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SIMATIC S7-1200 G2 Basic Controllers

Introduction

S7-1200 G2

Overview



SIMATIC S7-1200 G2 Controllers are the successor generation to the S7-1200 and the right choice for compact automation solutions with integrated I/Os, communication and technology functions for automation tasks in the low to medium performance range. They are available in standard and fail-safe versions.

The scalable SIMATIC S7-1200 G2 Controllers feature integrated inputs and outputs as well as communication options, and allow modular expansion. Digital and analog input and output modules as well as different communications and special modules enable flexible adaptation to the relevant automation task.

SIMATIC S7-1200 G2 Basic Controllers

Central processing units
Standard CPUs

CPU 1212C

Overview



- Controller for getting started with S7-1200 G2
- Expandable by:
 - 1 signal board (SB)
 - 8 signal modules (SM)

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Ordering data

Ordering data	Article No.	Ordering data	Article No.
CPU 1212C		SB 1231 signal board	
SIMATIC S7-1200 G2, compact CPU 1212C DC/DC/DC	6ES7212-1AG50-0XB0	SIMATIC S7-1200 G2, SB 1231 analog input module	6ES7231-4HD50-0XB0
Power supply: 20.4-28.8 V DC; onboard I/O: 8x DI 24 V DC; 6 x DO 24 V DC; memory: program 150 KB, data 500 KB, retentivity 20 KB		4 AI; inputs: 4 x AI 14 bit ADC (+/-10 V, +/-5 V, +/-2.5 V or 0-20 mA/4-20 mA)	
SIMATIC S7-1200 G2, compact CPU 1212C AC/DC/RLY	6ES7212-1BG50-0XB0	SB 1232 signal board	
Power supply: 85-264 V AC at 47-63 Hz; onboard I/O: 8 x DI 24 V DC; 6 DO relays 2 A; memory: program 150 KB, data 500 KB, retentivity 20 KB		SIMATIC S7-1200 G2, SB 1232 analog output module	6ES7232-4HD50-0XB0
SIMATIC S7-1200 G2, compact CPU 1212C DC/DC/RLY	6ES7212-1HG50-0XB0	1 AO, +/-10 V DC (12-bit resolution) or 0-20 mA (11-bit resolution)	
Power supply: 20.4-28.8 V DC; onboard I/O: 8x DI 24 V DC; 6 DO relays 2 A; memory: program 150 KB, data 500 KB, retentivity 20 KB		SB 1233 signal board	
Accessories		SIMATIC S7-1200 G2, SB 1233 analog I/O module	6ES7233-4HD50-0XB0
SB 1221 signal board		2 AI/2 AO, inputs: 2 x AI 14 bit ADC (+/-10 V, +/-5 V, +/-2.5 V or 0-20 mA/4-20 mA), outputs: 2 x AQ 14 bit DAC (+/-10 V, 0-20 mA or 4-20 mA)	
SIMATIC S7-1200 G2, SB 1221 digital input module	6ES7221-3BF50-0XB0	SIMATIC Memory Card (optional)	
8 DI 100 kHz; inputs: 8 x DI 24 V DC sink/source, 100 kHz		SIMATIC S7, memory card for S7-1x 00 CPU/SINAMICS	6ES7954-8LC04-0AA0
SB 1222 signal board		3.3 V Flash, 4 MB	
SIMATIC S7-1200 G2, SB 1222 digital output module	6ES7222-5BF50-0XB0	SIMATIC S7, memory card for S7-1x00 CPU/SINAMICS	6ES7954-8LE04-0AA0
8 DO 100 kHz; outputs: 8 x DQ 24 V DC 0.1 A sinking/sourcing transistor, 100 kHz		3.3 V Flash, 12 MB	
SB 1223 signal board		SIMATIC S7, memory card for S7-1x00 CPU/SINAMICS	6ES7954-8LF04-0AA0
SIMATIC S7-1200 G2, SB 1223 digital I/O module	6ES7223-7AF50-0XB0	3.3 V Flash, 24 MB	
4 DI/4 DO 200 kHz; inputs: 4 x DI 5 V DC, 200 kHz; outputs: 4 x DQ 5 V DC 0.1 A, sinking/sourcing transistor, 200 kHz		SIMATIC S7, memory card for S7-1x00 CPU	6ES7954-8LL04-0AA0
SIMATIC S7-1200 G2, SB 1223 digital I/O module	6ES7223-7BF50-0XB0	3.3 V Flash, 256 MB	
4 DI/4 DO 100 kHz; inputs: 4 x DI 24 V DC sink/source, 100 kHz; outputs: 4 x DQ 24 V DC 0.1 A sinking/sourcing transistor, 100 kHz		SIMATIC S7, memory card for S7-1x 00 CPU	6ES7954-8LP04-0AA0
		3.3 V Flash, 2 GB	
		SIMATIC S7, memory card for S7-1x 00 CPU	6ES7954-8LT04-0AA0
		3.3 V Flash, 32 GB	

SIMATIC S7-1200 G2 Basic Controllers

Central processing units
Standard CPUs

CPU 1212C

Ordering data

STEP 7 Professional / Basic V20

Target system:

SIMATIC S7-1200, S7-1200 G2,
S7-1500, S7-300, S7-400, WinAC

Requirement:

Windows 10 (64-bit)

- Windows 10 Professional Version 22H2
- Windows 10 Enterprise Version 22H2
- Windows 10 Enterprise 2019 LTSC & 2021 LTSC

Windows 11 (64-bit)

- Windows 11 Professional Version 22H2 & 23H2
- Windows 11 Enterprise Version 22H2 & 23H2

Windows Server (64-bit)

- Windows Server 2019 Standard (full installation)
- Windows Server 2022 Standard (full installation)

Type of delivery:

9 languages: en, de, zh included,
fr, sp, it, ru, ja, ko as download

SIMATIC STEP 7 Professional V20; floating license

Engineering software in the TIA Portal; software and documentation on DVD; license key on USB flash drive; Class A; For configuration of SIMATIC S7-1200/1200 G2/1500, S7-300/400/WinAC, SIMATIC Basic Panels, SIMATIC Unified Basic Panels.

The system requirements specification can be found at <https://www.siemens.com/compatool>

Article No.

6ES7822-1AA24-0YA5

Article No.

SIMATIC STEP 7 Professional V20, floating license download¹⁾

Engineering software in the TIA Portal; software, documentation and license key for downloading¹⁾; class A; for configuring SIMATIC S7-1200/1200 G2/1500, S7-300/400/WinAC, SIMATIC Basic Panels, SIMATIC Unified Basic Panels.

The system requirements specification can be found at <https://www.siemens.com/compatool>
Consignee email address required for delivery

6ES7822-1AE24-0YA5

SIMATIC STEP 7 Basic V20, floating license

Engineering software in the TIA Portal; software and documentation on DVD; license key on USB flash drive; Class A; for configuration of SIMATIC S7-1200/1200 G2; SIMATIC Basic Panels; SIMATIC Unified Basic Panels.

The system requirements specification can be found at <https://www.siemens.com/compatool>

6ES7822-0AA24-0YA5

SIMATIC STEP 7 Basic V20, floating license download¹⁾

Engineering software in the TIA Portal; software, documentation and license key for downloading; Class A; for configuring SIMATIC S7-1200/1200 G2; SIMATIC Basic Panels; SIMATIC Unified Basic Panels.

The system requirements specification can be found at <https://www.siemens.com/compatool>
Consignee email address required for delivery

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¹⁾ Up-to-date information and download availability can be found at <http://www.siemens.com/tia-online-software-delivery>.

SIMATIC S7-1200 G2 Basic Controllers

Central processing units
Standard CPUs

CPU 1212C

Technical specifications

Article number	6ES7212-1AG50-0XB0 CPU 1212C, DC/DC/DC, 8DI/6DO	6ES7212-1BG50-0XB0 CPU 1212C, AC/DC/RLY, 8DI/6DO	6ES7212-1HG50-0XB0 CPU 1212C, DC/DC/RLY, 8DI/6DO
General information			
Product type designation	CPU 1212C DC/DC/DC	CPU 1212C AC/DC/relay	CPU 1212C DC/DC/Relay
Engineering with			
• Programming package	STEP 7 V20 or higher	STEP 7 V20 or higher	STEP 7 V20 or higher
Supply voltage			
Rated value (DC)	Yes		Yes
• 24 V DC			
Rated value (AC)			
• 120 V AC	Yes	Yes	
• 230 V AC	Yes		
Memory			
Work memory			
• integrated	650 kbyte	650 kbyte	650 kbyte
• integrated (for program)	150 kbyte	150 kbyte	150 kbyte
• integrated (for data)	500 kbyte	500 kbyte	500 kbyte
Load memory			
• integrated	8 Mbyte	8 Mbyte	8 Mbyte
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte; with SIMATIC memory card	32 Gbyte; with SIMATIC memory card	32 Gbyte; with SIMATIC memory card
CPU processing times			
for bit operations, typ.	37 ns; / instruction	37 ns; / instruction	37 ns; / instruction
for word operations, typ.	30 ns; / instruction	30 ns; / instruction	30 ns; / instruction
for floating point arithmetic, typ.	74 ns; / instruction	74 ns; / instruction	74 ns; / instruction
Data areas and their retentivity			
Flag			
• Size, max.	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area
Address area			
Process image			
• Inputs, adjustable	1 kbyte	1 kbyte	1 kbyte
• Outputs, adjustable	1 kbyte	1 kbyte	1 kbyte
Time of day			
Clock			
• Hardware clock (real-time)	Yes	Yes	Yes
Digital inputs			
Number of digital inputs	8; Integrated	8; Integrated	8; Integrated
• of which inputs usable for technological functions	8; HSC (High Speed Counting)	8; HSC (High Speed Counting)	8; HSC (High Speed Counting)
Digital outputs			
Number of digital outputs	6; 20 kHz or 100 kHz	6; Relays	6; Relays
• of which high-speed outputs	4; 100 kHz (Qa.0 - Qa.3)		
Analog inputs			
Number of analog inputs	0		0
Analog outputs			
Number of analog outputs	0		0
1. Interface			
Interface type	PROFINET	PROFINET	PROFINET
Protocols			
• IP protocol	Yes; IPv4	Yes; IPv4	Yes; IPv4
• PROFINET IO Controller	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes
• Open IE communication	Yes; Optionally also encrypted	Yes; Optionally also encrypted	Yes; Optionally also encrypted
• Web server	Yes	Yes	Yes
• Media redundancy	Yes	Yes	Yes

