2.1 Parameter assignment

Parameter assignment in the user program

You can reconfigure individual channels of the module in RUN without this having an effect on the other channels.

Changing parameters in RUN

The parameters are transferred to the module with the "WRREC" instruction via 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 of the CPU.

If you reconfigure a module and diagnostics are pending prior to the reconfiguration, these diagnostics are not signaled as "outgoing".

Output parameter STATUS of the WRREC

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

The STATUS output parameter is 4 bytes long and is configured as followed:

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

Module-specific errors are displayed via Error_Decode = 0x80 and Error_Code_1 / Error_Code_2.

Error_ Code_1	Error_ Code_2	Cause	Remedy
0xB0	0x00	Number of the data record unknown	Enter valid number for data record.
0xB1	0x01	Length of the data record is incorrect	Enter valid value for data record length.
0xB2	0x00 to 0xFF	Module cannot be reached	• Check station - is the module plugged in correctly? • Check the parameters of the WRREC instruction.
0xE0	0x01	Wrong version in the header	Correct the version number of the parameter block.
0xE0	0x02	Header error (number or length of parameter block)	Correct the length and number of the parameter blocks.

Error_ Code_1	Error_ Code_2	Cause	Remedy
0xE1	0x01	Reserved bit set	Check and correct the parameters
0xE1	0x06	Invalid encoding for substitute value reaction	
0xE1	0x0E	Invalid redundancy parameter assignment	

A.2.2 Parameter assignment and structure of the module/channel parameters

Structure of data record 128

Data record 128 has a length of 76 bytes.

It contains the channel parameters of the 32 channels.

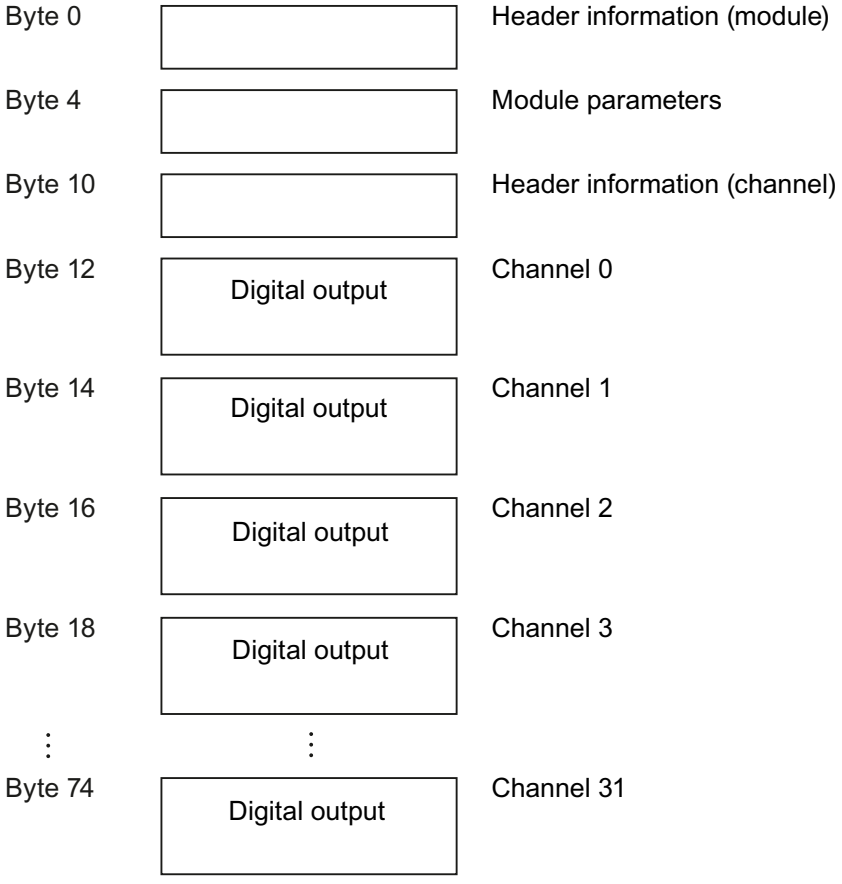


Figure A-1 Structure of data record 128

Header information and module parameters

The following figure shows the configuration of the header information and module parameters.

