

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Selected original pages for procurement and maintenance review

PRODUCT BRAND

Siemens

PRODUCT MODEL

6ES7136-6BA00-0CA0

Fail-safe eight-channel digital input module

SOURCE EDITIONS AND SCOPE

05/12/2020; last modified 05/09/2020 (PDF 1,2,3,4); 01/2022, A5E36769525-AC (PDF 3,4); 05/2020, A5E45575769-AD (PDF 8,9,10)

Selected original product data and related supply-diagnostic/altitude updates, not a complete operating or installation manual. Safety levels require a validated complete application. The 2013 terminal conflict remains unresolved; installation instructions are not provided. Full original manuals and later corrections remain required for engineering.

AMIKON PRODUCT SUPPORT

+86-18020776786 INFO@AMIKON.CN

AMIKONG.COM

Amikon prepared this independent reference package. Siemens remains the author of the appended original pages; original page numbers and manufacturer notices are retained.

SIMATIC DP, Electronics module for ET 200SP, F-DI 8x 24 V DC HF, 15 mm width, up to PL E (ISO 13849-1)/ SIL3 (IEC 61508)



General information	
Product type designation	F-DI 8x24VDC HF
usable BaseUnits	BU type A0
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	V12
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
• PROFINET as of GSD version/GSD revision	V2.31
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Input current	
Current consumption (rated value)	75 mA; without load
Current consumption, max.	21 mA; From the backplane bus

Encoder supply	
Number of outputs	8
Short-circuit protection	Yes; Electronic (response threshold 0.7 A to 1.8 A)
Output current	
• up to 60 °C, max.	0.3 A
24 V encoder supply	
• 24 V	Yes; min. L+ (-1.5 V)
• Short-circuit protection	Yes
• Output current, max.	800 mA; Total current of all encoders
Power	
Power available from the backplane bus	70 mW
Power loss	
Power loss, typ.	4 W
Address area	
Address space per module	
• Inputs	6 byte
• Outputs	4 byte
Hardware configuration	
Automatic encoding	Yes
• Electronic coding element type F	Yes
Digital inputs	
Number of digital inputs	8
Source/sink input	Yes; P-reading
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Input voltage	
• Rated value (DC)	24 V
• for signal "0"	-30 to +5 V
• for signal "1"	+15 to +30 V
Input current	
• for signal "1", typ.	3.7 mA
Input delay (for rated value of input voltage)	
for standard inputs	
— parameterizable	Yes
— at "0" to "1", min.	0.4 ms
— at "0" to "1", max.	20 ms
— at "1" to "0", min.	0.4 ms
— at "1" to "0", max.	20 ms
for technological functions	
— parameterizable	No

Cable length	
• shielded, max.	1 000 m
• unshielded, max.	500 m
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No
Diagnostics indication LED	
• RUN LED	Yes; green LED
• ERROR LED	Yes; red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes; green LED
• for channel diagnostics	Yes; red LED
• for module diagnostics	Yes; green/red DIAG LED
Potential separation	
Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
• between the channels and the power supply of the electronics	No
Isolation	
Isolation tested with	707 V DC (type test)
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PL _e
• SIL acc. to IEC 61508	SIL 3
Probability of failure (for service life of 20 years and repair time of 100 hours)	
— Low demand mode: PFD _{avg} in accordance with SIL3	< 2.00E-05
— High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09 1/h
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	50 °C
Altitude during operation relating to sea level	

- Installation altitude above sea level, max.

4 000 m; Restrictions for installation altitudes > 2 000 m, see manual

Dimensions

Width	15 mm
Height	73 mm
Depth	58 mm

Weights

Weight, approx.	49 g
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last modified:

05/09/2020 

SIEMENS

SIMATIC

ET 200SP

Product Information for the Documentation of ET 200SP Fail-safe Modules

Product Information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit (<https://www.siemens.com/industrialsecurity>).

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customers' exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed visit (<https://www.siemens.com/industrialsecurity>).

General amendments to the documentation

This Product Information contains amendments and corrections to the documentation of the ET 200SP fail-safe modules. The Product Information is part of the product supplied. The statements provided in it should be considered more up-to-date than other documentation if uncertainties arise.

Validity of the Product Information

The following information supplements the equipment manual of the ET 200SP fail-safe module:

- ET 200SP Digital Output Module F-DQ 8x24VDC/0.5A PP HF (<https://support.industry.siemens.com/cs/ww/en/view/109747998>)

Section 5.5 "Application: Connection of the ET 200SP digital output module F-RQ 1x24VDC/24..230VAC/5A (6ES7136-6RA00-0BF0)"

For the operation of the digital output module F-RQ 1x24VDC/24..230VAC/5A from FS 04 on, the use of the following readback times is required: Channel parameter "Max. readback time light test / dark test" with the default value "0.8 / 1.0 ms".

