

Overview

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

They can be used for safety-oriented 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, TÜV-approved blocks for safety-related functions.

- 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 the standard I/O modules together with the fail-safe I/O modules in the central system
 - Integrated standard PROFINET functionalities for PROFINET controllers and PROFINET iDevice services
 - Connection of distributed standard I/O via field bus such as PROFINET or PROFIBUS
 - 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
- One integrated engineering for both standard and safety from S7-1200 to S7-300/400/1500 and WinAC RTX F:
 - STEP 7 Safety Basic for easy engineering of the CPU 1200 FC
 - STEP 7 Safety Advanced for the entire fail-safe SIMATIC S7 portfolio
- Integrated system diagnosis of the CPUs, for standard and safety:
 - Consistent plain text display of system diagnostic 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 1214 FC	CPU 1215 FC
Variants	DC/DC/DC, DC/DC/relay	DC/DC/DC, DC/DC/relay
Main memory, integrated	100 KB	125 KB
Load memory, integrated	4 MB	4 MB
Memory card	SIMATIC memory card (optional)	SIMATIC memory card (optional)
Standard digital inputs/outputs, integrated	14/10	14/10
Standard analog inputs, integrated	2	2
Standard analog outputs, integrated	-	2
Process image	1024 bytes for inputs, 1024 bytes for outputs	1024 bytes for inputs, 1024 bytes for outputs
Expansion by signal board	Max. 1	Max. 1
Expansion by signal modules	Max. 8	Max. 8
Expansion by communication modules	Max. 3	Max. 3

Technical specifications

Article number	6ES7214-1AF40-0XB0	6ES7214-1HF40-0XB0	6ES7215-1AF40-0XB0	6ES7215-1HF40-0XB0
	CPU 1214 FC, DC/DC/DC, 14DI/10DO/2AI	CPU 1214 FC, DC/DC/RELAY, 14DI/10DO/2AI	CPU 1215 FC, DC/DC/DC, 14DI/10DO/2AI/2AO	CPU 1215 FC, DC/DC/RLY, 14DI/10DO/2AI/2AO
Product type designation				
General information				
Engineering with				
• Programming package	STEP 7 V13 SP1 or higher	STEP 7 V13 SP1 or higher	STEP 7 V13 SP1 or higher	STEP 7 V13 SP1 or higher
Supply voltage				
Rated value (DC)				
• 24 V DC	Yes	Yes	Yes	Yes
Encoder supply				
24 V encoder supply				
• 24 V	L+ minus 4 V DC min.	L+ minus 4 V DC min.	L+ minus 4 V DC min.	L+ minus 4 V DC min.