SIMATIC S7-1200 G2 Basic Controllers

Central processing units
Standard CPUs

CPU 1212C

Technical specifications

Article number	6ES7212-1AG50-0XB0 CPU 1212C, DC/DC/DC, 8DI/6DQ	6ES7212-1BG50-0XB0 CPU 1212C, AC/DC/RLY, 8DI/6DO	6ES7212-1HG50-0XB0 CPU 1212C, DC/DC/RLY, 8DI/6DO
Protocols			
Number of connections			
• Number of connections, max.	128; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
• UDP	Yes	Yes	Yes
Web server			
• supported	Yes	Yes	Yes
Communication functions			
S7 communication			
• supported	Yes	Yes	Yes
Number of connections			
• overall	PG Connections: 4 reserved; HMI Connections: 4 reserved / 82 max; S7 Connections: 78 max; Open User Connections: 78 max; Web Connections: 2 reserved / 80 max; Total Connections: 10 reserved / 88 max	PG Connections: 4 reserved; HMI Connections: 4 reserved / 82 max; S7 Connections: 78 max; Open User Connections: 78 max; Web Connections: 2 reserved / 80 max; Total Connections: 10 reserved / 88 max	PG Connections: 4 reserved; HMI Connections: 4 reserved / 82 max; S7 Connections: 78 max; Open User Connections: 78 max; Web Connections: 2 reserved / 80 max; Total Connections: 10 reserved / 88 max
Supported technology objects			
Motion Control	Yes	Yes	Yes
• Number of available Motion Control resources for technology objects	800	800	800
• Required Motion Control resources			
- per speed-controlled axis	40	40	40
- per positioning axis	80	80	80
- per synchronous axis	160	160	160
- per external encoder	80	80	80
- per output cam	20	20	20
- per cam track	160	160	160
- per probe	40	40	40
• Number of available Extended Motion Control resources for technology objects	40	40	40
• Required Extended Motion Control resources			
- per cam (1 000 points and 50 segments)	2; 1000 points and 1 segment	2; 1000 points and 1 segment	2; 1000 points and 1 segment
- for each set of kinematics	30	30	30
• kinematics functions			
- kinematics with up to 4 interpolating axes	Yes	Yes	Yes
- kinematics with 5 or more interpolating axes	No	No	No
- user-defined kinematics	No	No	No
- SIMATIC Safe Kinematics	No	No	No
Integrated Functions			
Counter	Yes	Yes	Yes
• Number of counters	8	8	8
• Counting frequency, max.	100 kHz; Ia.0 to Ia.5: 100 kHz (80 kHz in quadrature mode), Ia.6 to Ia.7: 30 kHz (20 kHz in quadrature mode)	100 kHz; Ia.0 to Ia.5: 100 kHz (80 kHz in quadrature mode), Ia.6 to Ia.7: 30 kHz (20 kHz in quadrature mode)	100 kHz; Ia.0 to Ia.5: 100 kHz (80 kHz in quadrature mode), Ia.6 to Ia.7: 30 kHz (20 kHz in quadrature mode)
Frequency measurement	Yes	Yes	Yes
PID controller	Yes	Yes	Yes
Number of pulse outputs	8; individually assigned to CPU and Signal Board	8; individually assigned to CPU and Signal Board	8; individually assigned to CPU and Signal Board
Limit frequency (pulse)	100 kHz	100 kHz	100 kHz
Product functions/security			
signed firmware update	Yes	Yes	Yes
Secure Boot	Yes	Yes	Yes
safely removing data	No	No	No

SIMATIC S7-1200 G2 Basic Controllers

Central processing units
Standard CPUs

CPU 1212C**Technical specifications**

Article number	6ES7212-1AG50-0XB0 CPU 1212C, DC/DC/DC, 8DI/6DQ	6ES7212-1BG50-0XB0 CPU 1212C, AC/DC/RLY, 8DI/6DO	6ES7212-1HG50-0XB0 CPU 1212C, DC/DC/RLY, 8DI/6DO
Ambient conditions			
Ambient temperature during operation			
• min.	-20 °C; No condensation	-20 °C; No condensation	-20 °C; No condensation
• max.	40 °C; at max. voltages and max. specifications	40 °C; 40 °C horizontal or 30 °C vertical at max. voltages and max. specifications	40 °C; 40 °C horizontal or 30 °C vertical at max. voltages and max. specifications
Configuration			
Configuration/programming			
Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
Dimensions			
Width	70 mm	70 mm	70 mm
Height	125 mm	125 mm	125 mm
Depth	100 mm	100 mm	100 mm
Weights			
Weight, approx.	319 g	373 g	333 g

SIMATIC S7-1200 G2 Basic Controllers

Central processing units
Standard CPUs

CPU 1214C

Overview



- Controller for intro to S7 with flexible expansion options
- Expandable by:
 - 2 signal boards (SB)
 - 10 signal modules (SM)

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Ordering data	Article No.	Ordering data	Article No.
CPU 1214C		SB 1231 signal board	
SIMATIC S7-1200 G2, compact CPU 1214C DC/DC/DC	6ES7214-1AH50-0XB0	SIMATIC S7-1200 G2, SB 1231 analog input module	6ES7231-4HD50-0XB0
20.4-28.8 V DC; onboard I/O: 14 x DI 24 V DC; 10 DO 24 V DC; memory: program 250 KB, data 750 KB, retentivity 20 KB		4 AI; inputs: 4 x AI 14 bit ADC (+/-10 V, +/-5 V, +/-2.5 V or 0-20 mA/4-20 mA)	
SIMATIC S7-1200 G2, compact CPU 1214C AC/DC/RLY	6ES7214-1BH50-0XB0	SB 1232 signal board	
Power supply: 85-264 V AC at 47-63 Hz; onboard I/O: 14 x DI 24 V DC; 10 DO relay 2 A; memory: program 250 KB, data 750 KB, retentivity 20 KB		SIMATIC S7-1200 G2, SB 1232 analog output module	6ES7232-4HD50-0XB0
SIMATIC S7-1200 G2, compact CPU 1214C DC/DC/RLY	6ES7214-1HH50-0XB0	1 AO, +/-10 V DC (12-bit resolution) or 0-20 mA (11-bit resolution)	
Power supply: 20.4-28.8 V DC; onboard I/O: 14 x DI 24 V DC; 10 DO relay 2 A; memory: program 250 KB, data 750 KB, retentivity 20 KB		SB 1233 signal board	
Accessories		SIMATIC S7-1200 G2, SB 1233 analog I/O module	6ES7233-4HD50-0XB0
SB 1221 signal board		2 AI/2 AO, inputs: 2 x AI 14 bit ADC (+/-10 V, +/-5 V, +/-2.5 V or 0-20 mA/4-20 mA), outputs: 2 x AQ 14 bit DAC (+/-10 V, 0-20 mA or 4-20 mA)	
SIMATIC S7-1200 G2, SB 1221 digital input module	6ES7221-3BF50-0XB0	SIMATIC Memory Card (optional)	
8 DI 100 kHz; inputs: 8 x DI 24 V DC sink/source, 100 kHz		SIMATIC S7, memory card for S7-1x 00 CPU/SINAMICS	6ES7954-8LC04-0AA0
SB 1222 signal board		3.3 V Flash, 4 MB	
SIMATIC S7-1200 G2, SB 1222 digital output module	6ES7222-5BF50-0XB0	SIMATIC S7, memory card for S7-1x00 CPU/SINAMICS	6ES7954-8LE04-0AA0
8 DO 100 kHz; outputs: 8 x DQ 24 V DC 0.1 A sinking/sourcing transistor, 100 kHz		3.3 V Flash, 12 MB	
SB 1223 signal board		SIMATIC S7, memory card for S7-1x00 CPU/SINAMICS	6ES7954-8LF04-0AA0
SIMATIC S7-1200 G2, SB 1223 digital I/O module	6ES7223-7AF50-0XB0	3.3 V Flash, 24 MB	
4 DI/4 DO 200 kHz; inputs: 4 x DI 5 V DC, 200 kHz; outputs: 4 x DQ 5 V DC 0.1 A, sinking/sourcing transistor, 200 kHz		SIMATIC S7, memory card for S7-1x00 CPU	6ES7954-8LL04-0AA0
SIMATIC S7-1200 G2, SB 1223 digital I/O module	6ES7223-7BF50-0XB0	3.3 V Flash, 256 MB	
4 DI/4 DO 100 kHz; inputs: 4 x DI 24 V DC sink/source, 100 kHz; outputs: 4 x DQ 24 V DC 0.1 A sinking/sourcing transistor, 100 kHz		SIMATIC S7, memory card for S7-1x 00 CPU	6ES7954-8LP04-0AA0
		3.3 V Flash, 2 GB	
		SIMATIC S7, memory card for S7-1x 00 CPU	6ES7954-8LT04-0AA0
		3.3 V Flash, 32 GB	

SIMATIC S7-1200 G2 Basic Controllers

Central processing units
Standard CPUs

CPU 1214C

Ordering data

STEP 7 Professional / Basic V20

Target system:

SIMATIC S7-1200, S7-1200 G2,
S7-1500, S7-300, S7-400, WinAC

Requirement:

Windows 10 (64-bit)

- Windows 10 Professional
Version 22H2
- Windows 10 Enterprise
Version 22H2
- Windows 10 Enterprise 2019
LTSC & 2021 LTSC

Windows 11 (64-bit)

- Windows 11 Professional
Version 22H2 & 23H2
- Windows 11 Enterprise
Version 22H2 & 23H2

Windows Server (64-bit)

- Windows Server 2019 Standard
(full installation)
- Windows Server 2022 Standard
(full installation)

Type of delivery:

9 languages: en, de, zh included,
fr, sp, it, ru, ja, ko as download

SIMATIC STEP 7 Professional V20; floating license

Engineering software in the
TIA Portal; software and
documentation on DVD;
license key on USB flash drive;
Class A;
For configuration of
SIMATIC S7-1200/1200 G2/1500,
S7-300/400/WinAC,
SIMATIC Basic Panels,
SIMATIC Unified Basic Panels.

The system requirements
specification can be found at
<https://www.siemens.com/compatool>

Article No.

6ES7822-1AA24-0YA5

Article No.

SIMATIC STEP 7 Professional V20, floating license download¹⁾

Engineering software in the
TIA Portal; software, documentation
and license key for downloading¹⁾;
class A; for configuring
SIMATIC S7-1200/1200 G2/1500,
S7-300/400/WinAC,
SIMATIC Basic Panels,
SIMATIC Unified Basic Panels.

The system requirements
specification can be found at
<https://www.siemens.com/compatool>
Consignee email address required
for delivery

6ES7822-1AE24-0YA5

SIMATIC STEP 7 Basic V20, floating license

Engineering software in the
TIA Portal; software and
documentation on DVD;
license key on USB flash drive;
Class A; for configuration of
SIMATIC S7-1200/1200 G2;
SIMATIC Basic Panels;
SIMATIC Unified Basic Panels.

The system requirements
specification can be found at
<https://www.siemens.com/compatool>

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Engineering software in the
TIA Portal; software, documentation
and license key for downloading;
Class A; for configuring
SIMATIC S7-1200/1200 G2;
SIMATIC Basic Panels;
SIMATIC Unified Basic Panels.

