

Technical specifications	
Short-circuit protection of the output	yes, electronic
• Threshold	typ. 1 A
Wiring of the actuators	using a 20-pin front connector

3.24 Digital output module SM 322; DO 16 x DC 24 V/0.5 A: (6ES7322-8BH10-0AB0)

Order number

6ES7322-8BH10-0AB0

Order number: "SIPLUS S7-300 module"

6AG1322-8BH10-7AB0

Properties

The digital output module SM 322; DO 16 x DC24 V/0.5 A is distinguished by the following properties:

- 16 outputs, electrically isolated in groups of 4 channels
- A nominal load voltage of 24 V DC
- Configurable diagnostics
- Programmable diagnostic interrupt
- Redundant
- Wire break at "0" and "1" signal
- Identification Data
- Firmware update possible

Use of the module with high-speed counters

Please note when using the module in combination with high-speed counters.

NOTE

When using a mechanical contact to switch on the 24-V power supply to SM 322; DO 16 x DC 24 V/0.5 A, its outputs will carry "1" signal for the duration of ca. 50 µs, due to the circuit structure.

Using the module

For the use of the SM 322; DO 16 x DC24V/0.5A, the following hardware and software requirements must be fulfilled:

- For the central use in S7-300, the module can be used with all available CPUs.
- For the decentral use in ET 200M, the module can be used with the following IM 153-modules and compatible successor modules:
 - IM 153-2; as of 6ES7153-2BA02-0XB0, (PROFIBUS).
 - IM 153-2; as of 6ES7153-2BA82-0XB0; (PROFIBUS, OUTDOOR).
 - IM 153-4; as of 6ES7153-4BA0x-0XB0; (PROFINET).

3.24 Digital output module SM 322; DO 16 x DC 24 V/0.5 A: (6ES7322-8BH10-0AB0)

- Requirement: STEP 7 V5.5 (HSP0217) or higher.
- A GSD file or a GSDML file must be used if the module is part of a distributed and controlled by a master produced by a third-party manufacturer. The corresponding file for the selected IM 153 is available for download from the Internet (<http://www.siemens.com/automation/service&support>).
- Module diagnosis and identification data (I&M) are available through STEP 7 and with SIMATIC PDM as of V6.0 + SP5 (HSP0217) or SIMATIC PDM V7.0 or higher and EDD for ET 200M "DP_IOSystem_Siemens_ET200M_Module.Device" as of V1.1.12.

Compatible use of the module 6ES7322-8BH0x-0AB0

You can replace the digital output module 6ES7322-8BH0x-0AB0 without changing your settings through a digital output module 6ES7322-8BH10-0AB0.

In this case, the module does not offer discrepancy failure monitoring.

If a STEP 7 version before STEP 7 V5.1 SP3 is used, the replacement value behavior will only be entered through the parameter dialog from HW config and transferred to the module during system startup.

In this case, all other settings must be transferred through SIMATIC PDM or in the user program through datasets to the module.

These settings are not saved retentively on the digital output module 6ES7322-8BH10-0AB0 and are reset after restarting the module.