SIMATIC S7-1200 basic controller

Central processing units

Fail-safe CPUs

CPU 1214 FC, CPU 1215 FC**Technical specifications (continued)**

Article number	6ES7214-1AF40-0XB0 CPU 1214 FC, DC/DC/DC, 14DI/10DO/2AI	6ES7214-1HF40-0XB0 CPU 1214 FC, DC/DC/ RELAY, 14DI/10DO/2AI	6ES7215-1AF40-0XB0 CPU 1215 FC, DC/DC/DC, 14DI/10DO/2AI/2AO	6ES7215-1HF40-0XB0 CPU 1215 FC, DC/DC/ RLY, 14DI/10DO/2AI/2AO
Power losses				
Power loss, typ.	12 W	12 W	12 W	12 W
Memory				
Work memory				
• Integrated	125 kbyte	125 kbyte	150 kbyte	150 kbyte
Load memory				
• Integrated	4 Mbyte	4 Mbyte	4 Mbyte	4 Mbyte
• Plug-in (SIMATIC Memory Card), max.	with SIMATIC memory card	with SIMATIC memory card	with SIMATIC memory card	with SIMATIC memory card
Backup				
• without battery	Yes	Yes	Yes	Yes
CPU processing times				
for bit operations, typ.	0.08 µs; / instruction	0.08 µs; / Operation	0.08 µs; / Operation	0.08 µs; / Operation
for word operations, typ.	1.7 µs; / instruction	1.7 µs; / Operation	1.7 µs; / Operation	1.7 µs; / Operation
for floating point arithmetic, typ.	2.3 µs; / Operation	2.3 µs; / Operation	2.3 µs; / Operation	2.3 µs; / Operation
Address area				
I/O address area				
• Inputs	1 024 byte	1 024 byte	1 024 byte	1 024 byte
• Outputs	1 024 byte	1 024 byte	1 024 byte	1 024 byte
Process image				
• Inputs, adjustable	1 024 byte	1 024 byte	1 024 kbyte	1 024 kbyte
• Outputs, adjustable	1 024 byte	1 024 byte	1 024 kbyte	1 024 kbyte
Time of day				
Clock				
• Hardware clock (real-time clock)	Yes	Yes	Yes	Yes
Digital inputs				
Number of digital inputs	14	14	14	14
• of which, inputs usable for technological functions	6; HSC (High Speed Counting)	6; HSC (High Speed Counting)	6; HSC (High Speed Counting)	6; HSC (High Speed Counting)
Digital outputs				
Number of digital outputs	10	10; Relays	10	10; Relays
• of which high-speed outputs	4; 100 kHz Pulse Train Output		4; 100 kHz Pulse Train Output	
Analog inputs				
Integrated channels (AI)	2; 0 to 10 V	2; 0 to 10 V	2; 0 to 10 V	2; 0 to 10 V
Input ranges				
• Voltage	Yes; 0 to 10 V	Yes; 0 to 10 V	Yes	Yes
Analog outputs				
Integrated channels (AO)			2; 0 to 20 mA	2; 0 to 20 mA
1st interface				
Interface type	PROFINET	PROFINET	PROFINET	PROFINET
Physics	Ethernet	Ethernet	Ethernet, 2-port switch, 2*RJ45	Ethernet, 2-port switch, 2*RJ45
Functionality				
• PROFINET IO Device	Yes	Yes	Yes	Yes
• PROFINET IO Controller	Yes	Yes	Yes	Yes
Communication functions				
S7 communication				
• supported	Yes	Yes	Yes	Yes
Open IE communication				
• TCP/IP	Yes	Yes	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes	Yes
• UDP	Yes	Yes	Yes	Yes
Web server				
• supported	Yes	Yes	Yes	Yes

Technical specifications (continued)

Article number	6ES7214-1AF40-0XB0 CPU 1214 FC, DC/DC/DC, 14DI/10DO/2AI	6ES7214-1HF40-0XB0 CPU 1214 FC, DC/DC/ RELAY, 14DI/10DO/2AI	6ES7215-1AF40-0XB0 CPU 1215 FC, DC/DC/DC, 14DI/10DO/2AI/2AO	6ES7215-1HF40-0XB0 CPU 1215 FC, DC/DC/ RLY, 14DI/10DO/2AI/2AO
Integrated Functions				
Number of counters	6	6	6	6
Counter frequency (counter) max.	100 kHz	100 kHz	100 kHz	100 kHz
Frequency meter	Yes	Yes	Yes	Yes
controlled positioning	Yes	Yes	Yes	Yes
PID controller	Yes	Yes	Yes	Yes
Number of alarm inputs	4	4	4	4
Number of pulse outputs	4	4	4	4
Limit frequency (pulse)	100 kHz		100 kHz	
Ambient conditions				
Ambient temperature in operation				
• Min.	0 °C	0 °C	0 °C	0 °C
• max.	55 °C	55 °C	55 °C	55 °C
Pollutant concentrations				
- SO2 at RH < 60% without condensation	SO2: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free	SO2: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free	SO2: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free	SO2: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free
Configuration				
programming				
Programming language				
- LAD	Yes; incl. failsafe	Yes; incl. failsafe	Yes; incl. failsafe	Yes; incl. failsafe
- FBD	Yes; incl. failsafe	Yes; incl. failsafe	Yes; incl. failsafe	Yes; incl. failsafe
- SCL	Yes	Yes	Yes	Yes
Dimensions				
Width	110 mm	110 mm	130 mm	130 mm
Height	100 mm	100 mm	100 mm	100 mm
Depth	75 mm	75 mm	75 mm	75 mm
Weights				
Weight, approx.	415 g	435 g	520 g	530 g

Ordering data

Article No.

Article No.