The system requirements
specification can be found at
<https://www.siemens.com/compatool>
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SIMATIC S7-1200 G2 Basic Controllers

Central processing units
Standard CPUs

CPU 1214C

Technical specifications

Article number	6ES7214-1AH50-0XB0 CPU 1214C, DC/DC/DC, 14DI/10DO	6ES7214-1BH50-0XB0 CPU 1214C, AC/DC/RLY, 14DI/10DO	6ES7214-1HH50-0XB0 CPU 1214C, DC/DC/RLY, 14DI/10DO
General information			
Product type designation	CPU 1214C DC/DC/DC	CPU 1214C AC/DC/Relay	CPU 1214C DC/DC/Relay
Engineering with			
• Programming package	STEP 7 V20 or higher	STEP 7 V20 or higher	STEP 7 V20 or higher
Supply voltage			
Rated value (DC)	Yes		Yes
• 24 V DC			
Rated value (AC)			
• 120 V AC	Yes	Yes	
• 230 V AC	Yes	Yes	
Memory			
Work memory			
• integrated	1 000 kbyte	1 000 kbyte	1 000 kbyte
• integrated (for program)	250 kbyte	250 kbyte	250 kbyte
• integrated (for data)	750 kbyte	750 kbyte	750 kbyte
Load memory			
• integrated	8 Mbyte	8 Mbyte	8 Mbyte
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte; with SIMATIC memory card	32 Gbyte; with SIMATIC memory card	32 Gbyte; with SIMATIC memory card
CPU processing times			
for bit operations, typ.	37 ns; / instruction	37 ns; / instruction	37 ns; / instruction
for word operations, typ.	30 ns; / instruction	30 ns; / instruction	30 ns; / instruction
for floating point arithmetic, typ.	74 ns; / instruction	74 ns; / instruction	74 ns; / instruction
Data areas and their retentivity			
Flag			
• Size, max.	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area
Address area			
Process image			
• Inputs, adjustable	1 kbyte	1 kbyte	1 kbyte
• Outputs, adjustable	1 kbyte	1 kbyte	1 kbyte
Time of day			
Clock			
• Hardware clock (real-time)	Yes	Yes	Yes
Digital inputs			
Number of digital inputs	14; Integrated	14; Integrated	14; Integrated
• of which inputs usable for technological functions	8; HSC (High Speed Counting)	8; HSC (High Speed Counting)	8; HSC (High Speed Counting)
Digital outputs			
Number of digital outputs	10; 20 kHz or 100 kHz	10; Relays	10; Relays
• of which high-speed outputs	4; 100 kHz (Qa.0 - Qa.3)		
Analog inputs			
Number of analog inputs	0	0	0
Analog outputs			
Number of analog outputs	0	0	0
1. Interface			
Interface type	PROFINET	PROFINET	PROFINET
Protocols			
• IP protocol	Yes; IPv4	Yes; IPv4	Yes; IPv4
• PROFINET IO Controller	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes
• Open IE communication	Yes; Optionally also encrypted	Yes; Optionally also encrypted	Yes; Optionally also encrypted
• Web server	Yes	Yes	Yes
• Media redundancy	Yes	Yes	Yes

SIMATIC S7-1200 G2 Basic Controllers

Central processing units
Standard CPUs

CPU 1214C

Technical specifications

Article number	6ES7214-1AH50-0XB0 CPU 1214C, DC/DC/DC, 14DI/10DO	6ES7214-1BH50-0XB0 CPU 1214C, AC/DC/RLY, 14DI/10DO	6ES7214-1HH50-0XB0 CPU 1214C, DC/DC/RLY, 14DI/10DO
Protocols			
Number of connections			
• Number of connections, max.	128; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
• UDP	Yes	Yes	Yes
Web server			
• supported	Yes	Yes	Yes
Communication functions			
S7 communication			
• supported	Yes	Yes	Yes
Number of connections			
• overall	PG Connections: 4 reserved; HMI Connections: 4 reserved / 82 max; S7 Connections: 78 max; Open User Connections: 78 max; Web Connections: 2 reserved / 80 max; Total Connections: 10 reserved / 88 max	PG Connections: 4 reserved; HMI Connections: 4 reserved / 82 max; S7 Connections: 78 max; Open User Connections: 78 max; Web Connections: 2 reserved / 80 max; Total Connections: 10 reserved / 88 max	PG Connections: 4 reserved; HMI Connections: 4 reserved / 82 max; S7 Connections: 78 max; Open User Connections: 78 max; Web Connections: 2 reserved / 80 max; Total Connections: 10 reserved / 88 max
Supported technology objects			
Motion Control	Yes	Yes	Yes
• Number of available Motion Control resources for technology objects	800	800	800
• Required Motion Control resources			
- per speed-controlled axis	40	40	40
- per positioning axis	80	80	80
- per synchronous axis	160	160	160
- per external encoder	80	80	80
- per output cam	20	20	20
- per cam track	160	160	160
- per probe	40	40	40
• Number of available Extended Motion Control resources for technology objects	40	40	40
• Required Extended Motion Control resources			
- per cam (1 000 points and 50 segments)	2; 1000 points and 1 segment	2; 1000 points and 1 segment	2; 1000 points and 1 segment
- for each set of kinematics	30	30	30
• kinematics functions			
- kinematics with up to 4 interpolating axes	Yes	Yes	Yes
- kinematics with 5 or more interpolating axes	No	No	No
- user-defined kinematics	No	No	No
- SIMATIC Safe Kinematics	No	No	No
Integrated Functions			
Counter	Yes	Yes	Yes
• Number of counters	8	8	8
• Counting frequency, max.	100 kHz; Ia.0 to Ia.5: 100 kHz (80 kHz in quadrature mode), Ia.6 to Ib.5: 30 kHz (20 kHz in quadrature mode)	100 kHz; Ia.0 to Ia.5: 100 kHz (80 kHz in quadrature mode), Ia.6 to Ib.5: 30 kHz (20 kHz in quadrature mode)	100 kHz; Ia.0 to Ia.5: 100 kHz (80 kHz in quadrature mode), Ia.6 to Ib.5: 30 kHz (20 kHz in quadrature mode)
Frequency measurement	Yes	Yes	Yes
PID controller	Yes	Yes	Yes
Number of pulse outputs	8; individually assigned to CPU and Signal Board	8; individually assigned to CPU and Signal Board	8; individually assigned to CPU and Signal Board
Limit frequency (pulse)	100 kHz	100 kHz	100 kHz
Product functions/security			
signed firmware update	Yes	Yes	Yes
Secure Boot	Yes	Yes	Yes
safely removing data	No	No	No

SIMATIC S7-1200 G2 Basic Controllers

Central processing units
Standard CPUs

CPU 1214C**Technical specifications**

Article number	6ES7214-1AH50-0XB0 CPU 1214C, DC/DC/DC, 14DI/10DO	6ES7214-1BH50-0XB0 CPU 1214C, AC/DC/RLY, 14DI/10DO	6ES7214-1HH50-0XB0 CPU 1214C, DC/DC/RLY, 14DI/10DO
Ambient conditions			
Ambient temperature during operation			
• min.	-20 °C; No condensation	-20 °C; No condensation	-20 °C; No condensation
• max.	40 °C; at max. voltages and max. specifications	40 °C; 40 °C horizontal or 30 °C vertical at max. voltages and max. specifications	40 °C; 40 °C horizontal or 30 °C vertical at max. voltages and max. specifications
Configuration			
Configuration/programming			
Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
Dimensions			
Width	80 mm	80 mm	80 mm
Height	125 mm	125 mm	125 mm
Depth	100 mm	100 mm	100 mm
Weights			
Weight, approx.	352 g	417 g	376 g

SIMATIC S7-1200 G2 Basic Controllers

Central processing units

Fail-safe CPUs

Overview



The fail-safe SIMATIC S7-1200 G2 Controllers are based on the S7-1200 G2 standard CPUs and offer additional safety-related functions.

They can be used for safety-related tasks according to IEC 61508 up to SIL 3 and ISO 13849-1 up to PL e.

Safety-related programs are created in the TIA Portal. The STEP 7 Safety engineering tool offers commands, operations and blocks for safety-related programs in the LAD and FBD languages. To this end, there is a library with pre-configured blocks for safety-related functions certified by the German Technical Inspectorate (TÜV).

- Standard controller with integrated safety functions:
 - Standardized and convenient diagnostic functions for standard and safety
 - Uniform symbols, data consistency, ...
- Modular system with scalable range of CPUs and expandable I/O quantity structure:
 - One engineering for standard and fail-safe automation
 - Use of standard I/O modules
 - Integrated standard PROFINET functionalities for PROFINET controllers and PROFINET iDevice services
 - Connection of distributed standard I/O via fieldbus such as PROFINET
 - F-library certified by the German Technical Inspectorate (TÜV) for all common safety functions
 - Free programming of the safety logic using FBD and LAD
 - Standard-compliant printout of the F program
- Integrated engineering for standard and safety:
 - Safety Basic integrated in STEP 7 Basic for easy engineering of the CPU 1200 FC
 - STEP 7 Safety Advanced for the entire fail-safe SIMATIC S7 portfolio
- Integrated system diagnostics of the CPUs, for standard and safety:
 - Consistent plain text display of system diagnostics information in the TIA Portal, HMI and web server
 - Messages are updated even if the CPU is in STOP state
 - System diagnostics integrated in the CPU firmware. Configuration by user not required
 - The diagnostics is automatically updated on configuration changes.
- 2 fail-safe compact controllers with graded performances in the versions DC/DC/DC and DC/DC/relay

Characteristics	CPU 1212FC	CPU1214FC
Variants	DC/DC/DC, DC/DC/relay	DC/DC/DC, DC/DC/relay
Work memory for program, integrated	200 KB	300 KB
Work memory for data, integrated	500 KB	750 KB
Load memory, integrated	8 MB	8 MB
Memory card	SIMATIC Memory Card (optional)	
Digital inputs/outputs, integrated	8/6	14/10
Process image	1024 bytes for inputs, 1024 bytes for outputs	
Expansion by signal board	Max. 1	Max. 2
Expansion by signal modules	Max. 6	Max. 10