Validity of the Product Information

The following information supplements the equipment manuals of the ET 200SP fail-safe modules:

- ET 200SP Digital input module F-DI 8x24VDC HF (<https://support.industry.siemens.com/cs/us/en/view/78589499>)
- ET 200SP Digital output module F-DQ 4x24VDC/2A PM HF (<https://support.industry.siemens.com/cs/us/en/view/78645789>)
- ET 200SP Power module F-PM-E 24VDC/8A PPM ST (<https://support.industry.siemens.com/cs/us/en/view/78645796>)

Section 6.3 "Interrupts/diagnostic alarms" – Table 6-6

Diagnostic alarm	Error code	Meaning	Remedy
Supply voltage too high	801b	The supply voltage is too high.	Check the supply voltage and then test the safety application.
Supply voltage too low	802b	The supply voltage is too low.	Check the supply voltage and then test the safety application.

Supply voltage outside the nominal range

If the supply voltage L+ is outside the specified value range, the DIAG LED flashes and the F-module is passivated.

When the voltage has recovered (level must remain within the specified value range for at least 1 minute (see section 7 "Technical specifications", subsection "Voltages, currents, potentials)), the DIAG LED stops flashing. The F-module remains passivated.

NOTICE

When an undervoltage or overvoltage event is detected (supply voltage too high/low – outside nominal range), it must be assumed that components may not execute their correct function properly after the supply voltage has returned to the nominal operating range. You can identify these components using a function check. Therefore, we recommend that you always perform a full function check of the machine/plant or in any case a check of the safety functions directly after an undervoltage or overvoltage event before re-commissioning.

Siemens AG
Digital Industries
Postfach 48 48
90026 NÜRNBERG
GERMANY

Product Information for the Documentation of ET 200SP Fail-safe Modules
A5E36769525-AC, 01/2022

SIEMENS

SIMATIC

ET 200SP

Product information for the ET 200SP fail-safe modules: Use at altitudes > 2000 m above sea level

Product Information

Introduction

This document contains important product information on the F-modules specified in the section "Validity". The product information is part of the product supplied. This product information should be considered more up-to-date than other documentation if uncertainties arise.

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

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Validity

The statements in this product information apply to the F-modules listed below for operating altitudes > 2000 m above sea level:

Table 1 Validity

Designation	Article number	Version	Max. operating altitude
ET 200SP F-DI 8x24VDC HF	6ES7136-6BA00-0CA0	FS04 or higher	4000 m above sea level
ET 200SP F-DQ 4x24VDC/2A PM HF	6ES7136-6DB00-0CA0	FS04 or higher	
ET 200SP F-DQ 8x24VDC/0.5A PP HF	6ES7136-6DC00-0CA0	FS01 or higher	
F-PM-E 24VDC/8A PPM ST	6ES7136-6PA00-0BC0	FS05 or higher	
F-AI 4xI 0(4)..20mA 2-/4-wire HF	6ES7136-6AA00-0CA1	FS01 or higher	
F-AI 4xU 0..10V HF	6ES7136-6AB00-0CA1	FS01 or higher	

Effects on the availability of modules

The higher cosmic radiation present during operation at altitudes over 2000 m above sea level will also start to have an effect on the failure rate of electronic components (the so-called soft error rate). In rare cases this can result in a transition of the module into the safe state, especially for safety modules. However, the functional safety of the module is fully retained.

Currently valid markings and approvals

Note

Information on the components of the ET 200SP automation system:

The markings and approvals printed on the components of the ET 200SP automation system are currently based on an operating altitude of up to 2000 m above sea level. The fail-safe modules are certified for use in safety mode up to the maximum operating altitude listed in Table 1 (according to IEC 61508:2010, EN ISO 13849-1:2015 and IEC 62061:2005/A2:2015).

F-DI 8x24VDC HF (6ES7136-6BA00-0CA0)

Shipping and storage conditions

The following information applies to the fail-safe module F-DI 8x24VDC HF.

Table 2 Shipping and storage conditions for modules

Type of condition	Permissible range
Barometric pressure	From 1140 hPa to 616 hPa (corresponds to an altitude of - 1000 m to 4000 m above sea level)

Climatic environmental conditions

The following information applies to the fail-safe module F-DI 8x24VDC HF.

Table 3 Climatic environmental conditions

Ambient conditions	Permissible range	Comments
Barometric pressure	From 1140 hPa to 616 hPa	Corresponds to an altitude of - 1000 m to 4000 m above sea level

Table 4 Permissible ambient temperature depending on installation location

Mounting position	Installation location above sea level		
	- 1000 m to 2000 m	from 2000 m to 3000 m	from 3000 m to 4000 m
	Maximum ambient temperature		
Horizontal	60 °C	54 °C	48 °C
Vertical	50 °C	45 °C	40 °C

The normative basis for the derating is IEC 61131-2:2017.

Comments

Linear interpolation between altitudes is permissible.

The derating factors compensate for the decreasing cooling effect of air at higher altitudes due to lower density.

Note

Ensure that the power supply units used are also suitable for altitudes > 2000 m above sea level.

Safety characteristics values

The safety characteristic values (PFD_{avg}, PFH values) given in the manual already include the influence of stronger cosmic radiation (soft error rate) for an application up to 4000 m above sea level.