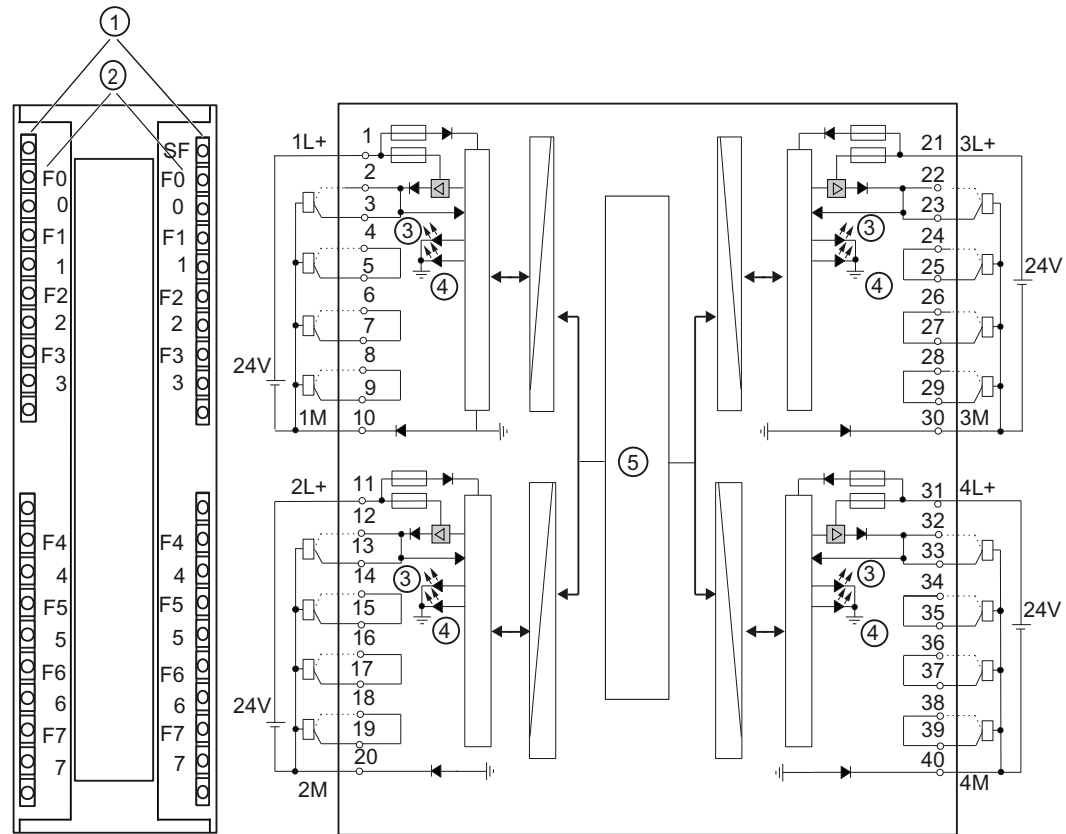
NOTE

A setting through SIMATIC PDM is only possible with the use of a 6ES7322-8BH10-0AB0 as a replacement for a 6ES7322-8BH0x-0AB0 as long as the device label (6ES7322-8BH0x-0AB0) in SIMATIC PDM was not updated with the actual device label through Device -> Load in PC/PG.

Redundant use of the module

A redundant use of the module is only permissible if the 6ES7322-8BH10-0AB0 is used and configured for both modules. No short-circuit monitoring occurs according to L+ in redundant use.

Wiring and block diagram



- ① Status displays - green
Error - red
- ② Channel numbers
Numbers 0 to 7 on the right side correspond to channel numbers 8 to 15
- ③ Channel status
- ④ Channel fault
- ⑤ Backplane bus interface

Redundant Output Signals

Two clamps are on each channel. Both connections are similar and can be used for a redundant control of an actuator. Redundant control can take place from 2 different modules without an external circuit. Both signal modules must be connected to the common reference potential M.

Technical specifications

Table 3-22 Technical specifications SM 322; DO 16 x DC 24V/0.5A

Technical specifications	
Dimensions and Weight	
Dimensions W x H x D (mm)	40 x 125 x 120
Weight	approx. 300 g
Module-specific data	

3.24 Digital output module SM 322; DO 16 x DC 24 V/0.5 A: (6ES7322-8BH10-0AB0)

Technical specifications	
Supports isochronous mode	No
Number of outputs	16
Cable length	
• Unshielded	Max. 600 m
• Shielded	Max. 1000 m
Voltages, Currents, Potentials	
Nominal load voltage L+	24 V DC
• Reverse polarity protection	Yes
Total current of outputs (per group)	
• Horizontal mounting position to 60 °C	Max. 2 A
• Vertical mounting position to 40 °C	Max. 2 A
Electrical isolation	
• Between channels and the backplane bus	Yes
• between channels in groups of	yes 4
Insulation tested with	DC 500 V
Power consumption	
• From the backplane bus	Max. 100 mA
• From load voltage L+ (without load)	Max. 100 mA
Power dissipation of the module	Typically 6 W
Status, Interrupts, Diagnostics	
Status LEDs	Green LED per channel
Interrupts	
• Diagnostic interrupt	Programmable
Diagnostic functions	Programmable
• Group error display	Red LED (SF)
• Channel error display	red LED, per channel
• Diagnostic information readable	supported
Actuator selection data	
Output voltage	
• "1" signal	Min. L + (- 0.7 V)
• "0" signal	$0.7 \text{ mA} \cdot R_L$ (R_L = load resistance value) max. 31 V for R_L = infinite
Output current	
• At signal "1" Nominal value Permitted range	0.5 A 5 mA up to 600 mA
• "0" signal (residual current)	Max. 0.7mA
Output delay (with resistive load)	
• At "1" to "0"	Max. 2.7 ms (including module cycle time)

Technical specifications	
• At "1" to "0"	Max. 2.7 ms (including module cycle time)
Load resistor range	48 Ω bis 4k Ω
Lamp load	Max. 5 W
Connecting 2 outputs in parallel	
• For redundant triggering of a load	supported
• To increase performance	Not possible
Control of a digital input	supported
Operating frequency	
• with resistive load	Max. 100 Hz
• With inductive load, to IEC 947-5-1, DC 13	Max. 2 Hz
• With lamp load	Max. 10 Hz
Limit (internal) of the inductive circuit interruption voltage to	Typical L+ (-68 V)
Short-circuit of an output	Yes, electronic
• Response threshold	Typical 1.4 A

Load resistances of the actuators

The load resistances of the actuators must be in the range from 48 Ω to 4 Ω . For larger values, a suitable resistance must be switched directly on the connection clamps of the actuator (observe the maximum power loss with signal "1").

The permissible rated voltage of the actuator must be greater than 28.2 V.

The lower response threshold of the actuator must be known in the operating temperature range or be determined experimentally. The output voltage of the module with signal "0" can be influenced through parallel switching of a resistance directly on the actuator connection clamps. With the selection of the resistance, the maximum power loss with signal "1" must be observed.