SIMATIC S7-1200 G2 Basic Controllers

Central processing units

Fail-safe CPUs

Ordering data	Article No.	Ordering data	Article No.
CPU 1212FC		SB 1233 signal board	
SIMATIC S7-1200 G2: Failsafe compact CPU 1212FC DC/DC/DC	6ES7212-1AF50-0XB0	SIMATIC S7-1200 G2, SB 1233 analog I/O module	6ES7233-4HD50-0XB0
Power supply: 20.4-28.8 V DC; Onboard I/O: 8 x DI 24 V DC; 6 x DO 24 V DC; Memory: program 200 KB, data 500 KB, retentivity 20 KB		2 AI/2 AO, inputs: 2 x AI 14 bit ADC (+/-10 V, +/-5 V, +/-2.5 V or 0-20 mA/4-20 mA), outputs: 2 x AQ 14 bit DAC (+/-10 V, 0-20 mA or 4-20 mA)	
SIMATIC S7-1200 G2: Failsafe compact CPU 1212FC DC/DC/RLY	6ES7212-1HF50-0XB0	SIMATIC Memory Card (optional)	
Power supply: 20.4-28.8 V DC; Onboard I/O: 8 x DI 24 V DC; 6 x DO relays 2 A; Memory: program 200 KB, data 500 KB, retentivity 20 KB		SIMATIC S7, memory card for S7-1x 00 CPU/SINAMICS	6ES7954-8LC04-0AA0
CPU 1214FC		3.3 V Flash, 4 MB	
SIMATIC S7-1200 G2: Failsafe compact CPU 1214FC DC/DC/DC	6ES7214-1AF50-0XB0	SIMATIC S7, memory card for S7-1x00 CPU/SINAMICS	6ES7954-8LE04-0AA0
Power supply: 20.4-28.8 V DC; Onboard I/O: 14 x DI 24 V DC; 10 x DO 24 V DC; memory: program 300 KB, data 750 KB, retentivity 20 KB		3.3 V Flash, 12 MB	
SIMATIC S7-1200 G2: Failsafe compact CPU 1214FC DC/DC/RLY	6ES7214-1HF50-0XB0	SIMATIC S7, memory card for S7-1x00 CPU/SINAMICS	6ES7954-8LF04-0AA0
Power supply: 20.4-28.8 V DC; Onboard I/O: 14 x DI 24 V DC; 10 x DO relays 2 A; memory: program 300 KB, data 750 KB, retentivity 20 KB		3.3 V Flash, 24 MB	
Accessories		SIMATIC S7, memory card for S7-1x00 CPU	6ES7954-8LL04-0AA0
SB 1221 signal board		3.3 V Flash, 256 MB	
SIMATIC S7-1200 G2, SB 1221 digital input module	6ES7221-3BF50-0XB0	SIMATIC S7, memory card for S7-1x 00 CPU	6ES7954-8LP04-0AA0
8 DI 100 kHz; inputs: 8 x DI 24 V DC sink/source, 100 kHz		3.3 V Flash, 2 GB	
SB 1222 signal board		SIMATIC S7, memory card for S7-1x 00 CPU	6ES7954-8LT04-0AA0
SIMATIC S7-1200 G2, SB 1222 digital output module	6ES7222-5BF50-0XB0	3.3 V Flash, 32 GB	
8 DO 100 kHz; outputs: 8 x DQ 24 V DC 0.1 A sinking/sourcing transistor, 100 kHz		STEP 7 Professional / Basic V20	
SB 1223 signal board		Target system:	
SIMATIC S7-1200 G2, SB 1223 digital I/O module	6ES7223-7AF50-0XB0	SIMATIC S7-1200, S7-1200 G2, S7-1500, S7-300, S7-400, WinAC	
4 DI/4 DO 200 kHz; inputs: 4 x DI 5 V DC, 200 kHz; outputs: 4 x DQ 5 V DC 0.1 A, sinking/sourcing transistor, 200 kHz		Requirement:	
SIMATIC S7-1200 G2, SB 1223 digital I/O module	6ES7223-7BF50-0XB0	Windows 10 (64-bit)	
4 DI/4 DO 100 kHz; inputs: 4 x DI 24 V DC sink/source, 100 kHz; outputs: 4 x DQ 24 V DC 0.1 A sinking/sourcing transistor, 100 kHz		• Windows 10 Professional Version 22H2	
SB 1231 signal board		• Windows 10 Enterprise Version 22H2	
SIMATIC S7-1200 G2, SB 1231 analog input module	6ES7231-4HD50-0XB0	• Windows 10 Enterprise 2019 LTSC & 2021 LTSC	
4 AI; inputs: 4 x AI 14 bit ADC (+/-10 V, +/-5 V, +/-2.5 V or 0-20 mA/4-20 mA)		Windows 11 (64-bit)	
SB 1232 signal board		• Windows 11 Professional Version 22H2 & 23H2	
SIMATIC S7-1200 G2, SB 1232 analog output module	6ES7232-4HD50-0XB0	• Windows 11 Enterprise Version 22H2 & 23H2	
1 AO, +/-10 V DC (12-bit resolution) or 0-20 mA (11-bit resolution)		Windows Server (64-bit)	
		• Windows Server 2019 Standard (full installation)	
		• Windows Server 2022 Standard (full installation)	
		Type of delivery:	
		9 languages: en, de, zh included, fr, sp, it, ru, ja, ko as download	
		SIMATIC STEP 7 Professional V20; floating license	6ES7822-1AA24-0YA5
		Engineering software in the TIA Portal; software and documentation on DVD; license key on USB flash drive; Class A; For configuration of SIMATIC S7-1200/1200 G2/1500, S7-300/400/WinAC, SIMATIC Basic Panels, SIMATIC Unified Basic Panels.	
		The system requirements specification can be found at https://www.siemens.com/compatool	

SIMATIC S7-1200 G2 Basic Controllers

Central processing units

Fail-safe CPUs

Ordering data	Article No.		Article No.
<p>SIMATIC STEP 7 Professional V20, floating license download¹⁾</p> <p>Engineering software in the TIA Portal; software, documentation and license key for downloading¹⁾; class A; for configuring SIMATIC S7-1200/1200 G2/1500, S7-300/400/WinAC, SIMATIC Basic Panels, SIMATIC Unified Basic Panels.</p> <p>The system requirements specification can be found at https://www.siemens.com/compatool</p> <p>Consignee email address required for delivery</p>	<p>6ES7822-1AE24-0YA5</p>	<p>SIMATIC STEP 7 Basic V20, floating license download¹⁾</p> <p>Engineering software in the TIA Portal; software, documentation and license key for downloading; Class A; for configuring SIMATIC S7-1200/1200 G2; SIMATIC Basic Panels; SIMATIC Unified Basic Panels.</p> <p>The system requirements specification can be found at https://www.siemens.com/compatool</p> <p>Consignee email address required for delivery</p>	<p>6ES7822-0AE24-0YA5</p>
<p>SIMATIC STEP 7 Basic V20, floating license</p> <p>Engineering software in the TIA Portal; software and documentation on DVD; license key on USB flash drive; Class A; for configuration of SIMATIC S7-1200/1200 G2; SIMATIC Basic Panels; SIMATIC Unified Basic Panels.</p> <p>The system requirements specification can be found at https://www.siemens.com/compatool</p>	<p>6ES7822-0AA24-0YA5</p>		

SIMATIC S7-1200 G2 Basic Controllers

Central processing units

Fail-safe CPUs

Technical specifications

Article number	6ES7212-1AF50-0XB0 CPU 1212FC, DC/DC/DC, 8DI/6DO	6ES7212-1HF50-0XB0 CPU 1212FC, DC/DC/RLY, 8DI/6DO
General information		
Product type designation	CPU 1212FC DC/DC/DC	CPU 1212FC DC/DC/Relay
Engineering with		
• Programming package	STEP 7 V20 or higher	STEP 7 V20 or higher
Supply voltage		
Rated value (DC)		
• 24 V DC	Yes	Yes
Memory		
Work memory		
• integrated	700 kbyte	700 kbyte
• integrated (for program)	200 kbyte	200 kbyte
• integrated (for data)	500 kbyte	500 kbyte
Load memory		
• integrated	8 Mbyte	8 Mbyte
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte; with SIMATIC memory card	32 Gbyte; with SIMATIC memory card
CPU processing times		
for bit operations, typ.	37 ns; / instruction	37 ns; / instruction
for word operations, typ.	30 ns; / instruction	30 ns; / instruction
for floating point arithmetic, typ.	74 ns; / instruction	74 ns; / instruction
Data areas and their retentivity		
Flag		
• Size, max.	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area
Address area		
Process image		
• Inputs, adjustable	1 kbyte	1 kbyte
• Outputs, adjustable	1 kbyte	1 kbyte
Time of day		
Clock		
• Hardware clock (real-time)	Yes	Yes
Digital inputs		
Number of digital inputs	8; Integrated	8; Integrated
• of which inputs usable for technological functions	8; HSC (High Speed Counting)	8; HSC (High Speed Counting)
Digital outputs		
Number of digital outputs	6; 20 kHz or 100 kHz	6; Relays
• of which high-speed outputs	4; 100 kHz (Qa.0 - Qa.3)	
Analog inputs		
Number of analog inputs	0	0
Analog outputs		
Number of analog outputs	0	0
1. Interface		
Interface type	PROFINET	PROFINET
Protocols		
• IP protocol	Yes; IPv4	Yes; IPv4
• PROFINET IO Controller	Yes	Yes
• PROFINET IO Device	Yes	Yes
• SIMATIC communication	Yes	Yes
• Open IE communication	Yes; Optionally also encrypted	Yes; Optionally also encrypted
• Web server	Yes	Yes
• Media redundancy	Yes	Yes
Protocols		
Number of connections		
• Number of connections, max.	128; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs
Open IE communication		
• TCP/IP	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes
• UDP	Yes	Yes
Web server		
• supported	Yes	Yes

SIMATIC S7-1200 G2 Basic Controllers

Central processing units

Fail-safe CPUs

Technical specifications

Article number	6ES7212-1AF50-0XB0 CPU 1212FC, DC/DC/DC, 8DI/6DO	6ES7212-1HF50-0XB0 CPU 1212FC, DC/DC/RLY, 8DI/6DO
Communication functions		
S7 communication		
• supported	Yes	Yes
Number of connections		
• overall	PG Connections: 4 reserved; HMI Connections: 4 reserved / 82 max; S7 Connections: 78 max; Open User Connections: 78 max; Web Connections: 2 reserved / 80 max; Total Connections: 10 reserved / 88 max	PG Connections: 4 reserved; HMI Connections: 4 reserved / 82 max; S7 Connections: 78 max; Open User Connections: 78 max; Web Connections: 2 reserved / 80 max; Total Connections: 10 reserved / 88 max
Supported technology objects		
Motion Control	Yes	Yes
• Number of available Motion Control resources for technology objects	800	800
• Required Motion Control resources		
- per speed-controlled axis	40	40
- per positioning axis	80	80
- per synchronous axis	160	160
- per external encoder	80	80
- per output cam	20	20
- per cam track	160	160
- per probe	40	40
• Number of available Extended Motion Control resources for technology objects	40	40
• Required Extended Motion Control resources		
- per cam (1 000 points and 50 segments)	2; 1000 points and 1 segment	2; 1000 points and 1 segment
- for each set of kinematics	30	30
• kinematics functions		
- kinematics with up to 4 interpolating axes	Yes	Yes
- kinematics with 5 or more interpolating axes	No	No
- user-defined kinematics	No	No
- SIMATIC Safe Kinematics	No	No
Integrated Functions		
Counter	Yes	Yes
• Number of counters	8	8
• Counting frequency, max.	100 kHz; Ia.0 to Ia.5: 100 kHz (80 kHz in quadrature mode), Ia.6 to Ia.7: 30 kHz (20 kHz in quadrature mode)	100 kHz; Ia.0 to Ia.5: 100 kHz (80 kHz in quadrature mode), Ia.6 to Ia.7: 30 kHz (20 kHz in quadrature mode)
Frequency measurement	Yes	Yes
PID controller	Yes	Yes
Number of pulse outputs	8; individually assigned to CPU and Signal Board	8; individually assigned to CPU and Signal Board
Limit frequency (pulse)	100 kHz	100 kHz
Standards, approvals, certificates		
Highest safety class achievable in safety mode		
Probability of failure (for service life of 20 years and repair time of 100 hours)		
- Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05	< 2.00E-05
- High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09 up to an operational altitude of 3 000 m or < 2.00E-09 at an operating altitude greater than 3 000 m up to 5 000 m	< 1.00E-09 up to an operational altitude of 3 000 m or < 2.00E-09 at an operating altitude greater than 3 000 m up to 5 000 m
Product functions/security		
signed firmware update	Yes	Yes
Secure Boot	Yes	Yes
safely removing data	No	No
Ambient conditions		
Ambient temperature during operation		
• min.	-20 °C; No condensation	-20 °C; No condensation
• max.	40 °C; at max. voltages and max. specifications	40 °C; 40 °C horizontal or 30 °C vertical at max. voltages and max. specifications