CPU 1214 FC

**Fail-safe compact CPU,
DC/DC/DC;**
integrated program/data memory
125 KB, load memory 4 MB;
power supply 24 V DC;
Boolean execution times
0.085 µs per operation;
14 digital inputs,
10 digital outputs,
2 analog inputs;
expandable by up to
3 communication modules,
8 signal modules, and 1 signal
board/communication board;
digital inputs can be used
as HSC at 100 kHz,
24 V DC digital outputs can be
used as pulse outputs (PTO) or
pulse-width modulated outputs
(PWM) at 100 kHz

6ES7214-1AF40-0XB0

**Fail-safe compact CPU,
DC/DC/relay;**

integrated program/data memory
125 KB, load memory 4 MB;
power supply 24 V DC;
Boolean execution times
0.085 µs per operation;
14 digital inputs,
10 digital outputs (relays),
2 analog inputs;
expandable by up to
3 communication modules,
8 signal modules, and 1 signal
board/communication board;
digital inputs can be used
as HSC at 100 kHz

6ES7214-1HF40-0XB0

SIMATIC S7-1200 basic controller

Central processing units

Fail-safe CPUs

CPU 1214 FC, CPU 1215 FC**Ordering data****Article No.****CPU 1215 FC**

Fail-safe compact CPU, DC/DC/DC;
integrated program/data memory 150 KB, load memory 4 MB; power supply 24 V DC; Boolean execution times 0.085 µs per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs; 2 analog outputs; expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz

6ES7215-1AF40-0XB0

Fail-safe compact CPU, DC/DC/relay;
integrated program/data memory 150 KB, load memory 4 MB; power supply 24 V DC; Boolean execution times 0.085 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; 2 analog outputs; expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz

6ES7215-1HF40-0XB0**Accessories****Digital input simulator Simulator Module SIM 1274 (optional)**

14 input switches, for CPU 1214C / CPU 1215C

6ES7274-1XH30-0XA0**Analog input simulator Simulator Module SIM 1274 (optional)**

2 potentiometers

6ES7274-1XA30-0XA0**SIMATIC memory card (optional)**

4 MB

6ES7954-8LC02-0AA0

12 MB

6ES7954-8LE02-0AA0

24 MB

6ES7954-8LF02-0AA0

256 MB

6ES7954-8LL02-0AA0

2 GB

6ES7954-8LP01-0AA0**Extension cable for two-tier configuration**

for connecting digital/analog signal modules; length 2 m

6ES7290-6AA30-0XA0**Article No.****Terminal block (spare part)**

for CPU 1214 FC, CPU 1215 FC

- For DI, with 20 screws, tin-plated; 4 units
- For DO, with 12 screws, tin-plated; 4 units

6ES7292-1AV30-0XA0**6ES7292-1AM30-0XA0**

for CPU 1214 FC

- For AI, with 3 screws, tin-plated; 4 units

6ES7292-1BC30-0XA0

for CPU 1215 FC

- For analog units, with 6 screws, gold-plated; 4 units

6ES7292-1BF30-0XB0**Front flap set (spare part)**

for CPU 1214 FC

6ES7291-1AB30-0XA0

for CPU 1215 FC

6ES7291-1AC30-0XA0**RJ45 cable grip**

4 items per pack

Single port

6ES7290-3AA30-0XA0

Dual port

6ES7290-3AB30-0XA0**STEP 7 Safety Basic V13 SP1****Task:**

Engineering tool for configuring fail-safe user programs for SIMATIC S7-1200 FC

Requirement:

STEP 7 Basic V13 SP1 and higher

Floating license for 1 user, software and documentation on DVD, license key on USB stick

6ES7833-1FB13-0YA5Floating license for 1 user, software, documentation and license key for download¹⁾; email address required for delivery**6ES7833-1FB13-0YH5****STEP 7 Safety Advanced V13 SP1****Task:**

Engineering tool for configuring fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller, ET 200SP, ET 200S, ET 200M, ET 200ISP, ET 200pro, ET 200eco

Requirement:

STEP 7 Professional V13 SP1

Floating license for 1 user, software and documentation on DVD, license key on USB stick

6ES7833-1FA13-0YA5Floating license for 1 user, software, documentation and license key for download¹⁾; email address required for delivery**6ES7833-1FA13-0YH5**

¹⁾ For up-to-date information and download availability, see: <http://www.siemens.com/tia-online-software-delivery>