- Load resistances between 10 k Ω and 1 M Ω can be reported as short-circuits after L+.
- Unwired outputs or loads greater than 1 M Ω are reported as "wire-break".

3.24.1 Parameters of digital output modules

Programming

For general information on programming digital modules, refer to the chapter Programming digital modules [\(Page 52\)](#).

The table below describes the programmable parameters of SM 322; DO 16 x DC 24 V/0.5 A, including defaults.

NOTE

A setting of the module through SIMATIC PDM is not possible.

Table 3-23 Setting for the digital output module SM 322; 6ES7322-8BH10-0AB0

Parameters	Value range	Default setting	Applicability
Diagnostics			
• Group diagnostics	Yes/no	no	Channel
• Load voltage L+ missing	Yes/no	No	Channel group
• Discrepancy error	Yes/no	No	Channel group
Diagnostics interrupt	yes/no	no	Module
Response at CPU-STOP	Substitute a value/ Keep last value	Substitute a value	Module
Substitute value	0/1	0	Channel

See also

Settings from the digital output module SM 322; DO 16 x DC 24 V/0.5 A
(6ES7322-8BH10-0AB0) (Page 439)

3.24.2 Diagnosis of digital output modules

Introduction

General information in regards to the evaluation of the diagnosis messages can be found in the chapter Diagnosis of digital modules (Page 53) and the design and content of the individual bytes in the chapter Diagnosis data from the SM 322; DO 16 x DC24 V/0.5 A (6ES7322-8BH10-0AB0) (Page 489).

Channel errors are signaled with the channel error display (red LED per channel) and reported in the data record 1. As soon as at least one channel error display is lit, the group error display (SF) is also lit.

Module errors are signaled via the diagnostic data record 0/1 and only displayed via the the group error display (SF).

Group diagnostics

Through the "Group diagnostics" setting, the message from the channel-specific fields, with the exception of "external load voltage L+", for "Setting error" and the recognition of a discrepancy error can be turned off.

Load voltage L+ missing

The approval of the channel diagnostics "external load point L+" occurs in channel groups through the diagnostics setting "Missing load voltage L+". This means that if the load voltage fails, the error will be reported to all four channels of a channel group. Additionally, the module-specific message occurs in the byte 0 of the diagnostics dataset 0 / 1, "external auxiliary voltage missing". Even if the diagnostics of "Missing load voltage L+" is turned off for all channels/channel groups, the recognition within the module remains active. This means that if there is a failure of at least one load voltage, the module error will always be reported in the byte 0 of the diagnostics data set 0 / 1 "External auxiliary voltage missing".

Fuse blown

If a fuse is blown, it will always be reported to all four channels of a channel group. In addition to the channel message, there is always the module-specific message in the byte 3 of the diagnostics dataset 0 / 1 "Fuse defect". Even if the "Group diagnostics" setting is

disabled by all channels, a defective fuse will always be reported as module error in the byte 3 of the diagnostics dataset 0 / 1 "Fuse defect".

Discrepancy error monitoring

For project engineering with the MLFB 6ES7322-8BH10-0AB0, the SM 322 DO 16 x DC24 V / 0.5A offers a discrepancy error monitoring.

The approval of the channel discrepancy error monitoring occurs in channel groups through the "Discrepancy error" diagnostics settings. With an approved discrepancy error monitoring, the module constantly checks the set and actual status of the corresponding digital outputs. With a recognized discrepancy, for example, due to a component defect on the digital module, the corresponding channel group will be turned off and the "Fuse defect" error will be reported to all affected channels in the channel group. After removal/insertion or restart of the module, the digital outputs will be reactivated and the discrepancy test runs again.

A discrepancy error is exclusively reported through the "Fuse defect" error. An additional indication through the byte 3 "Fuse defect" does not occur. Thus, a differentiation between the actual fuse blown and a discrepancy error is possible.

Description of the Diagnostic Evaluation

You can find a detailed description of how to evaluate diagnostic information in the STEP 7 online help.

3.24.3 Firmware update via HW Config

Introduction

The SM 322; DO 16 x DC 24V/0.5 A can be updated to the newest firmware version depending on the available compatible functional updates.

The most recent firmware versions are available from your Siemens representative or from the Internet (<http://www.siemens.com/automation/service&support>).

Preconditions / Requirements

- STEP 7 V5.5 +(HSP0217) or higher
- With a central use of the module in a S7-300, the firmware update must occur in the CPU-operating mode STOP. If the CPU is in the operating mode RUN, it may lead to unexpected behavior and the module is only available after a network off/network on.
- If the module is used in a distributed IO device ET 200M with active backplane bus modules (removal and insertion allowed), the a firmware update is also possible in the RUN CPU state.
- With a distributed use without active backplane bus modules, the firmware update is also possible in the RUN CPU state. Please observe that during the firmware update, the distributed IO device will be turned off shortly.

Firmware update

This is how you update the firmware of a central or distributed module:

1. Select the module SM 322; DO 16 x DC 24V/0.5 A in HW-config.
2. Select PLC > Update Firmware.