SIMATIC S7-1200 G2 Basic Controllers

Central processing units

Fail-safe CPUs

Technical specifications

Article number	6ES7212-1AF50-0XB0 CPU 1212FC, DC/DC/DC, 8DI/6DO	6ES7212-1HF50-0XB0 CPU 1212FC, DC/DC/RLY, 8DI/6DO
Configuration		
Configuration/programming		
Programming language		
- LAD	Yes; incl. failsafe	Yes; incl. failsafe
- FBD	Yes; incl. failsafe	Yes; incl. failsafe
- SCL	Yes	Yes
Dimensions		
Width	70 mm	70 mm
Height	125 mm	125 mm
Depth	100 mm	100 mm
Weights		
Weight, approx.	319 g	333 g
Article number	6ES7214-1AF50-0XB0 CPU 1214FC, DC/DC/DC, 14DI/10DO	6ES7214-1HF50-0XB0 CPU 1214FC, DC/DC/RLY, 14DI/10DO
General information		
Product type designation	CPU 1214FC DC/DC/DC	CPU 1214FC DC/DC/Relay
Engineering with		
• Programming package	STEP 7 V20 or higher	STEP 7 V20 or higher
Supply voltage		
Rated value (DC)		
• 24 V DC	Yes	Yes
Memory		
Work memory		
• integrated	1 050 kbyte	1 050 kbyte
• integrated (for program)	300 kbyte	300 kbyte
• integrated (for data)	750 kbyte	750 kbyte
Load memory		
• integrated	8 Mbyte	8 Mbyte
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte; with SIMATIC memory card	32 Gbyte; with SIMATIC memory card
CPU processing times		
for bit operations, typ.	37 ns; / instruction	37 ns; / instruction
for word operations, typ.	30 ns; / instruction	30 ns; / instruction
for floating point arithmetic, typ.	74 ns; / instruction	74 ns; / instruction
Data areas and their retentivity		
Flag		
• Size, max.	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area
Address area		
Process image		
• Inputs, adjustable	1 kbyte	1 kbyte
• Outputs, adjustable	1 kbyte	1 kbyte
Time of day		
Clock		
• Hardware clock (real-time)	Yes	Yes
Digital inputs		
Number of digital inputs	14; Integrated	14; Integrated
• of which inputs usable for technological functions	8; HSC (High Speed Counting)	8; HSC (High Speed Counting)
Digital outputs		
Number of digital outputs	10; 20 kHz or 100 kHz	10; Relays
• of which high-speed outputs	4; 100 kHz (Qa.0 - Qa.3)	
Analog inputs		
Number of analog inputs	0	0
Analog outputs		
Number of analog outputs	0	0

SIMATIC S7-1200 G2 Basic Controllers

Central processing units

Fail-safe CPUs

Technical specifications

Article number	6ES7214-1AF50-0XB0 CPU 1214FC, DC/DC/DC, 14DI/10DO	6ES7214-1HF50-0XB0 CPU 1214FC, DC/DC/RLY, 14DI/10DO
1. Interface		
Interface type	PROFINET	PROFINET
Protocols		
• IP protocol	Yes; IPv4	Yes; IPv4
• PROFINET IO Controller	Yes	Yes
• PROFINET IO Device	Yes	Yes
• SIMATIC communication	Yes	Yes
• Open IE communication	Yes; Optionally also encrypted	Yes; Optionally also encrypted
• Web server	Yes	Yes
• Media redundancy	Yes	Yes
Protocols		
Number of connections		
• Number of connections, max.	128; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs
Open IE communication		
• TCP/IP	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes
• UDP	Yes	Yes
Web server		
• supported	Yes	Yes
Communication functions		
S7 communication		
• supported	Yes	Yes
Number of connections		
• overall	PG Connections: 4 reserved; HMI Connections: 4 reserved / 82 max; S7 Connections: 78 max; Open User Connections: 78 max; Web Connections: 2 reserved / 80 max; Total Connections: 10 reserved / 88 max	PG Connections: 4 reserved; HMI Connections: 4 reserved / 82 max; S7 Connections: 78 max; Open User Connections: 78 max; Web Connections: 2 reserved / 80 max; Total Connections: 10 reserved / 88 max
Supported technology objects		
Motion Control	Yes	Yes
• Number of available Motion Control resources for technology objects	800	800
• Required Motion Control resources		
- per speed-controlled axis	40	40
- per positioning axis	80	80
- per synchronous axis	160	160
- per external encoder	80	80
- per output cam	20	20
- per cam track	160	160
- per probe	40	40
• Number of available Extended Motion Control resources for technology objects	40	40
• Required Extended Motion Control resources		
- per cam (1 000 points and 50 segments)	2; 1000 points and 1 segment	2; 1000 points and 1 segment
- for each set of kinematics	30	30
• kinematics functions		
- kinematics with up to 4 interpolating axes	Yes	Yes
- kinematics with 5 or more interpolating axes	No	No
- user-defined kinematics	No	No
- SIMATIC Safe Kinematics	No	No

SIMATIC S7-1200 G2 Basic Controllers

Central processing units

Fail-safe CPUs

Technical specifications

Article number	6ES7214-1AF50-0XB0 CPU 1214FC, DC/DC/DC, 14DI/10DO	6ES7214-1HF50-0XB0 CPU 1214FC, DC/DC/RLY, 14DI/10DO
Integrated Functions		
Counter	Yes	Yes
• Number of counters	8	8
• Counting frequency, max.	100 kHz; Ia.0 to Ia.5: 100 kHz (80 kHz in quadrature mode), Ia.6 to Ib.5: 30 kHz (20 kHz in quadrature mode)	100 kHz; Ia.0 to Ia.5: 100 kHz (80 kHz in quadrature mode), Ia.6 to Ib.5: 30 kHz (20 kHz in quadrature mode)
Frequency measurement	Yes	Yes
PID controller	Yes	Yes
Number of pulse outputs	8; individually assigned to CPU and Signal Board	8; individually assigned to CPU and Signal Board
Limit frequency (pulse)	100 kHz	100 kHz
Standards, approvals, certificates		
Highest safety class achievable in safety mode		
Probability of failure (for service life of 20 years and repair time of 100 hours)		
- Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05	< 2.00E-05
- High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09 up to an operational altitude of 3 000 m or < 2.00E-09 at an operating altitude greater than 3 000 m up to 5 000 m	< 1.00E-09 up to an operational altitude of 3 000 m or < 2.00E-09 at an operating altitude greater than 3 000 m up to 5 000 m
Product functions/security		
signed firmware update	Yes	Yes
Secure Boot	Yes	Yes
safely removing data	No	No
Ambient conditions		
Ambient temperature during operation		
• min.	-20 °C; No condensation	-20 °C; No condensation
• max.	40 °C; at max. voltages and max. specifications	40 °C; 40 °C horizontal or 30 °C vertical at max. voltages and max. specifications
Configuration		
Configuration/programming		
Programming language		
- LAD	Yes; incl. failsafe	Yes; incl. failsafe
- FBD	Yes; incl. failsafe	Yes; incl. failsafe
- SCL	Yes	Yes
Dimensions		
Width	80 mm	80 mm
Height	125 mm	125 mm
Depth	100 mm	100 mm
Weights		
Weight, approx.	352 g	376 g

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Digital modules

SM 1221 digital input modules

Overview



- Digital inputs as supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the respective task
- For subsequent expansion of the system with additional inputs

Ordering data

Article No.

SM 1221 digital input signal module

**SIMATIC S7-1200 G2:
SM 1221 digital input module 16 DI**

Inputs: 16 x DI 24 V DC sink/source

6ES7221-1BH50-0XB0

Technical specifications

Article number	6ES7221-1BH50-0XB0 SM 1221 Digital Input, 16DI
General information	
Product type designation	SM 1221, DI 16x 24 V DC
Input current	
from backplane bus 5 V DC, max.	90 mA
Digital inputs	
• from load voltage L+ (without load), max.	4.1 mA; per channel
Digital inputs	
Number of digital inputs	16
• in groups of	4
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Number of simultaneously controllable inputs	
horizontal installation	
- up to 40 °C, max.	16
- up to 50 °C, max.	16
vertical installation	
- up to 40 °C, max.	16
Input voltage	
• Rated value (DC)	24 V
• for signal "0"	5 V DC or 0.5 mA
• for signal "1"	15 V DC at 2.5 mA

Article number	6ES7221-1BH50-0XB0 SM 1221 Digital Input, 16DI
Input current	
• for signal "0", max. (permissible quiescent current)	0.5 mA
• for signal "1", min.	2.5 mA
• for signal "1", typ.	4.1 mA
Input delay (for rated value of input voltage) for standard inputs	
- parameterizable	Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four
for interrupt inputs	
- parameterizable	No
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	No
Diagnoses	
• Monitoring the supply voltage	No
Diagnostics indication LED	
• for status of the inputs	Yes
• for maintenance	Yes
Potential separation	
Potential separation digital inputs	
• between the channels, in groups of 4	4
• between the channels and backplane bus	Yes; 707 V DC (type test)
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
CSA approval	No
UL approval	Yes
cULus	Yes
FM approval	No
RCM (formerly C-TICK)	Yes
KC approval	No
Marine approval	No
connection method	
required front connector	No
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
Dimensions	
Width	30 mm
Height	125 mm
Depth	100 mm
Weights	
Weight, approx.	166 g

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Digital modules

SB 1221 digital input modules

Overview



- Digital inputs as a supplement to the integral I/O of SIMATIC S7-1200 G2 CPUs
- Can be plugged directly into the CPU

Ordering data

Article No.

**SIMATIC S7-1200 G2,
SB 1221 digital input module,
8 DI 100 kHz**

Inputs: 8 x DI 24 V DC sink/source,
100 kHz

6ES7221-3BF50-0XB0

Technical specifications

Article number	6ES7221-3BF50-0XB0 SB 1221 Signal Board, 8DI 24VDC 100kHz
General information	
Product type designation	SB 1221, DI 8x 24 V DC 100 kHz
Input current	
from backplane bus 5 V DC, typ.	108 mA
Digital inputs	
• from load voltage L+ (without load), max.	6 mA; per channel
Digital inputs	
Number of digital inputs	8; sink / source
• in groups of	8
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Number of simultaneously controllable inputs	
all mounting positions	
- up to 40 °C, max.	8
Input voltage	
• Rated value (DC)	24 V
• for signal "0"	5 V DC or 0.5 mA
• for signal "1"	15 V DC at 2.5 mA
Input current	
• for signal "0", max. (permissible quiescent current)	0.5 mA
• for signal "1", min.	3.3 mA
• for signal "1", typ.	6 mA

Article number	6ES7221-3BF50-0XB0 SB 1221 Signal Board, 8DI 24VDC 100kHz
Input delay (for rated value of input voltage) for standard inputs	
- parameterizable	Yes; 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 μs; 0.05 / 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 ms
for interrupt inputs	
- parameterizable	Yes
for technological functions	
- parameterizable	Yes
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	No
Diagnoses	
• Monitoring the supply voltage	No
Diagnostics indication LED	
• DIAG LED	Yes
• for status of the inputs	Yes
Potential separation	
Potential separation digital inputs	
• between the channels	No
• between the channels, in groups of	8
• Number of potential groups	1
• between the channels and backplane bus	Yes; 707 V DC (type test)
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
CSA approval	No
UL approval	Yes
cULus	Yes
FM approval	No
RCM (formerly C-TICK)	Yes
KC approval	No
Marine approval	No
Ambient conditions	
Ambient temperature during operation	
• min.	-20 °C
• max.	40 °C; at max. voltages and max. specifications
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
Dimensions	
Width	15 mm
Height	62 mm
Depth	63 mm
Weights	
Weight, approx.	26 g

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Digital modules

SM 1222 digital output modules

Overview



- Digital outputs as a supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the respective task
- For subsequent expansion of the system with additional outputs

Ordering data

Article No.