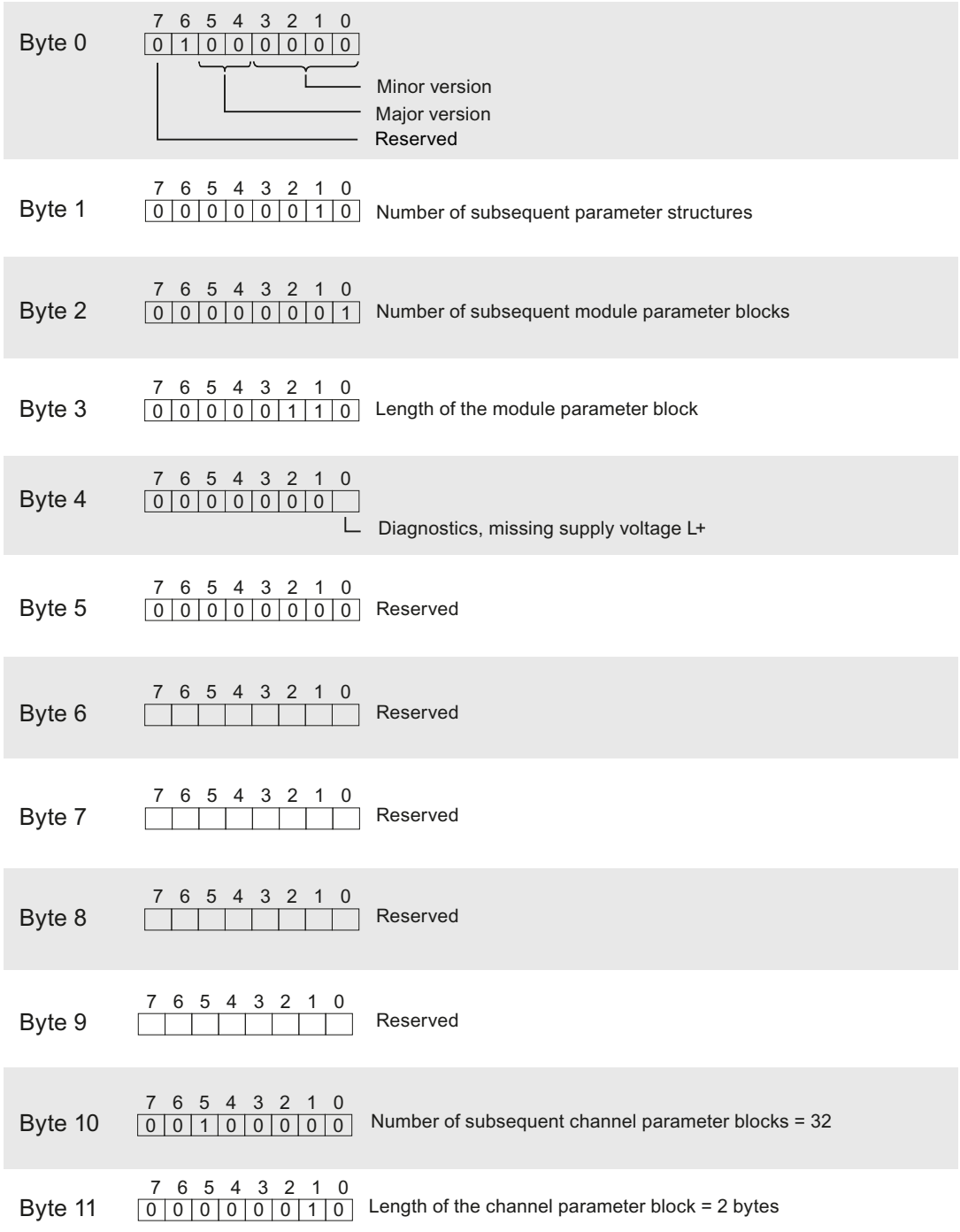


Figure A-2 Header information and module parameters of data record 128

Channel parameters

Each channel parameter block contains the channel parameters for a digital output (2 bytes).

The following figure shows the configuration of the channel parameters for channels 0 to 31.

x = 12 + (channel number * 2); with channel number = 0...31

All unused bits and the bits or bytes marked as "reserved" must be set to zero.
You activate a channel parameter by setting the corresponding bit to "1" or the corresponding value.