SM 1222 digital output signal module

SIMATIC S7-1200 G2: SM 1222 digital output module 16 DO

Outputs: 16 x DO, 24 V DC 0.5 A, sourcing transistor

6ES7222-5BH50-0XB0

SIMATIC S7-1200 G2: SM 1222 digital output module, 16RLY

Outputs: 16 x DO, relay 2 A

6ES7222-5HH50-0XB0

4

Technical specifications

Article number	6ES7222-5BH50-0XB0	6ES7222-5HH50-0XB0
	SM 1222 Digital Output, 16DQ	SM 1222 Digital Output, 16RLY
General information		
Product type designation	SM 1222, DQ 16x 24 V DC/0.5 A	SM 1222, DQ 16x relay/2 A
Supply voltage		
Rated value (DC)	24 V	24 V
Input current		
from backplane bus 5 V DC, max.	120 mA	115 mA
Digital outputs		
• from load voltage L+, max.	45 mA	9 mA; per relay coil
Digital outputs		
Number of digital outputs	16	16
• in groups of	8	8
Short-circuit protection	No; to be provided externally	No; to be provided externally
Limitation of inductive shutdown voltage to	typ. (L+) -40 V, 1 W dissipation	
Switching capacity of the outputs		
• with resistive load, max.	0.5 A	2 A
• on lamp load, max.	5 W	30 W with DC, 200 W with AC
Output voltage		
• Rated value (DC)	24 V	5 V DC to 30 V DC
• Rated value (AC)		5 V AC to 250 V AC
• for signal "0", max.	0.1 V; with 10 kOhm load	
• for signal "1", min.	L+ (-0.5 V)	
Output current		
• for signal "1" rated value	0.5 A	2 A
• for signal "0" residual current, max.	10 µA	
Output delay with resistive load		
• "0" to "1", max.	50 µs	10 ms
• "1" to "0", max.	200 µs	10 ms
Total current of the outputs (per group)		
horizontal installation		
- up to 50 °C, max.	4 A; Current per mass (Group of 8)	16 A; Current per mass

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Digital modules

SM 1222 digital output modules

Technical specifications

Article number	6ES7222-5BH50-0XB0 SM 1222 Digital Output, 16DQ	6ES7222-5HH50-0XB0 SM 1222 Digital Output, 16RLY
Relay outputs		
• Number of relay outputs		16
• Rated supply voltage of relay coil L+ (DC)		24 V
• Number of operating cycles, max.		mechanically 10 million, at rated load voltage 100 000
Switching capacity of contacts		
- with inductive load, max.		2 A
- on lamp load, max.		30 W with DC, 200 W with AC
- with resistive load, max.		2 A
Interrupts/diagnostics/status information		
Diagnostics function	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnoses		
• Monitoring the supply voltage	Yes	Yes
Diagnostics indication LED		
• DIAG LED	Yes	Yes
• for status of the outputs	Yes	Yes
Potential separation		
Potential separation digital outputs		
• between the channels		Relays
• between the channels, in groups of 8	8	8
• between the channels and backplane bus	707 V DC (type test)	Yes; 1500 V AC (type test)
Degree and class of protection		
IP degree of protection	IP20	IP20
Standards, approvals, certificates		
CE mark	Yes	Yes
CSA approval	No	No
UL approval	Yes	Yes
cULus	Yes	Yes
FM approval	No	No
RCM (formerly C-TICK)	Yes	Yes
KC approval	No	No
Marine approval	No	No
Ambient conditions		
Ambient temperature during operation		
• min.		-20 °C; No condensation
• max.		40 °C; at max. voltages and max. specifications
connection method		
required front connector	No	No
Mechanics/material		
Enclosure material (front)		
• Plastic	Yes	Yes
Dimensions		
Width	30 mm	30 mm
Height	125 mm	125 mm
Depth	100 mm	100 mm
Weights		
Weight, approx.	173 g	217 g

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Digital modules

SB 1222 digital output modules

Overview



- Digital outputs as a supplement to the integral I/O of the SIMATIC S7-1200 G2 CPUs
- Can be plugged directly into the CPU

Ordering data

Article No.

**SIMATIC S7-1200 G2,
SB 1222 digital output module,
8 DO 100 kHz**

6ES7222-5BF50-0XB0

Outputs: 8 x DQ 24 V DC 0.1 A
sinking/sourcing transistor, 100 kHz

Technical specifications

Article number	6ES7222-5BF50-0XB0 SB 1222 Signal Board, 8DQ 24VDC 100kHz
General information	
Product type designation	SB 1222, DQ 8x 24 V DC 100 kHz
Supply voltage	
Rated value (DC)	24 V
Input current	
from backplane bus 5 V DC, typ.	30 mA
Digital outputs	
• from load voltage L+, max.	15 mA
Digital outputs	
Number of digital outputs	8
• in groups of	8
Short-circuit protection	Yes
Switching capacity of the outputs	
• with resistive load, max.	0.1 A
Output voltage	
• Rated value (DC)	24 V
• for signal "0", max.	1 V
• for signal "1", min.	L+ (-1.5 V)

Article number	6ES7222-5BF50-0XB0 SB 1222 Signal Board, 8DQ 24VDC 100kHz
Output current	
• for signal "1" rated value	0.1 A
Output delay with resistive load	
• "0" to "1", max.	1.8 μs
• "1" to "0", max.	1.8 μs
Total current of the outputs (per group)	
horizontal installation	
- up to 50 °C, max.	0.4 A
Interrupts/diagnostics/ status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
Diagnostics indication LED	
• DIAG LED	Yes
• for status of the outputs	Yes
Potential separation	
Potential separation digital outputs	
• between the channels	No
• between the channels, in groups of	8
• Number of potential groups	1
• between the channels and backplane bus	Yes; 707 V DC (type test)
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
CSA approval	No
UL approval	Yes
cULus	Yes
FM approval	No
RCM (formerly C-TICK)	Yes
KC approval	No
Marine approval	No
Ambient conditions	
Ambient temperature during operation	
• min.	-20 °C
• max.	40 °C; at max. voltages and max. specifications
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
Dimensions	
Width	15 mm
Height	62 mm
Depth	63 mm
Weights	
Weight, approx.	29 g

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Digital modules

SM 1223 digital input/output modules

Overview



- Digital inputs and outputs as supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the respective task
- For subsequent expansion of the system with additional inputs and outputs

Ordering data

Article No.

SM 1223 digital input/output signal module

SIMATIC S7-1200 G2, SM 1223 digital input/output module, 8 DI/8 DO

Inputs: 8 x DI 24 V DC sink/source
Outputs: 8 x DO, 24 V DC 0.5 A, sourcing transistor

6ES7223-5BH50-0XB0

SIMATIC S7-1200 G2, SM 1223 digital input/output module, 8 DI/8 RLY;

Inputs: 8 x DI 24 V DC sink/source;
Outputs: 8 x DO relay 2 A

6ES7223-5PH50-0XB0

Technical specifications

Article number	6ES7223-5BH50-0XB0	6ES7223-5PH50-0XB0
	SM 1223 Digital I/O, 8DI/8DO	SM 1223 Digital I/O, 8DI/8RLY
General information		
Product type designation	SM 1223, DI 8x 24 V DC, DQ 8x 24 V DC 0.5A	SM 1223, DI 8x 24 V DC, DQ 8x relay
Supply voltage		
Rated value (DC)	24 V	24 V
Input current		
from backplane bus 5 V DC, max.	110 mA	105 mA
Digital inputs		
• from load voltage L+ (without load), max.	4.1 mA; per channel	4.1 mA; per channel
Digital outputs		
• from load voltage L+, max.	45 mA	9 mA; per relay coil
Digital inputs		
Number of digital inputs	8	8
• in groups of	4	4
Input characteristic curve in accordance with IEC 61131, type 1	Yes	Yes
Number of simultaneously controllable inputs		
all mounting positions		
- up to 40 °C, max.	8	8
horizontal installation		
- up to 40 °C, max.	8	8
- up to 50 °C, max.	8	8
vertical installation		
- up to 40 °C, max.	8	8
Input voltage		
• Type of input voltage	DC	DC
• Rated value (DC)	24 V	24 V
• for signal "0"	5 V DC or 0.5 mA	5 V DC or 0.5 mA
• for signal "1"	15 V DC at 2.5 mA	15 V DC at 2.5 mA
Input current		
• for signal "0", max. (permissible quiescent current)	1 mA	1 mA
• for signal "1", min.	2.5 mA	2.5 mA
• for signal "1", typ.	4.1 mA	4 mA

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Digital modules

SM 1223 digital input/output modules

Technical specifications

Article number	6ES7223-5BH50-0XB0 SM 1223 Digital I/O, 8DI/8DO	6ES7223-5PH50-0XB0 SM 1223 Digital I/O, 8DI/8RLY
Input delay (for rated value of input voltage) for standard inputs		
- parameterizable	Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four	Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four
for interrupt inputs		
- parameterizable	No	No
Digital outputs		
Number of digital outputs	8	8
• in groups of	8	8
Short-circuit protection	No; to be provided externally	No; to be provided externally
Limitation of inductive shutdown voltage to	typ. (L+) -40 V, 1 W dissipation	
Switching capacity of the outputs		
• with resistive load, max.	0.5 A	2 A
• on lamp load, max.	5 W	30 W with DC, 200 W with AC
Output voltage		
• Rated value (DC)	24 V	5 V DC to 30 V DC
• Rated value (AC)		5 V AC to 250 V AC
• for signal "0", max.	0.1 V; with 10 kOhm load	
• for signal "1", min.	20 V DC	
Output current		
• for signal "1" rated value	0.5 A	2 A
• for signal "0" residual current, max.	10 µA	
Output delay with resistive load		
• "0" to "1", max.	50 µs	10 ms
• "1" to "0", max.	200 µs	10 ms
Total current of the outputs (per group)		
horizontal installation		
- up to 50 °C, max.	2 A; Current per mass	16 A; Current per mass
Relay outputs		
• Number of relay outputs		8
• Rated supply voltage of relay coil L+ (DC)		24 V
• Number of operating cycles, max.		mechanically 10 million, at rated load voltage 100 000
Switching capacity of contacts		
- with inductive load, max.		2 A
- on lamp load, max.		30 W with DC, 200 W with AC
- with resistive load, max.		2 A
Interrupts/diagnostics/ status information		
Diagnostics function	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnoses		
• Monitoring the supply voltage	Yes	Yes
Diagnostics indication LED		
• DIAG LED	Yes	
• for status of the inputs	Yes	Yes
• for status of the outputs	Yes	Yes
• for maintenance		Yes
Potential separation		
Potential separation digital inputs		
• between the channels, in groups of	4	4
• between the channels and backplane bus	Yes; 707 V DC (type test)	Yes; 707 V DC (type test)
Potential separation digital outputs		
• between the channels		Relays
• between the channels, in groups of	8	8
• between the channels and backplane bus	Yes; 707 V DC (type test)	Yes; 4 200 V DC (type test)

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Digital modules

SM 1223 digital input/output modules**Technical specifications**

Article number	6ES7223-5BH50-0XB0 SM 1223 Digital I/O, 8DI/8DO	6ES7223-5PH50-0XB0 SM 1223 Digital I/O, 8DI/8RLY
Degree and class of protection		
IP degree of protection	IP20	IP20
Standards, approvals, certificates		
CE mark	Yes	Yes
CSA approval	No	No
UL approval	Yes	Yes
cULus	Yes	Yes
FM approval	No	No
RCM (formerly C-TICK)	Yes	Yes
KC approval	No	No
Marine approval	No	No
Ambient conditions		
Ambient temperature during operation		
• min.		-20 °C; No condensation
• max.		40 °C; at max. voltages and max. specifications
connection method		
required front connector	No	No
Mechanics/material		
Enclosure material (front)		
• Plastic	Yes	Yes
Dimensions		
Width	30 mm	30 mm
Height	125 mm	125 mm
Depth	100 mm	100 mm
Weights		
Weight, approx.	170 g	194 g

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Digital modules

SB 1223 digital input/output modules

Overview



- Digital inputs and outputs as a supplement to the integral I/O of the SIMATIC S7-1200 G2 CPUs
- Can be plugged directly into the CPU

Ordering data

Article No.

**SIMATIC S7-1200 G2,
SB 1223 digital I/O module,
4 DI/4 DO 200 kHz**

Inputs: 4 x DI 5 V DC, 200 kHz;
Outputs: 4 x DQ 5 V DC 0.1 A
sinking/sourcing transistor, 200 kHz

6ES7223-7AF50-0XB0

**SIMATIC S7-1200 G2,
SB 1223 digital I/O module,
4 DI/4 DO 200 kHz**

Inputs: 4 x DI 5 V DC, 200 kHz;
Outputs: 4 x DQ 5 V DC 0.1 A
sinking/sourcing transistor, 200 kHz

6ES7223-7BF50-0XB0

Technical specifications

Article number	6ES7223-7AF50-0XB0	6ES7223-7BF50-0XB0
	SB 1223 Signal Board, 4DI/4DQ 5V 200kHz	SB 1223 Signal Board, 4DI/4DQ 24V 100kHz
General information		
Product type designation	SB 1223, DI 4x 5 V DC/DQ 4x 5 V DC 200 kHz	SB 1223, DI 4x 24 V DC/DQ 4x 24 V DC 100 kHz
Supply voltage		
Rated value (DC)	5 V	24 V
Input current		
from backplane bus 5 V DC, typ.	60 mA	48 mA
Digital inputs		
• from load voltage L+ (without load), max.	15 mA; per channel	6 mA; per channel
Digital outputs		
• from load voltage L+, max.	12 mA	15 mA
Digital inputs		
Number of digital inputs	4; Current-sourcing	4; sink / source
• in groups of	4	4
Input characteristic curve in accordance with IEC 61131, type 1		Yes
Number of simultaneously controllable inputs		
all mounting positions		
- up to 40 °C, max.	4	4
Input voltage		
• Rated value (DC)	5 V	24 V
• for signal "0"	(L+ minus 1.0 V DC) ... L+ (2.2 ... 0 mA)	5 V DC or 0.5 mA
• for signal "1"	0 V ... (L+ minus 2.0 V DC) (20 ... 5.1 mA)	15 V DC at 2.5 mA
Input current		
• for signal "0", max. (permissible quiescent current)	2.2 mA	0.5 mA
• for signal "1", min.	5.1 mA	3.3 mA
• for signal "1", typ.	15 mA	6 mA
Input delay (for rated value of input voltage)		
for standard inputs		
- parameterizable	Yes; 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 μs; 0.05 / 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 ms	Yes; 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 μs; 0.05 / 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 ms
for interrupt inputs		
- parameterizable	Yes	Yes
for technological functions		
- parameterizable	Yes	Yes

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Digital modules

SB 1223 digital input/output modules

Technical specifications

Article number	6ES7223-7AF50-0XB0 SB 1223 Signal Board, 4DI/4DQ 5V 200kHz	6ES7223-7BF50-0XB0 SB 1223 Signal Board, 4DI/4DQ 24V 100kHz
Digital outputs		
Number of digital outputs	4	4
• in groups of	4	4
Short-circuit protection	No	Yes
Switching capacity of the outputs		
• with resistive load, max.	0.1 A	0.1 A
Output voltage		
• Rated value (DC)	5 V	24 V
• for signal "0", max.	0.2 V	1 V
• for signal "1", min.	L+ (-0.7 V)	L+ (-1.5 V)
Output current		
• for signal "1" rated value	0.1 A	0.1 A
Output delay with resistive load		
• "0" to "1", max.	500 ns	1.8 µs
• "1" to "0", max.	500 ns	1.8 µs
Total current of the outputs (per group)		
horizontal installation		
- up to 50 °C, max.	0.2 A	0.2 A
Interrupts/diagnostics/status information		
Diagnostics function	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnoses		
• Monitoring the supply voltage	Yes	Yes
Diagnostics indication LED		
• DIAG LED	Yes	Yes
• for status of the inputs	Yes	Yes
• for status of the outputs	Yes	Yes
Potential separation		
Potential separation digital inputs		
• between the channels	No	No
• between the channels, in groups of	4	4
• Number of potential groups	1	1
• between the channels and backplane bus	Yes; 707 V DC (type test)	Yes; 707 V DC (type test)
Potential separation digital outputs		
• between the channels	No	No
• between the channels, in groups of	4	4
• Number of potential groups	1	1
• between the channels and backplane bus	Yes; 707 V DC (type test)	Yes; 707 V DC (type test)
Degree and class of protection		
IP degree of protection		IP20
Standards, approvals, certificates		
CE mark	Yes	Yes
CSA approval	No	No
UL approval	Yes	Yes
cULus	Yes	Yes
FM approval	No	No
RCM (formerly C-TICK)	Yes	Yes
KC approval	No	No
Marine approval	No	No

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Digital modules

SB 1223 digital input/output modules**Technical specifications**

Article number	6ES7223-7AF50-0XB0	6ES7223-7BF50-0XB0
	SB 1223 Signal Board, 4DI/4DQ 5V 200kHz	SB 1223 Signal Board, 4DI/4DQ 24V 100kHz
Ambient conditions		
Ambient temperature during operation		
• min.	-20 °C	-20 °C
• max.	40 °C; at max. voltages and max. specifications	40 °C; at max. voltages and max. specifications
Mechanics/material		
Enclosure material (front)		
• Plastic	Yes	Yes
Dimensions		
Width	15 mm	15 mm
Height	62 mm	62 mm
Depth	63 mm	63 mm
Weights		
Weight, approx.	28 g	28 g

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Analog modules

SM 1231 analog input modules

Overview



- Analog inputs for SIMATIC S7-1200
- Extremely short conversion times
- For the connection of analog sensors without additional amplifiers

Ordering data

Article No.

SM 1231 analog input signal module

SIMATIC S7-1200 G2, SM 1231 analog input module, 8 AI

Inputs: 8 x AI 14 bit ADC
(+/-10 V, +/-5 V, +/-2.5 V or
0-20 mA/4-20 mA)

6ES7231-4HF50-0XB0

Technical specifications

Article number	6ES7231-4HF50-0XB0 SM 1231 Analog Input, 8AI
General information	
Product type designation	SM 1231, AI 8x 14 bit
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	45 mA
from backplane bus 5 V DC, typ.	75 mA
Analog inputs	
Number of analog inputs	8; Current or voltage differential inputs
permissible input voltage for voltage input (destruction limit), max.	35 V
permissible input current for current input (destruction limit), max.	40 mA
Cycle time (all channels) max.	1.25 ms; at 400 Hz rejection
Input ranges	
• Voltage	Yes; ±10V, ±5V, ±2.5V
• Current	Yes; 4 to 20 mA, 0 to 20 mA
• Thermocouple	No
• Resistance thermometer	No
• Resistance	No
Input ranges (rated values), voltages	
• -10 V to +10 V	Yes
• -2.5 V to +2.5 V	Yes
• -5 V to +5 V	Yes
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes

Article number	6ES7231-4HF50-0XB0 SM 1231 Analog Input, 8AI
Cable length	
• shielded, max.	100 m; shielded, twisted pair
Analog value generation for the inputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	13 bit; + sign
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 Hz
Smoothing of measured values	
• parameterizable	Yes
Errors/accuracies	
Temperature error (relative to input range), (+/-)	25 °C ±0.1 % / -20 °C to 60 °C ±0.2 % of the full-scale deflection
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.1 %
• Current, relative to input range, (+/-)	0.1 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency	
• Common mode voltage, max.	12 V
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
Diagnostics indication LED	
• DIAG LED	Yes
• for status of the inputs	Yes
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
CSA approval	No
UL approval	Yes
cULus	Yes
FM approval	No
RCM (formerly C-TICK)	Yes
KC approval	No
Marine approval	No
Ambient conditions	
Ambient temperature during operation	
• min.	-20 °C
• max.	40 °C; at max. voltages and max. specifications
connection method	
required front connector	No
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
Dimensions	
Width	30 mm
Height	125 mm
Depth	100 mm
Weights	
Weight, approx.	175 g

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Analog modules

SB 1231 analog input modules

Overview



- Analog input for SIMATIC S7-1200 G2
- Extremely short conversion times
- For the connection of analog sensors without additional amplifiers
- For solving even more complex automation tasks
- Can be plugged directly into the CPU

Ordering data

Article No.

**SIMATIC S7-1200 G2,
SB 1231 analog input module, 4 AI**

6ES7231-4HD50-0XB0

Inputs: 4 x AI 14 bit ADC
(+/-10 V, +/-5 V, +/-2.5 V or
0-20 mA/4-20 mA)

Technical specifications

Article number	6ES7231-4HD50-0XB0 SB 1231 Signal Board, 4AI
General information	
Product type designation	SB 1231, AI 4x 14 bit
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	30 mA
from backplane bus 5 V DC, typ.	28 mA
Analog inputs	
Number of analog inputs	4; Current or voltage differential inputs
permissible input voltage for voltage input (destruction limit), max.	35 V
permissible input current for current input (destruction limit), max.	40 mA
Cycle time (all channels) max.	0.625 ms; at 400 Hz rejection
Input ranges	
• Voltage	Yes; ±10V, ±5V, ±2.5V
• Current	Yes; 4 to 20 mA, 0 to 20 mA
• Thermocouple	No
• Resistance thermometer	No
• Resistance	No
Input ranges (rated values), voltages	
• -10 V to +10 V	Yes
• -2.5 V to +2.5 V	Yes
• -5 V to +5 V	Yes

Article number	6ES7231-4HD50-0XB0 SB 1231 Signal Board, 4AI
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes
Cable length	
• shielded, max.	100 m; shielded, twisted pair
Analog value generation for the inputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	13 bit; + sign
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 Hz
Smoothing of measured values	
• parameterizable	Yes
Errors/accuracies	
Temperature error (relative to input range), (+/-)	25 °C ±0.1 % / -20 °C to 60 °C ±0.2 % of the full-scale deflection
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.1 %
• Current, relative to input range, (+/-)	0.1 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency	
• Common mode voltage, max.	12 V
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
Diagnostics indication LED	
• DIAG LED	Yes
• for status of the inputs	Yes
Standards, approvals, certificates	
CE mark	Yes
CSA approval	No
UL approval	Yes
cULus	Yes
FM approval	No
RCM (formerly C-TICK)	Yes
KC approval	No
Marine approval	No
Ambient conditions	
Ambient temperature during operation	
• min.	-20 °C
• max.	40 °C; at max. voltages and max. specifications
connection method	
required front connector	No
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
Dimensions	
Width	15 mm
Height	62 mm
Depth	63 mm
Weights	
Weight, approx.	30 g

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Analog modules

SM 1232 analog output modules

Overview



- Analog outputs for SIMATIC S7-1200
- Extremely short conversion times
- For connecting analog actuators without additional amplifiers
- For solving even more complex automation tasks

Ordering data

Article No.