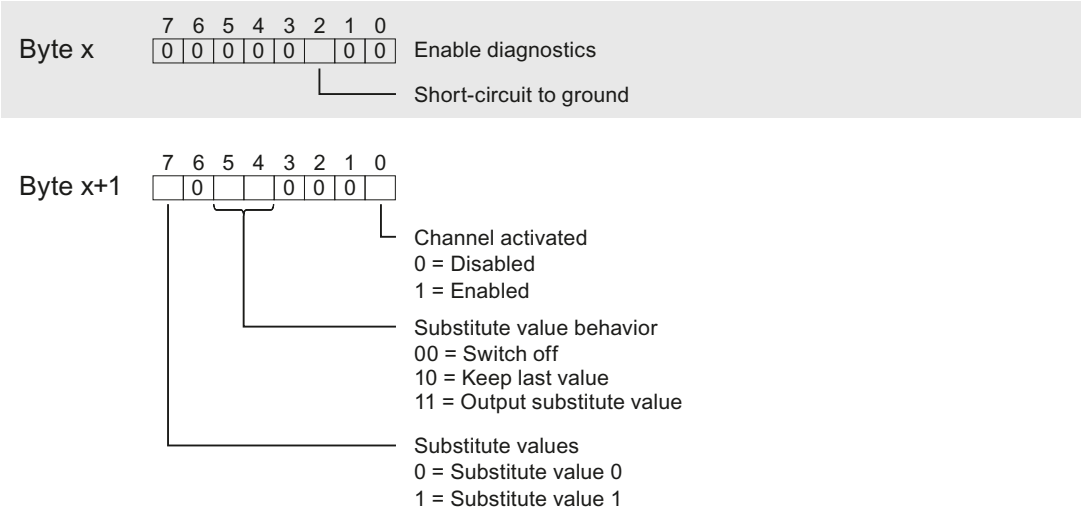


Figure A-3 Configuration byte x and x+1 for the channels 0 to 31

A.2.3 Diagnostics messages and maintenance events

Diagnostics messages

A diagnostics message is generated for each diagnostics event and the DIAG LED on the I/O module flashes red or the MT LED lights up yellow.

The diagnostics messages can be read in the diagnostics buffer of the CPU.

Diagnostic messages are assigned either channel-specific to an output or assigned as module messages to all outputs. All channels are switched off for diagnostics messages that affect the entire module. Only the corresponding digital output is affected by diagnostics messages, which refer to individual channels.

Table A-1 Diagnostics messages, their meanings and remedy options

Diagnostics message	Error code	Assign-ment	Meaning	Remedy
Parameter as-signment error	10_H	Module	• Parameter assignment does not match the terminal block used • Incorrect parameter assignment	• Correct the parameter as-signment • Check terminal block
Supply voltage missing	11_H	Module	Supply voltage L+ missing or too low	• Check wiring of the supply voltage at the terminal block • Check terminal block type

Diagnostics message	Error code	Assignment	Meaning	Remedy
Channel/component temporarily unavailable	$1F_H$	Module	Firmware update is in progress or has been canceled during the update. The module generates no process and substitute values in this state.	• Restart the firmware update • Wait for firmware update
Module is faulty	100_H	Module	Module is faulty	Replace I/O module
Short-circuit to M	106_H	Channel	Short-circuit of the actuator supply to ground Only effective in the connected state: Output value=1	Correction of the process wiring
Shutdown on button activation	122_H	Module	The output disable switch was activated.	Pull module
Retentive memory in carrier module defective	154_H	Module	Fault detected in the memory block on the carrier module during startup.	Replace carrier module
Retentive memory in the terminal block defective	155_H	Module	Fault detected in the memory block on the terminal block during startup.	Replace terminal block

Maintenance events

A maintenance event is generated for each maintenance required identified. The MT LED lights up on the module.

Maintenance messages have no direct effect on the function of the module or digital outputs.

Table A-2 Maintenance messages, their meaning and possible remedies

Maintenance message	Error code	Assignment	Meaning / Cause	Remedy
Retentive memory in carrier module defective	154_H	Module	Fault detected in the memory block on the carrier module during operation.	Replace carrier module
Retentive memory in the terminal block defective	155_H	Module	Fault detected in the memory block on the terminal block during operation.	Replace terminal block

A.2.4 Address space

Abbreviations

- "IB" stands for input byte, that is, the module start address in the input area
- "QB" stands for output byte, that is the module start address in the output area
- "DQn" stands for digital output n
- "QDQn" stands for the value status (QI) of digital output n

Address space

The following figure shows the mapping of the address space of the DQ 32x24VDC/0.5A HA:

Table A-3 Address space of the DQ 32x24VDC/0.5A HA

IB x +	AB x +	7	6	5	4	3	2	1	0
0	-	QDQ7	QDQ6	QDQ5	QDQ4	QDQ3	QDQ2	QDQ1	QDQ0
1	-	QDQ15	QDQ14	QDQ13	QDQ12	QDQ11	QDQ10	QDQ9	QDQ8
2	-	QDQ23	QDQ22	QDQ21	QDQ20	QDQ19	QDQ18	QDQ17	QDQ16
3	-	QDQ31	QDQ30	QDQ29	QDQ28	QDQ27	QDQ26	QDQ25	QDQ24
-	0	DQ7	DQ6	DQ5	DQ4	DQ3	DQ2	DQ1	DQ0
-	1	DQ15	DQ14	DQ13	DQ12	DQ11	DQ10	DQ9	DQ8
-	2	DQ23	DQ22	DQ21	DQ20	DQ19	DQ18	DQ17	DQ16
-	3	DQ31	DQ30	DQ29	DQ28	DQ27	DQ26	DQ25	DQ24

Evaluate value status

There is a bit value status for each digital output in the input address space.

Irrespective of the diagnostics enables, each value status provides information on the validity of the corresponding process value.

- Value status = 1: Process value okay, "good"
- Value status = 0: Process value not okay, "bad"

Basically, the value status is set to "good" if the digital value can be output without error. The value status is set to "bad" in the following cases:

- The digital value cannot be output due to an error.
- The digital channel is deactivated.

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