**SIMATIC S7-1200 G2,
SM 1232 analog output module,
8 AO**

6ES7232-4HF50-0XB0

Outputs: 8 x AQ 14 bit DAC
(+/-10 V, 0-20 mA or 4-20 mA)

Technical specifications

Article number	6ES7232-4HF50-0XB0 SM 1232 Analog Output, 8AQ
General information	
Product type designation	SM 1232, AQ 8x 14 bit
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	45 mA
from backplane bus 5 V DC, typ.	90 mA
Analog outputs	
Number of analog outputs	8; Current or voltage
Output ranges, voltage	
• -10 V to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	1 000 Ω
• with current outputs, max.	600 Ω
Cable length	
• shielded, max.	100 m; shielded, twisted pair

Article number	6ES7232-4HF50-0XB0 SM 1232 Analog Output, 8AQ
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	14 bit; Voltage: 14 bit; Current : 13 bit
Errors/accuracies	
Temperature error (relative to output range), (+/-)	25 °C ±0.3 % / -20 °C to 60 °C ±0.6 % of the full-scale deflection
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to output range, (+/-)	0.3 %
• Current, relative to output range, (+/-)	0.3 %
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• DIAG LED	Yes
• for status of the outputs	Yes
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
CSA approval	No
UL approval	Yes
cULus	Yes
FM approval	No
RCM (formerly C-TICK)	Yes
KC approval	No
Marine approval	No
Ambient conditions	
Ambient temperature during operation	
• min.	-20 °C
• max.	40 °C; at max. voltages and max. specifications
connection method	
required front connector	No
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
Dimensions	
Width	30 mm
Height	125 mm
Depth	100 mm
Weights	
Weight, approx.	173 g

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Analog modules

SB 1232 analog output modules

Overview



- Analog outputs for SIMATIC S7-1200
- Can be plugged directly into the CPU

Ordering data

Article No.

**SIMATIC S7-1200 G2,
SB 1232 analog output module,
4 AO**

6ES7232-4HD50-0XB0

Outputs: 4 x AQ 14 bit DAC
(+/-10 V, 0-20 mA or 4-20 mA)

Technical specifications

Article number	6ES7232-4HD50-0XB0 SB 1232 Signal Board , 4AQ
General information	
Product type designation	SB 1232, AQ 4x 14 bit
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	30 mA
from backplane bus 5 V DC, typ.	25 mA
Analog outputs	
Number of analog outputs	4; Current or voltage
Output ranges, voltage	
• -10 V to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	1 000 Ω
• with current outputs, max.	600 Ω
Cable length	
• shielded, max.	100 m; shielded, twisted pair

Article number	6ES7232-4HD50-0XB0 SB 1232 Signal Board , 4AQ
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	14 bit; Voltage: 14 bit; Current : 13 bit
Errors/accuracies	
Temperature error (relative to output range), (+/-)	25 °C ±0.3 % / -20 °C to 60 °C ±0.6 % of the full-scale deflection
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to output range, (+/-)	0.3 %
• Current, relative to output range, (+/-)	0.3 %
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• DIAG LED	Yes
• for status of the outputs	Yes
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
CSA approval	No
UL approval	Yes
cULus	Yes
FM approval	No
RCM (formerly C-TICK)	Yes
KC approval	No
Marine approval	No
Ambient conditions	
Ambient temperature during operation	
• min.	-20 °C
• max.	40 °C; at max. voltages and max. specifications
connection method	
required front connector	No
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
Dimensions	
Width	15 mm
Height	62 mm
Depth	63 mm
Weights	
Weight, approx.	28 g

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Analog modules

SM 1233 analog input/output modules

Overview



- Analog inputs and outputs for the SIMATIC S7-1200
- Extremely short conversion times
- For connecting analog actuators and sensors without additional amplifiers
- For solving even more complex automation tasks

Ordering data

**SIMATIC S7-1200 G2,
SM 1233 analog I/O module,
4 AI/4 AO**

Inputs: 4 x AI 14 bit ADC (+/-10 V,
+/-5 V, +/-2.5 V or 0-20 mA/4-20 mA);
Outputs: 4 x AQ 14 bit DAC
(+/-10 V, 0-20 mA or 4-20 mA)

Article No.

6ES7233-4HF50-0XB0

Technical specifications

Article number	6ES7233-4HF50-0XB0 SM 1233 Analog I/O, 4AI/4AQ
General information	
Product type designation	SM 1233, AI 4x 14 bit/AQ 4x 14 bit
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	40 mA
from backplane bus 5 V DC, typ.	80 mA
Analog inputs	
Number of analog inputs	4; Current or voltage differential inputs
permissible input voltage for voltage input (destruction limit), max.	35 V
permissible input current for current input (destruction limit), max.	40 mA
Cycle time (all channels) max.	0.625 ms; at 400 Hz rejection
Input ranges	
• Voltage	Yes; ±10V, ±5V, ±2.5V
• Current	Yes; 4 to 20 mA, 0 to 20 mA
Input ranges (rated values), voltages	
• -10 V to +10 V	Yes
• -2.5 V to +2.5 V	Yes
• -5 V to +5 V	Yes
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes

Article number	6ES7233-4HF50-0XB0 SM 1233 Analog I/O, 4AI/4AQ
Cable length	
• shielded, max.	100 m; shielded, twisted pair
Analog outputs	
Number of analog outputs	4; Current or voltage
Output ranges, voltage	
• -10 V to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	1 000 Ω
• with current outputs, max.	600 Ω
Cable length	
• shielded, max.	100 m; shielded, twisted pair
Analog value generation for the inputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	13 bit; + sign
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 Hz
Smoothing of measured values	
• parameterizable	Yes
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	14 bit; Voltage: 14 bit; Current : 13 bit
Errors/accuracies	
Temperature error (relative to input range), (+/-)	25 °C ±0.1 % / -20 °C to 60 °C ±0.2 % of the full-scale deflection
Temperature error (relative to output range), (+/-)	25 °C ±0.3 % / -20 °C to 60 °C ±0.6 % of the full-scale deflection
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.1 %
• Current, relative to input range, (+/-)	0.1 %
• Voltage, relative to output range, (+/-)	0.3 %
• Current, relative to output range, (+/-)	0.3 %
Interference voltage suppression for $f = n \times (f1 \pm 1 \%)$, f1 = interference frequency	
• Common mode voltage, max.	2 V
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• DIAG LED	Yes
• for status of the inputs	Yes
• for status of the outputs	Yes

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Analog modules

SM 1233 analog input/output modules**Technical specifications**

Article number	6ES7233-4HF50-0XB0 SM 1233 Analog I/O, 4AI/4AQ
Potential separation	
Potential separation analog inputs	
• between the channels and the power supply of the electronics	No
Potential separation analog outputs	
• between the channels and the power supply of the electronics	No
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
CSA approval	No
UL approval	Yes
cULus	Yes
FM approval	No
RCM (formerly C-TICK)	Yes
KC approval	No
Marine approval	No

Article number	6ES7233-4HF50-0XB0 SM 1233 Analog I/O, 4AI/4AQ
Ambient conditions	
Ambient temperature during operation	
• min.	-20 °C
• max.	40 °C; at max. voltages and max. specifications
connection method	
required front connector	No
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
Dimensions	
Width	30 mm
Height	125 mm
Depth	100 mm
Weights	
Weight, approx.	174 g

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Analog modules

SB 1233 analog input/output modules

Overview



- Analog inputs and outputs for the SIMATIC S7-1200
- Extremely short conversion times
- For connecting analog actuators and sensors without additional amplifiers
- For solving even more complex automation tasks
- Can be plugged directly into the CPU

Ordering data

Article No.

**SIMATIC S7-1200 G2,
SB 1233 analog I/O module,
2 AI/2 AO**

6ES7233-4HD50-0XB0

Inputs: 2 x AI 14 bit ADC (+/-10 V, +/-5 V, +/-2.5 V or 0-20 mA/4-20 mA),
outputs: 2 x AQ 14 bit DAC
(+/-10 V, 0-20 mA or 4-20 mA)

Technical specifications

Article number	6ES7233-4HD50-0XB0 SB 1233 Analog I/O, 2AI/2AQ
General information	
Product type designation	SB 1233, AI 2x 14 bit/AQ 2x 14 bit
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	25 mA
from backplane bus 5 V DC, typ.	29 mA
Analog inputs	
Number of analog inputs	2; Current or voltage differential inputs
permissible input voltage for voltage input (destruction limit), max.	35 V
permissible input current for current input (destruction limit), max.	40 mA
Cycle time (all channels) max.	0.625 ms; at 400 Hz rejection
Input ranges	
• Voltage	Yes; ±10V, ±5V, ±2.5V
• Current	Yes; 4 to 20 mA, 0 to 20 mA
Input ranges (rated values), voltages	
• -10 V to +10 V	Yes
• -2.5 V to +2.5 V	Yes
• -5 V to +5 V	Yes

Article number	6ES7233-4HD50-0XB0 SB 1233 Analog I/O, 2AI/2AQ
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes
Cable length	
• shielded, max.	100 m; shielded, twisted pair
Analog outputs	
Number of analog outputs	2; Current or voltage
Output ranges, voltage	
• -10 V to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	1 000 Ω
• with current outputs, max.	600 Ω
Cable length	
• shielded, max.	100 m; shielded, twisted pair
Analog value generation for the inputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	13 bit; + sign
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 Hz
Smoothing of measured values	
• parameterizable	Yes
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	14 bit; Voltage: 14 bit; Current : 13 bit
Errors/accuracies	
Temperature error (relative to input range), (+/-)	25 °C ±0.1 % / -20 °C to 60 °C ±0.2 % of the full-scale deflection
Temperature error (relative to output range), (+/-)	25 °C ±0.3 % / -20 °C to 60 °C ±0.6 % of the full-scale deflection
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.1 %
• Current, relative to input range, (+/-)	0.1 %
• Voltage, relative to output range, (+/-)	0.3 %
• Current, relative to output range, (+/-)	0.3 %
Interference voltage suppression for $f = n \times (f1 \pm 1 \%)$, $f1 =$ interference frequency	
• Common mode voltage, max.	2 V
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• DIAG LED	Yes
• for status of the inputs	Yes
• for status of the outputs	Yes

SIMATIC S7-1200 G2 Basic Controllers

I/O modules

Analog modules

SB 1233 analog input/output modules

Technical specifications

Article number	6ES7233-4HD50-0XB0 SB 1233 Analog I/O, 2AI/2AQ
Potential separation	
Potential separation analog inputs	
• between the channels and the power supply of the electronics	No
Potential separation analog outputs	
• between the channels and the power supply of the electronics	No
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
CSA approval	No
UL approval	Yes
cULus	Yes
FM approval	No
RCM (formerly C-TICK)	Yes
KC approval	No
Marine approval	No

Article number	6ES7233-4HD50-0XB0 SB 1233 Analog I/O, 2AI/2AQ
Ambient conditions	
Ambient temperature during operation	
• min.	-20 °C
• max.	40 °C; at max. voltages and max. specifications
connection method	
required front connector	No
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
Dimensions	
Width	15 mm
Height	62 mm
Depth	63 mm
Weights	
Weight, approx.	30 g